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# EXAMINING CAREER AND TECHNICAL EDUCATION PRACTITIONER PREPARATION AND PROFESSIONAL DEVELOPMENT NEEDS

SHANE WILSON LANGE

111 Pages

This quantitative study was used to investigate Illinois automotive educator professional development needs and to identify the demographic landscape of Illinois secondary and post-secondary automotive teachers. The study should bring a greater understanding of what automotive teachers feel they need to learn in order to continue as successful educators. A modified Borich (1980) needs assessment model was used to identify the perceived importance and ability levels for 32 professional competencies. Mean Weighted Discrepancy Scores (MWDS) were calculated using the importance and ability scores in order to report the professional development need. The administered survey was also utilized to examine their level of education, level of teacher preparation, the length of automotive teaching experience, age, and type of school in which they served. An effort was made to discover any unique professional development needs based on these listed demographic categories. Understanding what automotive teachers in Illinois are struggling with will go a long way in working to establish support systems for the teachers.

KEYWORDS: Automotive; Automotive Teacher; Alternative Preparation; Borich Needs Assessment; CTE; Career and Technical Education; Illinois; Mean Weighted Discrepancy Score; MWDS; Professional Development; Needs Assessment; Traditional Preparation

# EXAMINING CAREER AND TECHNICAL EDUCATION PRACTITIONER PREPARATION AND PROFESSIONAL DEVELOPMENT NEEDS

SHANE WILSON LANGE

A Dissertation Submitted in Partial
Fulfillment of the Requirements
for the Degree of

DOCTOR OF EDUCATION

School of Teaching and Learning

ILLINOIS STATE UNIVERSITY

2020

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# EXAMINING CAREER AND TECHNICAL EDUCATION PRACTITIONER PREPARATION AND PROFESSIONAL DEVELOPMENT NEEDS

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There are many experiences that have led me to this place, but first I want to recognize that I am grateful for the abilities that were given to me by my creator without merit. No matter which way I tried to run, I was always led back to the place where I could have the greatest impact.

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I thank my friend, that I also call my wife, Lisa for always believing in me and giving me the little nudges along the way to push me to the finish line. Her passion for education and learners has been an inspiration to me all along.

To my committee: You have each played a significant role in getting me to this point. I hope you remember that I am a first-generation college graduate. The odds have been against me persisting education. I was alternatively prepared via an applied undergraduate degree, time in industry, and a fifth-year program. All your research suggests that I could have easily been a statistic to attrition, but your passion and knowledge supported me. Your ideas and compassion led me to this point. I thank each of you, Dr. Steven Mertens, Dr. Nancy Latham, and Dr. Deborah MacPhee.

S.W.L.

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# CHAPTER I: INTRODUCTION

Career and technical education (CTE) is one of the traditional means of preparing people for careers which require specialized skillsets. CTE has been evolving in the United States since the days of apprenticeship in the 1700's (Association for Career and Technical Education, 2006). CTE offers real-world experiences, rigorous curriculum, and relevant content. According to superintendents in Illinois, only 43% of Illinois industrial teachers hired in 2017 were considered qualified, and 13% of districts admitted to cancelling classes or programs due to staffing issues. (Illinois Association of Regional Superintendents of Schools, 2017). Currently, there is a critical shortage of CTE participants in the automotive program of study, and it is becoming increasingly difficult for businesses to find automotive technicians (Unrau, 2017). This shortage extends to the hiring of automotive instructors.

The majority of newly hired industrial instructors require professional support to be successful. Despite the immense research covering the professional development needs of educators, there is little research concerning what professional development could benefit CTE educators and even less about automotive technology teachers. An ERIC search using the search parameter *automotive technology* only yields 159 articles. If you limit the same search to *peer reviewed* the same search only yields 23 articles. Making the concession to use all CTE related fields in the search allows the use of many other references, but few illuminate the professional development needs of CTE educators. Two commonly cited CTE authors suggested that an emphasis should be placed on providing effective professional development for these instructors (Ruhland & Bremer 2002). Much of the research pertaining to general education suggested that the quality of teacher preparation directly influences job satisfaction and persistence in teaching. Jorissen (2002) suggested that the level of preparation and the quality of the preparation program

influences job satisfaction, and job satisfaction contributes to the decision to persist in teaching. Darling-Hammond (2003) indicated that the length of time that teachers stay in the field increases as their level of preparation increases. Henke , Chen, and Geis (2000) reported that 29% of teachers that did not complete a student teaching experience and 49% of uncertified teachers leave the profession within the first five years. Darling-Hammond (2003) found that in California, 40% of teachers with emergency permits left after the first year. Fowler (2002) revealed that around half of the teachers in their institute for new teachers left within three years. Research has shown that alternatively prepared teachers are more likely to leave the field than those that were traditionally prepared (Darling-Hammond 2000).

## Study Purpose

There has been little published research on whether similar outcomes occur with career and technical education and even less pertaining to automotive instructors. A lack of understanding of pedagogical best practices among CTE educators, specifically automotive instructors, may contribute to these recruiting and retention issues. Research pertaining to the developmental needs of these educators could begin the process of creating pedagogical support with the goal of reducing these pressures.

A quantitative study investigating automotive technology educator preparation and the perceptions of their professional development helps bring a greater understanding of what automotive educators feel they need to learn in order to be more successful. A quantitative approach was used to identify the distribution of educational backgrounds among Illinois automotive teachers. The survey instrument used for this discovery process was also utilized to examine the length of automotive teaching experience, and level of educational preparation.

Understanding what automotive teachers in Illinois are struggling with will go a long way for working to establish support systems for the teachers that are already working.

## Conceptual Framework

According to Rojewski (2002), there are four main things that a conceptual framework should address. He stated that it should:

> Establish the parameters of a profession by delineating its mission and current practices, (b) account for historical events to allow understanding of how we got to where we are, (c) establish the philosophical underpinnings of the field and underscore the relationships between philosophy and practice, and (d) provide a forum for understanding needed or actual directions of the field. (p. 8)

Lewis (1998) argued that two major influences should be considered when developing or identifying a conceptual framework for vocational education: (a) workforce readiness influenced by the global economy, and (b) the ever changing skills, work, and jobs shaped by the development of new technologies. The federal government has had a primary role in the development of vocational education because of the importance of position in the global economy. The most recent influence occurred in 2019 with the passing of the Strengthening of Career and Technical Education for the 21st Century Act (Perkins V). Funding seems to make the greatest impact on the mission and current practices of CTE. Perkins V is the latest reauthorization of the Federal funding campaign for CTE. Perkin's V describes CTE as organized educational activities that:

(a) offer a sequence of courses that-

(1) provides individuals with rigorous academic content and relevant technical knowledge and skills needed to prepare for further education and careers

in current or emerging professions, which may include high-skill, high wage, or in-demand industry sectors or occupations, which shall be, at the secondary level, aligned with challenging State academic standards adopted by a State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965;

(2) provides technical skill proficiency or a recognized post-secondary credential, which may include an industry recognized credential, a certificate, or an associate degree;

(3) may include prerequisite courses (other than remedial course) that meet the requirements of this subparagraph;

(b) include competency-based, work-based, or other applied learning that supports the development of academic knowledge, higher order reasoning and problem-solving skills, work attitudes, employability skills, technical skills, and occupation-specific skills, knowledge of all aspects of an industry, including entrepreneurship of an individual;

(c) to the extent practicable, coordinate between secondary and post-secondary education programs through programs of study, which may include coordination through articulation agreements, early college high school programs, dual or concurrent enrollment program opportunities, or other transfer agreements that provide post-secondary credit or advanced standing; and

(d) may include career exploration at the high school level or as early as middle grades (as such term is defined in section 8101 of the Elementary and Secondary Education Act of 1965) (Hyslop, 2018, p. 17).

Understanding the historical perspectives of career vocational education (CTE) is important when trying to understand the relationship between schooling and work. Examining what worked and what did not is essential when looking to develop practical alternatives for career and technical education (Kincheloe, 1999). Federal legislation impacted the direction of CTE beginning with the Smith-Hughes Act of 1917 (Rojewski, 2002). Throughout history there have been changes in CTE both in scope and purpose. The main goal of the Smith-Hughes Act was to develop skilled labor that was brought on because of the changes in the economy as a result the Industrial revolution. Other acts of Federal influence include the Vocational Education Act of 1963 and the Carl D. Perkins legislation and all of its reauthorizations. Along with the purpose of developing a pool of skilled workers, the Vocational Education Act and the Perkins legislations attempted to promote social equity in vocational education (Rojewski, 2002). The mandates, however, created division between traditional academic education and vocational education. A perception that vocational education was for students that could not achieve success in traditional academic courses was created (Hayward & Benson, 1993).

The philosophical foundations of career and technical education rest within two different camps. Prosser's ideas of social efficiency suggested that vocational education should be used to train an efficient workforce that could be used to contribute to the economy. Prosser stated, "Vocational training will be effective in proportion as the specific training experiences for forming right habits of doing and thinking are repeated

to the point the habits developed are those of the finished skills necessary for gainful employment," (Prosser, 1949, 23). On the other hand, Dewey saw education as a means of establishing personal fulfilment (Rojewski, 2002). From Dewey's perspective, vocational education was to be used by all students to teach them to become problem solvers and seekers of knowledge. Dewey (1916) argued that vocational education should address the "full intellectual and social" aspects of the vocation. "…Above all, it would train power of readaptation to changing conditions so that future workers would not become blindly subject to a fate imposed upon them," (Dewey, 1916, p. 372). Dewey's efforts are acknowledged as a large part of the philosophy recognized as pragmatism. Using pragmatism as a paradigm for research allows for an impartial existence where one can consider the existence of singular or multiple realities while being open to empirical evidence in an effort solve practical issues (Creswell, & Clark, 2007).

## Research Questions

RQ 1. What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation?

RQ 2. What do practicing automotive teachers identify as important professional-related activities to their success as an educator?

RQ 3. How do practicing automotive teachers self-assess their current level of performance in their professional-related activities?

RQ 4. What are the differences in professional development needs for practicing automotive teachers based on the various demographic variables?

Career and technical education is crucial to the economy, and students that participate seem to graduate at a higher rate (Webb, 2012). Nationally, companies struggle to find skilled workers to meet their rate of attrition and growth. The recruitment and retention of CTE educators has become an issue for school districts and colleges. Many of the recruited CTE teachers enter the profession with alternative educator preparation, and there is little peer reviewed research that examines the professional growth needs of these teachers. The attempt of this research was to discover the needs a specific group of CTE teachers in Illinois. The intent was to examine this group as there is a significant gap in all research with a focus on automotive teachers.

## Definitions

*Alternatively prepared* – An educator that has been prepared for teaching through means outside the traditional path which requires coursework in pedagogy and student teaching experiences.

*Automotive technology* – An education program that provides learning opportunities in automotive repair, diagnostics, and maintenance.

*Career and technical education* – Provides students of all ages with the academic and technical skills, knowledge and training necessary to succeed in future careers and to become lifelong learners (Career and Technical Education, 2018).

*STEM career* – Careers that involve subjects in the fields of chemistry, computer and information technology science, engineering, geosciences, life sciences, mathematical sciences, physics and astronomy, social sciences (e.g., anthropology, economics, psychology, and sociology) (National Science Foundation, 2018).

*Traditionally prepared* – A teacher that has completed the traditional coursework in pedagogy and the student teaching experience.

# CHAPTER II: REVIEW OF THE LITERATURE

According to the Manpower Group's 2017 U.S. Talent Shortage Survey, 46% of employers are struggling to find skilled labor to staff open positions, and the number one category for their struggles is the skilled trades. A very important element of our economy is having a talented workforce to participate in it, and career and technical education (CTE) plays an essential role in preparing this workforce. As part of this study, a thorough examination of the current literature regarding the preparation and development of talented and effective educators for CTE was conducted.

CTE, as means of preparing the workforce, has been part of the United State since our foundation in 1776 (ACTE, 2006). It has taken many forms such as trade apprenticeship, vocational education, industrial arts, and now CTE. The fundamental purpose has not changed, and that is to allow students the chance to build a set of skills that includes: critical thinking, hands-on production and development, and analytic problem solving to help them become successful. Currently, CTE encompasses 16 career clusters which include: hospitality and tourism, information technology, marketing sales and service, business management, manufacturing, government and public administration, health sciences, arts A/V technology and communication, architecture, finance, transportation distribution and logistics, human services, agriculture, law public safety and security, training, and science technology engineering and mathematics.

The many career clusters require CTE teachers to be proficient in a given skill and also be effective facilitators. CTE is somewhat unique in the way that programs are staffed because of the unique skill-set required and because of the many influences that have shaped CTE over the years. It is important to examine these influences to fully understand CTE practitioner

preparation and professional development. Dainty and Belcher (2008) suggested that many factors have influenced educators within the CTE domain of education. The factors that have influenced these educators also contributed to the decision-making processes of policy makers, superintendents, and principals when they were deciding who could teach the many students enrolled in CTE courses. Societal issues, such as retirement and a growing group of students entering CTE courses, created a need for educators to fill a growing number of CTE vacancies. Dainty and Belcher (2008) also suggested that other issues, such as the negative perception of CTE, affected the number of students willing to participate in the traditional path of teacher preparation. A decline in the number of CTE preparation programs (DeWitt, 2010) led to a need for creative solutions for recruiting and retaining CTE educators. These creative hiring strategies have led to the recruitment of alternatively prepared instructors. Thus, it was important in this literature review to also examine literature regarding alternative preparation, traditional preparation, and any research comparing the two modes of preparation. An essential part of any staffing effort is being sure that the faculty that is in service remains in service. Attrition poses a threat to the ability to staff CTE teaching roles. The attrition of CTE instructors may be influenced by the strategies that are used to support the professional development of this population of educators. The diverse educational backgrounds and varied experiences of these educators makes it difficult to identify effective professional development strategies for educator growth and retention.

Aragon (2018) described an immediate need for teachers to fill many openings in various content areas, including CTE areas, in the United States. There are a number of contributing factors for the current shortage of educators including: a significant number of teachers retiring, teachers leaving the education profession, and a growing number of school-age students (Garcia

& Huseman 2009). Teacher preparation programs continue to produce teachers in our public schools, but as Ingersoll (2001) explained, teacher turnover makes it difficult to produce enough teachers to fill all of the open positions due to attrition. According to Drage (2010), teacher turnover is costly, and it directly affects the education of the students involved. CTE is an area of education that has suffered from an eroding number of students over the years, but in recent history programs have experienced a growth in the number of students that are participating (Fletcher & Gordan, 2017). Teacher shortages, in CTE programs, are being experienced by many states. Some of the contributing factors of the shortages include the recruitment of qualified teachers, the retention of teachers that are hired, and increasing enrollment (Kerna 2012). This literature review, attempted to examine the literature around CTE practitioner preparation and professional development. The review also includes an examination of the foundations and history of vocational education to begin to understand societal perceptions of CTE which may affect traditional teacher preparation participation. The research incorporated within this literature review includes: the history of CTE, CTE teacher shortages, CTE teacher attrition, perceptions of CTE, methods of CTE teacher preparation, Illinois CTE teacher requirements teaching, CTE teacher self-efficacy, CTE teacher effectiveness, and CTE faculty professional development.

## History of Career and Technical Education

Understanding the history of career and technical education (CTE) should be the first step anytime that conceptual frameworks or pedagogical reforms are being examined. As Kincheloe (1999) noted:

> Without historical insight, vocational educational policymakers fail to gain insights into the relationship between schooling and work that the past may provide. As a result,

> vocational educational leaders may devote great energy to reinventing a pedagogy incapable of addressing the demands of democracy and the needs of an evolving economy....Historical consciousness can help vocational educators recognize the inherent problems in particular assumptions or particular ways of operating and facilitate the development of pragmatic alternatives. (p. 93)

The history of CTE and vocational education reveals a practice that began as a method of apprenticeship designed to develop workers for a trade before people entered the workforce (Lynch, 2006).

There were three main pieces of legislation that have influenced the frameworks for career and technical education: (a) the Smith-Hughes Act of 1917, (b) the Vocational Act of 1963, and (c) the Carl D. Perkin's Act. All three have influenced technical education because a major function of the reforms was to provide funding to schools for career and technical education. Funding has a major influence on what is offered because of accountability measures built into each piece of legislation.

**Smith-Hughes Act of 1917**

The expansion of apprentice programs led to school reforms such as the Smith-Hughes National Vocational Act of 1917 (Gordon, Daggett, McCaslin, Parks, & Castro, 2002). According to Hayward and Benson (1993), the role of the Smith-Hughes Act of 1917 was to provide federal funding for vocational education in public schools, but the act also put restrictions on the students that participated in vocational education. Students that participated in one vocational course, were restricted to a maximum of 50% of academic instruction. Meaning that students could not participate in more than 50% general education curriculum if they were participating in any type of vocational

education. The authors argued that these restrictions subjected students to job-related tasks while curtailing most of their engagement in theoretical content. Rojewski (2002) argued that the two most influential forces that have inspired CTE are the federal government and the philosophies regarding the nature of vocational education. He believed that since the inception of the Smith Hughes Act of 1917, the federal government has been the primary driver for the direction and scope of CTE. Although the Federal government provides funding through federal mandates, the structure of vocational education is highly decentralized. Hayward and Benson (1993) explained that the constitution does not place the burden for educational decision making on the federal government, and because of this there is great inconsistency with regard to decision making regarding vocational education within the thousands of U.S school districts.

**Vocational Education Act of 1963**

The Vocational Education Act of 1963 (U.S. Department of Health, Education, and Welfare, 1965) introduced, a new era of the federal government's involvement in vocational education. With the passage of this mandate, the two explicit goals of vocational education became preparing the workforce for the economic needs of the country and meeting the social needs of the students. This mandate was less concerned with the category of vocation but rather the needs of the population being served. Looking to pass new vocational education legislation, President Kennedy requested that a panel examine the oversights of the Smith-Hughes Act of 1917. The panel was constructed by the Secretary of Health, Welfare, and Education and found that the growing service industries were in need of skilled and semi-skilled labor. According to the panel, the Smith-Hughes Act of 1917 did very little to fund or encourage the training

of such workers. The panel also found that there were 700,000 to 800,000 people between the ages of 16 and 21 that were neither working or in school (U.S. Department of Health, Education, and Welfare, 1965). The findings of this panel informed the new criteria for the Vocational Education Act of 1963.

The objective of the Vocational Education Act of 1963 was to make sure that the influence that the federal government was having on vocational education was comprehensive in all vocations covered under the Act. The distinguishing characteristic for defining vocational education from theoretical education is that persons generally described as professionals were excluded from vocational education. This left the large group of students looking to learn a skill without earning a bachelor degree. (U.S. Department of Health, Education, and Welfare, 1965).

**Carl D. Perkins Act**

The Carl D. Perkins Act of 1984 expanded the focus of the federal government to include inclusion of services for students with special needs. The mandate also funded the modernization and enhancement of programs. The mandate prioritized vocational education allocations in the following ways: 57% for special populations and 43% for program enhancement. Special populations specified included single parents, non-traditional students by gender, and criminal offenders (Imperatore & Hyslop, 2017).

During the 1990s, the division between vocational education and general education began to come into focus. The history of isolation began to break down in order to help prepare students for the modernization happening in society (Gordon, 2007). The 1990 reauthorization of the Carl D. Perkins Act added Applied Technology to the title. This reauthorization required the integration of academics, expected articulation

between all levels of education, and stimulated relationships with industry. The Act also spelled out funding opportunities for secondary and postsecondary institutions to create pathways for students to start training in high school and continue into college (Lynch, 2000). In 1998 the reauthorization of the Perkins Act realigned Perkin's funding appropriations by giving 85% to local agencies and 15% to the states. The state portion included a reserve for creating equity for the rural districts (Gordon, 2008).

The Perkins Act was reauthorized in 2006, but remained similar to the 1998 reauthorization with the exception of accountability. The new Act encouraged bridging the gap between academic coursework and technical content, the collaboration between secondary and postsecondary institutions, and required that the curriculum be "rigorous and coherent" (Association for Career & Technical Education, 2006).

Historically federal funding has driven the direction of technical programs. Even though the funding strategy overwhelmingly favored local agencies, the federal government held them accountable for how the funding was being used. Further division between academic and technical education created with the Smith Hughes Act was so apparent that legislators felt that it was necessary to mandate collaboration activities.

## Issues in Career and Technical Education

Several themes emerged during the review of literature about the issues facing CTE. Teacher shortages in CTE areas as well as teacher recruitment and retention issues were found in the literature. Negative perceptions of CTE was documented, which can be partially attributed to the process of federal CTE funding. The shortage of teachers has prompted the creation of alternative modes of certification for CTE teachers without consistent frameworks for success.

## CTE Teacher Shortage

Data from the reviewed literature revealed a heightened demand for CTE teachers nationally (Gray & Walter, 2001; National Research Center for Career and Technical Education, 2011; O'Connor, Malow, & Bisland, 2011; Wilkin & Nwoke, 2011). Annually, there continues to be a deficit of teachers to fill the growing demand for CTE courses (McCandless & Sauer, 2010). Many states were having a difficult time filling open positions in CTE programs. Wilken and Nwoke (2011) highlighted Michigan as one of those states, and policymakers issued an exemption that allowed retired CTE teachers to come back to teach in a CTE program while maintaining pension payments. Virginia, South Dakota, Iowa, and New York had identified critical staffing issues for CTE programs. The critical shortage of teachers in CTE affects economic growth. (Wilkin & Nwoke, 2011). According to reports by the Association for Career and Technical Education (ACTE, n.d.), students earning a sub-baccalaureate increased nationally by 71% from 2002-2012. Deloitte and the Manufacturing Institute (2018) reported that 80% of manufacturers will not meet the demand of clients due to a shortage of technically educated talent. Wilken and Nwoke also noted that there was a decrease in CTE teacher educator programs from 432 to 385 in the decade from 1990 to 2000. All 50 states and Washington, D.C. had alternative paths for certification for CTE in an attempt to fill these positions (Reese, 2010).

New York City schools created incentives for education could be used to recruit and retain teachers for CTE. Their research illustrated the framework of a program that recruited potential CTE teachers for a licensure program that was paid for by the New York City Department of Education. Students also received a salary and benefits while they were completing the program; 34 of the 35 teachers that completed the program were teaching in a CTE area in New York City schools (Wilken & Nwoke, 2011). These shortages can be

elucidated by the factors to follow: attrition, perception of CTE, modes of preparation, teacher self-efficacy, and professional development and support.

**CTE Teacher Attrition**

As stated previously, attrition is an important consideration for the reduction of CTE teacher shortages. Su, Dainty, and Sandford (2011) listed several indicators that have an effect on CTE teacher attrition, including: educational preparation, initial commitment to teaching, social integration, the first year teaching experience, skills and abilities, and institutional factors. Educational preparation inspires teachers to do what is necessary to succeed. The strongest predictor of retention in the profession is the initial commitment to teaching, and social integration into the community of colleagues influences retention. The 205 CTE teacher participants that responded to their survey listed a strong commitment to improving student performance, maintaining a positive reputation for the school, and increasing student engagement as most important. Ruhland (2001) also concluded that teachers remaining in the field were very committed to the profession, but career related stress was the most frequent reason for leaving the profession. Poor induction and support during the first year of teaching increases the chance of attrition. Su et al. indicated that inherent abilities in communication, prior academic success, creativity, and professionalism contribute to the retention of teachers. Institutional support, perception of job security, and knowing that they are doing a good job also contribute to retention.

McCandless and Sauer (2010) found a higher attrition rate for two-year alternative prepared CTE instructors. McCandless and Sauer recommend supporting these teachers with professional development during the first year of teaching.

Retention is a contributing factor for reducing teacher shortages in CTE. The limited number of studies pertaining to teacher retention, suggests that more research should be completed in this area because of the crucial role that retention plays in shortage areas of CTE.

**Perceptions of CTE**

Federal mandates have "created division" between practical and theoretical instruction in U.S. public schools (Hayward and Benson, 1993). They argued that details within the mandates reinforced the division between vocational education and other parts of the high school curriculum. Wonacott (2000) titled a category in his paper, "VocEd is for Misfits and Dummies," to highlight some of the negative perceptions of CTE that remain (pg. 3). According to (Stone, 1993) the long held belief that technical education is for non-college bound, potential dropouts, and other special needs students still endures. This perception is perpetuated by popular mediums such as comic strips and television ("What do people think of us", 1997). The attitudes toward CTE have been passed down from its inception throughout the implementation of technical education. The inherent nature of technical education, with its hands on learning and engaging curriculum, has created a haven for students that do not function well in theoretical and lecture based educational settings. In the past when students were low achieving or behaving poorly in academic courses, they were sent to technical courses. This supported the stigma that CTE was for students that could not achieve in core coursework. Brown (2003) stated:

> Although many people have associated vocational education with non-college bound, at risk, or special needs students, new career/technical/vocational programs attract a wide range of students providing them with skills that increase worker productivity, skill transfer, job access and job stability. (p. 4)

She added that 80% of high school students take a career course and 13% of students take more than one.

Some student CTE participants disagree with the deficit mindset that people hold of CTE, however they also believe that the curricula found within CTE programming can be more stimulating and more engaging than that of more theoretical courses. Gentry, Peters, and Mann (2007) conducted a study that surveyed gifted and talented students as well as general students that were involved in CTE courses and academic courses. The students commented that the CTE programs provided autonomy, caring and effective teachers, relationships with students with similar interests, and the ability to learn content in an applied manner. The same students spoke about the lack of relevant content and lack of appropriate application of the content in the traditional academic courses.

These perceptions that CTE is less than traditional tracks of study were also felt by educators (Gammil, 2015). Gammil contended the perception of CTE being less rigorous as compared to academic courses and that the teachers of CTE courses are not as qualified as the teachers of the academic courses remains. She also argued that CTE courses were viewed as less important components of education because they are not required for graduation. When she surveyed other teachers she found that many of them believed that CTE courses were for students that could not handle the standard academic coursework. The deficit thinking regarding the rigor of CTE courses does not weigh in the point of view of the students. Students who enrolled in both CTE courses and academic courses felt that they were given autonomy and the ability to learn by applying concepts in their CTE courses. Many of them were not given similar opportunities in their academic courses, and the students had positive views of CTE (Gentry et al., 2007). Whatever the reason for the deficit thinking, Stott (2006) pointed out that emphasis

on four-year pathways for students has created a shortage of skilled labor in the US. According to a report by Delloitte and the Manufacturing Institute (2018), 80% of manufacturers expressed that talent shortages in the skilled trades will impact their ability to meet consumer demand. According to a report by the US Department of Education (Balfanz, Bridgeland, Fox, DePaoli, Ingram & Maushard, 2014), 93% of students that concentrated in CTE coursework graduated high school, and 91% of high school students that completed 2-3 CTE credits enrolled in college after graduation.

**Modes of CTE Teacher Preparation**

The number of CTE teacher education programs, for secondary and post-secondary CTE teaching roles, have declined throughout the US at institutions of higher education, but the number of students participating nationally have remained steady (Fletcher, Gordon, Asunda, & Zirkle, 2015). In 1988, Lynch (1990) found 432 colleges offering CTE teacher preparation programs. His study has been updated twice since then, once by Bruening and colleagues (2001) who identified 385 institutions, and once by Fletcher and Gordan (2017) who identified 263 institutions that offered CTE preparation programs. There were only slight differences in the number of CTE teacher preparation enrollments between the earlier Bruening et al. (2001) study and the updated Fletcher and Gordan (2017) study. Bruening et al. (2001) found that the average number of students enrolled, nationally, in undergraduate alternative license/certification programs to be 55 and 16 in undergraduate alternative license/certification programs. Fletcher and Gordan (2017) found the average number of students in undergraduate alternative certification/licensure programs nationally was 17, and the average number of CTE undergraduate students in traditional certification/ licensure areas was 50. Little has changed in CTE teacher undergraduate program enrollment despite the decrease in the number of

preparation programs. Recruiting has also become increasingly difficult at local levels to staff open CTE teaching positions (Gray & Walter, 2001; Wilkin & Nwoke, 2011). CTE teaching positions are being filled and maintained by an increasing number of alternatively prepared or licensed teachers when traditionally prepared teachers were not available. These alternatively prepared teachers come from diverse educational backgrounds with different levels of business and industrial experience, and they require different categories and levels of support (Zirkle, Martin, & McCaslin, 2007). According to Ruhland and Bremer (2002), the majority of alternative preparation programs for CTE teachers are similar to those available to academic teachers. There is conflicting evidence as to whether there is a difference in effectiveness between traditionally prepared and alternatively prepared teachers (Darling-Hammond, 2009; Duncan, Cannon, & Kitchel, 2013; Redding & Smith, 2016).

Quality CTE preparation programs should exhibit certain traits. The curriculum should integrate theory with practice, the faculty should understand workforce preparation, and experiences should include workplace subject matter and clinical practices (Sander, 2007). Ruhland and Bremer (2002) examined efficacy and support of secondary CTE teachers. Thirty-eight percent of the respondents had not completed all the requirements for certification in their respective state. In addition, 65% of health profession teachers, 56% of agriculture teachers, and 46% of trade and industrial teachers had not completed all of the requirements for certification prior to beginning their first teaching assignment. The National Research Center for Career and Technical Education (NRCCTE) conveyed that no state alternative path to certification was the same as another (Zirkle, Martin, & McCaslin, 2007). Reese (2010) also found that there were no two states that had the same path for alternative certification.

Stephens (2015) reviewed the academic foundations and experience of a voluntary group of respondents that were teaching while using the Annual Occupational Authorization (AOA) provision in Michigan. The author examined the pedagogical knowledge, industry experience, and the assessment usage, of these AOA instructors, by using a modified version of the Southern Regional Education Board's High Schools that Work teacher survey. The data from this research suggested that many AOA instructors are using instructional strategies that are supported by literature, that a majority of AOA instructors possess post-secondary credentials, and that many AOA instructors do not understand the process to become vocationally certified. Stephens (2015) also found that when states require a bachelor's degree as a requirement for certification, they experienced teacher shortages in those areas. It is apparent that many states made concessions when positions needed to be filled. The U.S. Department of Education (2008) reported that up to 50% of the teachers that filled the teaching positions in health professions and automotive technologies did not participate in a formal traditional or alternative teaching preparation program, and 60% of automotive teachers did not possess an undergraduate degree. Duncan et al. (2013) found that only 49% of vocational certificate teachers in Idaho had a bachelor's degree.

Stephens (2015) stated that annual occupational authorization teachers in Michigan move from one building to the next in order to circumvent the obligation to meet all requirements for the alternative license within eight years. The eight-year window resets once the teacher starts at a new school. This requirement could have an adverse effect on teacher attrition. The varied guidelines for respective states' alternative certification make it difficult to discern what is necessary to support these teachers once they are in the classroom.

There are many teachers that have entered the CTE teaching profession with alternative certification, and many others that have not participated in a formal alternative preparation or induction program. This practice will not change anytime soon because the literature showed that when there was not an alternative path for certification, teacher shortages occurred.

**Self-Efficacy of CTE Teachers**

Beginning CTE teachers require a sense of self-efficacy to remain in the profession, those that lack this efficacy, tended to leave within the first few years of service (Elliot et al., 2010). Self-efficacy is the belief in one's own abilities (Bandura 1977). Duncan et al. (2013) conducted a quantitative study to determine if there was a difference in efficacy between traditionally and alternatively certified CTE teachers in Idaho. They purported teachers that are more confident in their own abilities will be more likely to have less stress, have the confidence to try new things, and would be more likely to stay in the profession. They found that 60% of traditionally certified teachers had earned a bachelor degree and 38% had earned a graduate degree. In addition, 49% of the group of alternatively certified research participants had earned a bachelor degree and 22% of the teachers had earned a graduate degree. The researchers found that traditionally licensed teachers felt more efficacious in teaching safety in the lab and with classroom management. The alternatively licensed teachers felt more successful using non-computer technology and teaching problem solving skills. These conclusions could be used to develop professional development for the respective groups of educators. Professional development frameworks could be produced to address the areas where teachers feel less efficacy. Frameworks would be different depending on the individual paths of education that the respective educators received. The authors purported that the alternatively certified teachers may have felt confident in their abilities because of their industrial experience. The respondents of the Ruhland and Bremer (2002)

research found similar results in terms of pedagogical knowledge efficacy. Of the respondents in their research, the teachers with a bachelor's degree in education felt the most prepared in pedagogy, and the teachers that were alternatively certified felt the least prepared in pedagogy.

**CTE Teacher Effectiveness**

National corporate reform has created accountability measures for teachers at all levels of public education (McGill, 2015). This is no different for the teachers in the area of CTE. Teachers in K-12 need to meet certain qualitative and quantitative expectations to be considered effective. According to their research, Wilken and Nwoke (2011) found that there was a reduction of the number of teacher preparation programs that are traditionally preparing CTE teachers. This meant that in order to fill the growing number of CTE positions, schools have had to hire teachers that have not completed the traditional route of certification. Bowen (2013) argued that there was not a significant difference of effectiveness between the teachers that were traditionally prepared than the ones that were not traditionally prepared. End of course testing was compared from students that were taught by alternatively certified teachers and students that were taught by traditionally prepared teachers. There was little statistical difference between the numbers of proficient students from the two respective groups of teachers. Bowen mentioned that the qualitative data exhibited mixed results for alternatively certified teachers. Some of the teachers were using effective strategies, while others were not. This situation presents dilemma for the administrators that are hiring the alternatively certified teachers because according to Reese (2010), there are no two alternative certification paths that are exactly the same. This means that some alternatively certified teachers may not have adequate training in educational pedagogy. Darling-Hammond (2009) disagreed with much of the research that has been done comparing the effectiveness of traditionally prepared teachers and alternatively prepared

teachers. She stated that many of the teachers used in the studies were from hard to staff locations. She stated that neither category (traditionally prepared or alternatively prepared) were particularly effective.

**Illinois CTE Teaching Requirements**

The Illinois State Board of Education (ISBE) website contains the licensure requirements for each of the categories of K-12 educators in Illinois. ISBE requires that a person must either possess a Professional Educator License (PEL) or receive an alternative teacher licensure. The PEL requires that a bachelor' degree or higher from and accredited institution, 32 content hours from a regionally accredited institution, student teaching experience, passing scores on the test of academic proficiency (TAP), a basic skills assessment, and content tests. A candidate must also have completed coursework pertaining to teaching exceptional children, reading across the curriculum, and teaching English language learners. Prior to 2017, the alternative licensure path required that a person have a Bachelor's degree or higher from an accredited institution with a grade point average of at least 3.0 and pass the TAP. Along with this requirement the candidate must complete an intensive pedagogical session over the summer. Over the course of the next two years, the person must have a mentor, pass certain course requirements, and pass the edTPA performance based assessment process. Once the requirements are met, the alternative license—Educator License with Stipulations or Alternative Provisional Educator—becomes a PEL. A search of the website did not reveal the mentorship requirement or clearly explain what an "intensive pedagogical experience" for the summer consisted of. There are exceptions for emergency teacher placements at each respective regional office of education. As of 2017, the provisional CTE license only requires that the candidate have 8,000 of relevant work experience in the skill being taught, and they must complete 120 hours of professional development during

the five year renewal cycle. ISBE also states that the provisional license can be renewed an unlimited amount of times (ISBE, n.d.a).

The requirements for teacher preparation at the community college is even more relaxed than for secondary schools. The Illinois Community College Board (ICCB) only requires that a faculty member have 2,000 hours of relevant work experience and the proper industry qualifications. The ICCB only spells out one such specialized qualification and that is American Welding Society certification for welding. This leaves a lot of room for interpretation.

## CTE Professional Development

CTE teachers have many responsibilities that are unique to their area of education. According to Cannon, Tenuto, and Kitchel (2009) some of these responsibilities include: (a) engaging students in a classroom and laboratory environment, (b) maintaining a program budget, (c) occupational analysis, (d) curriculum development, (e) creating and maintaining a safe work environment, (f) recruitment of students, and (g) development of public relations. NRCCTE received a multi-million dollar grant to commission an investigation into what professional development would be beneficial to be certain that secondary CTE teachers have the skills to identify student needs and deliver instruction to meet those needs (NRCCTE,2010). One of the important outcomes from the research was the identification of three questions that should be considered any time professional development is designed or facilitated:

1. What do teachers most need to learn to prepare students for both employment and further education?
2. How can professional development experiences be structured to incorporate the characteristics that the literature identifies as essential to effective professional development?

3. Are adequate resources available to provide the professional development that is needed?

Cannon et al. (2013) examined Idaho principals' perception of professional development needs for CTE teachers. The principals responded by ranking the importance of each of the responsibilities of CTE instructors. They ranked teaching students to think critically and creatively, motivating students to learn, teaching proper safety practices in the lab, teaching proper safety attitudes in the classroom, and evaluating student performance as their top five responsibilities for CTE teachers. When asked to evaluate the effectiveness of the CTE teachers under their supervision in the key areas of CTE teacher responsibility, teaching proper safety practices in the lab, and teaching proper safety attitudes in the classroom were the only two from their top five responsibilities that showed up in their top ten list efficacious abilities of their teachers. The research suggested that there is a need for professional development in the areas of engaging learners, teaching critical and creative thinking skill, and effective assessment practices (Cannon et al., 2013). CTE instructors that enter the profession through alternative preparation tend to be more confident with the content knowledge of their chosen CTE cluster and less efficacious with pedagogical knowledge. (Bottoms, Egelson, Sass, & Uhn, 2013)

CTE teachers perceived a need for professional development (Duncan et al., 2013). According to Fullan and Steigelbaur (1991) professional development can have a dramatic effect on reducing teacher attrition. O'Connor (2012) found that as many as 33 % of new teachers were entering the profession through alternative routes, and according to Duncan et al. (2013) there is insufficient evidence to conclude that there is a difference in participation in professional development between alternatively prepared and traditionally prepared teachers. Drage (2010) stated that meaningful professional development has a significant positive influence on teacher

retention. There are several barriers that restrict professional development participation by CTE instructors. Drage determined that the three main barriers included lack of time, lack of money, and lack of relevant opportunities. She also found that teachers are intrinsically motivated to participate in professional development to improve their teaching abilities.

Professional development can be helpful in reducing teacher attrition. However, neither alternatively or traditionally prepared teachers are more likely to participate in professional development. The main barriers for participating in professional development are lack of time, lack of money, and lack of appropriate professional development. The diverse educational and work experiences exhibited by CTE teachers make it essential to understand what professional development needs will support their success.

## Gaps in the Literature

All 50 states offered some sort of alternative certification to teach in the CTE area of education. However, little research attempted to discover the frameworks for the alternative licensure programs for CTE programs nationally. Research in regards to the alternative certification frameworks and their effectiveness in creating effective efficacious CTE teachers would be informative to maintaining successful CTE programs nationwide. It seems fundamental that incoming CTE teachers need to understand the frameworks and pathways to alternative certification, but according to the research many of these teachers did not understand exactly how to become certified. More research needs to be conducted on the percentage of teachers that become fully certified in CTE after entering CTE while lacking full certification. This might illuminate a trend of teachers that leave CTE because of a lack of certification. Although there was research about negative perceptions of CTE, there was not any research determining whether the negative perceptions affected the recruitment and retention of teachers.

Several pieces of the literature mentioned that alternative licensure programs are necessary in order to satisfy the growing need for CTE teachers. There was little current literature that attempted to discover the rationale for the shortage of CTE teachers. An ERIC search found no studies that addressed the motivation for CTE teachers to leave their teaching positions. One study (McCandless & Sauer, 2010) received a completed survey from two leavers from the CTE teaching profession. It would be difficult to draw conclusions from such a low number of participants

Some of the literature suggested that the lack of professional development or educational preparation are contributing factors. It seems that there needs to be a larger scope of research to determine the contributing factors for attrition in CTE content areas. Effective professional development and induction programs are shown to reduce attrition rates, but there is little literature related to the effects of these programs to retain CTE teachers. Perceptions of CTE teachers and the rigor of CTE programs may affect the recruitment and retention of CTE teachers according to the small scope of research available. Literature about the socio-political bias toward the effectiveness and the rigor of CTE courses and their teachers remains lacking as well. A few articles discussed the different professional development needs between traditionally prepared and alternatively prepared teachers, but to solidify efforts and to build supportive frameworks more research is necessary. It was stated that each career cluster of CTE requires different attention, and there was very little research specifically dealing with automotive teachers. This is especially disturbing considering that up to 60% of automotive teachers did not possess an undergraduate degree (Stephens, 2015).

## Conclusions

It is important to understand how staffing concerns influence policy making in regard to practitioner preparation. Dealing with the consequences of relaxed preparation standards drives the need for examining the professional development strategies for teacher growth and retention. Developing an understanding as to why teachers leave the profession is also very valuable when attempting to staff open positions. Understanding how CTE teachers are prepared and what professional development they need to be effective make it possible to develop effective frameworks for teacher education for CTE content areas. The literature exposed a theme in which teacher shortages produced alternative paths to certification. The alternative certifications reduced the amount of qualifications necessary to become certified. Reducing the number of qualifications for certification can fill an immediate need, but there is not any literature that exposed what the schools are doing to make sure the teachers are being guided toward success. Using creative solutions for recruitment, such as alternative preparation pathways, may create a need for structured professional development and mentoring programs. According to general education research, these programs help reduce the attrition of educators. Similar strategies may be effective with CTE programs by helping to retain these alternatively certified individuals and help these teachers to be effective educators.

The current literature revealed the large variance among individual state alternative certification programs. A theory for this phenomenon could be that the federal mandate through the Carl D. Perkins Act gives authority to the state and local regions for CTE decision making, but it would seem fruitful to use the research conducted on theoretical frameworks and best practices and adapt it for all regions. States could still have control over their programs, but they could have structured pathways for educator success. It was exposed that the time required to

meet the qualifications can be deferred for a specific amount of time in some states. If the time can be deferred is having a deadline effective for getting teachers qualified in a suitable amount of time? During the qualification period, are the students benefiting from the coursework? As previously discussed, when requiring a bachelor's degree, teacher shortages occur in CTE areas. Efforts should be made to determine whether CTE teachers receive adequate professional development and mentorship to be effective and to support them to remain in the profession.

Considerations should be given to new research which surveys teachers that have left the profession. Using the information from this research, teacher preparation programs can be better equipped to handle the issues of preparing educators for CTE. Since there was a substantial percentage of new CTE teachers entering the profession with alternative preparation, consideration should be given to developing induction programs and professional development strategies for retaining those individuals. Pedagogical professional development could be beneficial to alternatively prepared teachers, whereas technical experience professional development could be beneficial to traditionally prepared teachers. Teachers that are well prepared seem to be more effective. Effective teachers that are respected will most likely remain in the profession. There is little research specifically dealing with CTE attrition. Much more research is needed to determine the contributing factors of attrition in CTE, and what is needed to recruit skilled candidates to excel in this profession. One group of CTE practitioners that showed up very little in the research was automotive teachers. One article that did, exposed that up to 60% of automotive teachers did not have an undergraduate degree. Understanding their unique professional development needs could be beneficial to reducing attrition in this content area.

## Theoretical Framework

Reiman and Thies-Sprinthall (1998) argued that teachers progress through five stages throughout their career. During the *novice* stage, teachers experience discovery and survival. As they progress to the *advanced beginner stage,* teachers begin to incorporate new ideas into effective teaching strategies. They then move on to the *competent* stage, where they are capable of many skills and master of some. When teachers reach the *proficient* stage they begin to think more analytically about their teaching. Finally, *expert* teachers can be flexible and implement strategies on the go.

NRCCTE (2010) conducted a multimillion dollar research project to understand the professional development needs of secondary career and technical educators with these stages of teacher development in mind. A product of their research is the three questions, mentioned previously, that should be considered anytime professional development is developed or considered: What do teachers most need to learn to prepare students for both employment and further education, how can professional development experiences be structured to incorporate the characteristics that the literature identifies as essential to effective professional development?, and are adequate resources available to provide the professional development that is needed? These questions lead to the desire to find out what professional development would be beneficial for Illinois automotive instructors, so that they can be effective in preparing learners for their future careers.

Borich (1980) developed a survey instrument that has been successful in multiple research projects for determining the development needs of faculty and staff. The needs assessment allows participants to rank relevance of a goal and then their unique level of attainment for each respective goal. The discrepancy between the relevance ranking and their

efficacy is the training need. The Borich Needs Assessment Model was the inspiration for the instrumentation for the current research topic.

## Research Topic

An ERIC search with the search criteria of "automotive" and "teacher" found no research pertaining to automotive teacher preparation or their professional development needs. In fact, there were no articles that pertained to the role automotive teachers specifically. I am specifically interested in the professional development needs of Illinois automotive instructors. There was no research pertaining to this specific field, so general CTE literature was used to frame the research proposal.

# CHAPTER III: RESEARCH METHODOLOGY

Chapter 3 provides an overview of the quantitative methodology including information regarding data collection methods, study variables, population and sample, and data analysis procedures for uncovering the distribution of the professional demographics among automotive teachers in Illinois public secondary and post-secondary schools. I explored the pedagogical professional development needs of these practitioners and investigated whether there was a significant difference in professional development need among teachers of different professional demographic groups within the criteria of: practitioner preparation, type of school, level of education, automotive teaching experience, and teacher age. Validity and reliability of the study is presented as well as application and limitations of the research. As a foundational study into the professional development needs of automotive instructors, quantitative methodology was chosen to appraise a larger group of participants, and to attempt to explore the relationship between practitioner preparation and pedagogical professional development need.

Career and technical education (CTE) is one of the traditional means of preparing people for careers that require specialized skillsets. According to Snelling (2017), postsecondary CTE graduates earn significantly more, on average, than students that majored in academic fields, and there tends to be more opportunities than people to fill them. Researchers at the Bayer Corporation surveyed 150 Fortune 1000 company recruiters, and they found that more than half of these companies struggled to find qualified candidates with at least a two year technical degree (Bayer Corporation, 2014). Participants also stated that their companies created more STEM related jobs each year than non-STEM related jobs. Contributing to the dilemma is a shortage of CTE teacher education participants (NRCCTE, 2010; Wilkin & Nwoke, 2011). Automotive programs are struggling to keep up with the demand for technicians, and schools are having

trouble finding traditionally prepared teachers to lead their classrooms. The number of unfilled automotive jobs is expected to climb from 75,900 in 2016 to 92,000 per year (Unrau, 2017). Mayersohn (2017) reported that manufacturers such as BMW and Fiat are recruiting directly for their independent dealerships due to the shortages. While the shortage of technicians and moldable students is apparent, the condition of the education programs that prepare them is not.

CTE teachers are generally experts in the content area they teach, but often they do not have formal experience in pedagogy. This may originate from the fact that numerous CTE educators have been prepared by one of the alternative pathways brought about by the shortage of teachers (Walter & Gray, 2002). Teachers that have been prepared through alternative routes seem to have a lower efficacy in pedagogical understanding when compared to traditionally prepared teachers (Ruhland & Bremer 2002). The population of educators with a lack of pedagogical knowledge practicing in CTE areas may be affecting student outcomes. If a specific group of teachers have a larger deficit, then they would require more professional development pertaining to pedagogical growth. The need for pedagogical professional experiences presents an issue because of the absence of peer reviewed research that directly relates to CTE. Regardless of the origin of this shortfall, there is a concern with the implementation of best practices in CTE courses which directly affects student outcomes.

## Problem Statement

There was very little research pertaining directly to automotive educators or their practitioner preparation, and there were shortages of qualified teaching candidates in the areas of CTE. These shortages could have an impact the quality of education and the opportunity for career exploration that students experience. Adding to the dilemma is the fact that the number of traditional CTE teacher preparation programs has decreased over time (Wilkin & Nwoke, 2011).

The number of candidates that complete the traditional preparation programs is also thereby reduced. Wilkin and Nwoke (2011) asserted that policymakers and administrators have amended the qualifications necessary to teach CTE courses in an attempt to fill the vacancies that have materialized because of the pressures affecting the field. Alternative certifications have led to the creation of alternative pathways for teacher preparation in CTE concentration areas. Research that explores the effectiveness of alternatively certified CTE teachers as compared to traditionally certified teachers is limited. Teachers who are alternatively prepared do not persist at the same rate as traditionally prepared teachers unless deliberate actions are taken to encourage professional growth (McCandless & Sauer, 2010). Research pertaining to academic practitioner preparation has found that attrition rates among alternatively prepared teachers is high. One study found that up to 49% of teachers that entered the field without certification, left within the first five years (Henke, Chen, & Geis, 2000), and Hammond (2002) found that up to 40% leave after the first year. There is limited research in the area of CTE practitioner persistence, or whether or not the teachers that do persist are effective educators. The pressures that influence teacher recruitment and retention become very important with instances of hard-to-staff teaching positions. Research that associates professional development with teacher persistence supports the need for exploration of the professional development needs of automotive instructors. The industry need for qualified technicians, a clear shortage of CTE instructors, and the lack of research pertaining to automotive teacher professional development needs lead to the necessity for this research.

## Research Design

The data gathered from this descriptive quantitative study will be used to identify differing professional development needs of many specific groups of automotive practitioners

including: teachers with different teacher preparation, varying years of teaching experience, varying levels of education, secondary or post-secondary assignment, and different age groups of automotive teachers in Illinois. This study used a non-experimental research design approach. It was not an experimental design because the independent variable, practitioner preparation, could not be controlled, nor could participants be placed into control and experimental groups because the research was conducted post facto (Salkind, 2010). This study should illuminate any differences in professional development need between the professional demographic groups being studied. I wanted to explore if the independent variables, practitioner preparation, level of education, teacher age, type of school, or years of automotive teaching experience influenced pedagogical professional development need (Salkind, 2010). Surveys were used to assess the distribution of teacher education pathways among automotive educators in Illinois. I used a modified Borich (1980) inspired needs assessment model to find the mean weighted discrepancy scores (MWDS) of each professionally-related teaching activity and then compared the perceived professional development needs of the groups of educators. The following research questions guided the adoption of the instrumentation and the data collection and analysis methods for this research:

**Research Questions**

This research study was guided by five research questions:

RQ 1. What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation?

RQ 2. What do practicing automotive teachers identify as important professional-related activities to their success as an educator?

RQ 3. How do practicing automotive teachers self-assess their current level of performance in their professional-related activities?

RQ 4. What are the differences in professional development needs for practicing automotive teachers based on the various demographic variables?

Table 1 includes the research variables, the level of measurement of each variable, and the categories of the variables.

Table 1

*Summary of Study Variables and Data Types*

| Variables | Level of Measurement | Variable Categories |
|---|---|---|
| ***Independent Variables*** | | |
| Highest Degree Obtained | Ordinal | No degree = 1<br>Associate's degree = 2<br>Bachelor's degree = 3<br>Master's degree = 4<br>Doctoral degree = 5 |
| Teaching Preparation Obtained | Ordinal | No teacher preparation = 1<br>Some preparation, no degree = 2<br>Bachelor's degree = 2<br>Master's degree = 3<br>Doctoral degree = 4 |
| Years of Teaching Automotive Courses | Ordinal | 0 to 5 years =1<br>6 to 10 years = 2<br>11 to 15 years = 3<br>16 to 20 years = 4<br>More than 20 = 5 |
| Age | Ordinal | 22 to 29 = 1<br>30 to 39 = 2<br>40 to 49 = 3<br>50 or older = 4 |
| Gender | Nominal | Male = 1<br>Female = 2 |
| Type of School Employed | Nominal | Secondary = 1<br>Post-Secondary = 2 |
| Years of Teaching in Current Position | Ordinal | 0 to 5 years =1<br>6 to 11 years = 2<br>12 to 17 years = 3<br>18 or more years = 4 |

*Table Continues*

| Variables | Level of Measurement | Variable Categories |
|---|---|---|
| ***Dependent Variables*** | | |
| Perception of Level Importance for Teaching Activity | Ordinal | Low = 1<br>Moderate = 2<br>High = 3<br>Very High = 4 |
| Perception of Level of Competency for Teaching Activity | Ordinal | Low = 1<br>Moderate = 2<br>High = 3<br>Very High = 4 |

**Study Population**

The target population (*n*=397) of the research was current 2019-2020 Illinois public high school and Illinois public college automotive teachers. The entire Illinois public secondary and post-secondary teaching population had an equal opportunity to participate in the research. Contact information, for the high school automotive teachers was accessed from the Illinois State Board of Education (ISBE) website where teacher contact information is listed by the classification of instructional programs (CIP). The CIP that encompassed automotive programs is transportation, distribution, and logistics. ISBE employment information system (EIS) reports were available for public viewing, and these reports identify educators, their teaching assignment by CIP code, and school identification information. A simple Microsoft Excel filter was used to identify teachers by teaching assignment. Illinois had 231 secondary teachers with automotive as a primary or secondary teaching role. There was a great deal of information provided within the EIS report including: name, school of employment, school address, and faculty email address. The ISBE website also offered professional organizations recognized by the state for the respective CTE content areas. The Illinois College Automotive Instructors Association (ICAIA) was listed for automotive technologies. This group is comprised of college and high school teachers from Illinois and surrounding states. Members were listed in a database, and they also

have contact with other members twice a year at the state conferences. The Illinois Community College Board (ICCB) lists the community colleges in Illinois. A manual identification of automotive programs was done to be sure that no public community college automotive teachers were omitted from the research. Each community college with an automotive program has a directory with faculty contact information. There were 166 Illinois public college automotive instructors based on directory identification. The list of college and secondary automotive instructors was compared to the ICAIA directory to ensure that all Illinois' automotive instructors had an equal opportunity to participate in the research. Southern Illinois University Carbondale was the only Illinois university that offered automotive technologies at the four-year level. All of their automotive teachers were also members of ICAIA, therefore they were listed in the ICAIA database.

**Instrument**

The survey instrument that was utilized was modified from the needs assessment survey created by Borich (1980) who stated, "A training need can be defined as a discrepancy between an educational goal and trainee performance in relation to this goal" (p. 39). Borich's survey presented competencies by which the participant had to rank their "perceived relevance" and "perceived level of attainment." The difference between the two was the perceived development need. Wallin and Smith (2005) employed a Borich inspired needs assessment instrument to gauge the faculty development needs at 29 of Georgia's technical colleges. They used an advisory committee of technical college faculty to develop the instrument, which included 50 professional activities divided into seven clusters. They received a response rate of 45% ($n$=714). The Wallin and Smith instrument most closely suited the needs of this research because

the seven clusters of activities are all relevant to the automotive population subject to the research.

Several other studies have adopted modified versions of the Borich Needs Assessment model. Garton and Chung (1997) used a modified Borich Needs Assessment Model to identify the in-service needs of Missouri agriculture teachers. Their instrument was examined for face validity by graduate associates, teacher educators, and state supervisors and deemed to have validity. Garton and Chung determined that the reliability of the instrument was $\alpha = .95$ (Cronbach's alpha coefficient). Another example of research that utilized Borich's discrepancy model for needs assessment is McAdoo (2018), which was modified to identify the professional development needs of career and technical and agriculture teachers in Georgia K-12 public schools. His survey utilized competencies that are important for automotive teachers in Illinois. He utilized two categories (side-by-side) for each survey item, importance and competence. Each category employed a 5-point Likert scale for participant choice. The difference between the two categories represents the professional development needs of the participants. Other studies that utilized the Borich Needs Assessment model were Cannon, et al. (2013), Golden (2013), and Moon (2014). Cannon et al. (2013) utilized a panel of experts to evaluate their Borich instrument for face, content, and construct validity. They also calculated coefficient alphas to illustrate reliability, and they found "Importance" ratings to be $\alpha = .924$ and competence ratings to be $\alpha = .943$. Moon (2014) also used Cronbach's alpha to determine reliability of his needs assessment instrument, and found that it was significantly better ($\alpha = .979$) than the 0.8 used to suppose reliability. Salkind (2010) contended that construct validity is a gauge of how well an instrument measures what it was intended to measure. Previous research has utilized the Borich Needs Assessment model, and there has been a track record of face, content, and

construct reliability associated with the instrument. “Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct” (Santos, 1999, para 7). Nunnally (1978) suggested that a Cronbach’s alpha coefficient of at least 0.7 is acceptable for research. As described previously, the validity and reliability of the Borich Needs Assessment Model is well documented, and thus was anticipated with the current study.

**Strategies for Protecting Human Subjects**

Before any data collection began, I submitted a plan outlining the data collection procedures to the Illinois State University Institutional Review Board (IRB). The plan included copies of the survey and the informed consent. The Illinois State University IRB approved the research without modification. The IRB forms and informed consent statement can be found in Appendix C.

**Data Collection**

Data was collected through an online survey modified from the previously implemented instrument created by Wallin and Smith (2005) found in the appendix of their publication. Survey research is at the will of the participants that are being asked to complete the survey. Online survey data collection has the advantage of allowing participants to answer at their convenience and allows the researcher to disperse the survey quickly and inexpensively (Trochim & Donnelly, 2008). On-the-other-hand participants may not identify any importance in their participation in the research, or mistake the contact for spam. “Using multiple contact attempts and varying the timing, delivery method, and mode of those attempts are a few ways we discuss in this book of increasing the likelihood of making contact with sample members” (Dillman, Smyth, & Christian, 2014 p.6). Participants were contacted by email and in-person at the ICAIA conference. According to Dillman et al. (2014), there are four types of survey errors

that should be limited. Sampling error is only present when the group of respondents does not represent the whole population, and the same is true for coverage error. The survey instrument was delivered to the entire population of Illinois secondary and post-secondary automotive teachers, and the sampling error and coverage is only a factor if there is a reduced response rate. An important step in limiting nonresponse was following survey data collection procedures outlined by Dillman et al. (2014), using mixed-mode contact attempts.

Data was collected in a single phase starting with participant contact on October 17, 2019. On October 17, 2019, an email was sent out to participants explaining the purpose and process for their participation in the research including a link to the online survey. A series of reminder emails were sent on October 21, 2019, October 22, 2019, and October 28, 2019. The final participant data was collected by November 5, 2019 (Table 2).

Table 2

*Data Collection Timeline*

| Study Stage | Date |
|---|---|
| ICAIA conference contact | October 17, 2019 |
| Participant contact with survey | October 17, 2019 |
| Follow-up email contact 1 | October 21, 2019 |
| Follow-up email contact 2 | October 22, 2019 |
| Follow-up email contact 3 | October 28, 2019 |
| Final participant data collected | November 5, 2019 |

**Data Analysis**

Demographic questions are embedded within the research instrument. The following demographic variables: teaching assignment category (secondary or post-secondary), level of education, years of automotive teaching service, age, and level of teacher preparation. See table

one for level of measurement and variable groups. I attempted to find the distribution of alternatively prepared and traditionally prepared automotive teachers within Illinois. This is a measure of central tendency, and the mode describes which practitioner group had a higher population within the schools. I used frequencies and percentages to analyze this nominal and ordinal demographic data. The descriptive statistics associated with the automotive teachers is displayed in tables. Teachers that had not completed a teaching degree are labeled alternatively prepared. This includes teachers that had not completed formal pedagogical coursework, those that did not receive a formal pedagogical coursework degree, and those that were in the process of completing coursework while teaching. Question 1 "What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation," explored these demographic relationships. The following are the hypotheses for question 1:

*RQ 1 - Null Hypothesis:* There will be no demographic differences between automotive teachers that completed traditional education preparation and those that completed an alternative form of teacher education preparation in Illinois secondary and post-secondary schools.

*RQ 1 – Research Hypothesis:* There will be demographic differences between automotive teachers that completed traditional education preparation and those that completed an alternative form of teacher education preparation in Illinois secondary and post-secondary schools.

The two main steps required for determining a professional development need are: understanding what is important for the target population's professional success and understanding if there is a skill gap present within the target population. Research question 2

"What do practicing automotive teachers identify as important professional-related activities to their success as an educator," explored what the teachers perceived as important. Research question 3 "How do practicing automotive teachers self-assess their current level of performance in their professional-related activities," explored the teachers' perceived level of efficacy with the professional activities. The following are the hypotheses for research questions 2 and 3.

*RQ 2 - Null Hypothesis:* There will be no professional-related activities identified as important by Illinois secondary and post-secondary teachers to continue successfully as teaching professionals.

*RQ 2 – Research Hypothesis:* Professional-related activities will be identified as important by Illinois secondary and post-secondary teachers to continue successfully as teaching professionals.

*RQ 3 - Null Hypothesis:* There will be no professional-related activities identified with low efficacy by Illinois secondary and post-secondary teachers.

*RQ 3 – Research Hypothesis:* Illinois secondary and post-secondary teachers will identify professional related activities with low efficacy.

Research question 4 examined automotive teachers' perception of professional development needs and any differences between the demographic variable groups of automotive instructors. Several CTE studies have been completed using the Borich (1980) model to identify the professional development needs of practitioners (Cannon, et al., 2013; Cannon, Kitchel, & Duncan 2009; Christensen, Warnick, Spielmaker, Tarpley, & Straquadine, 2009; & Layfield, & Dobbins 2002). Borich (1980) suggested that training assumptions could be made by gathering a practitioner's perceived importance of a goal and subtracting their perceived performance in that goal. In this case the "goal" would be their perceived level of importance of a concept and their

"performance" would be their perceived effectiveness. The difference between the two was the professional development need. The survey instrument for this study was similar in construction to the many studies cited above. The Borich's needs assessment model was constructed so that participants can rank the importance of items directly relating to pedagogical knowledge and teacher effectiveness. The participants were then asked to rank their effectiveness in each of the same items. Perceived professional development needs were calculated by finding the mean weighted discrepancy scores (MWDS) for the pedagogical competencies. The differences between importance and effectiveness was the professional development needs of the practitioners. A discrepancy score was calculated for each of the participants, on each of the competencies, by taking the importance ranking and subtracting the effectiveness ranking. A weighted discrepancy score was calculated by multiplying the individual discrepancy scores by the mean importance rating. MWDS for the pedagogical competencies was calculated by taking the weighted discrepancy scores and dividing by the number of participants.

Once the professional development needs were established, I examined whether there were unique professional development needs for any of the variable groups of practitioners by performing *t*-tests or analyses of variance (ANOVA) for each individual development category. The independent variable groups included the demographic characteristics: type of school the practitioner serves (secondary of post-secondary), preparation method (alternatively prepared or traditionally prepared), automotive teaching experience, educational level, and teacher age. The *t* -tests and ANOVAs compared the MWDS ratings of the respective groups within the demographic independent variable categories.

*RQ 4 - Null Hypothesis:* There will be no difference in the pedagogical professional development needs between the respective groups within the demographic independent variable categories of automotive teachers.

*RQ 4 - Alternative Hypothesis:* There will be a difference in pedagogical professional development need between the respective groups within the demographic independent variable categories of automotive teachers.

## Applications and Limitations

Moving forward with this research allowed exploration of the professional development needs of automotive instructors in Illinois, and with it I attempted to gauge the difference in professional development need between traditionally prepared and alternatively prepared practitioners as well as the other professional demographic variables (age, level of education, years of experience, and secondary or post-secondary teaching assignment) . The information could be used for hiring decisions, development of induction programs, professional development strategies, or practitioner preparation program development. Parties that might benefit from this research include: practitioners, district administrators, deans, designers of professional development, and practitioner preparation program developers and decision makers.

Descriptive studies have been completed for agriculture teachers. A study was conducted for the professional development needs of principals. This was the first study to examine whether there are unique professional development needs of alternatively prepared automotive instructors. Generalizations will be limited to secondary and post-secondary automotive teachers in Illinois. The research could be adapted and completed with other populations of automotive teachers or different CTE content areas.

The participation was be limited to Illinois automotive teachers of public secondary and post-secondary schools. Teachers from other states that are part of ICAIA were excluded. For-profit automotive school teachers were excluded as well. Private schools may have different qualifications for employment, and this could lead to unique professional development needs. The study relied on the ability of the participants to rank the importance of the pedagogical concept and be truthful in their rankings of perceived effectiveness. The limitations of the study should not deter from the usefulness of this foundational research for automotive practitioners.

# CHAPTER IV: FINDINGS

The results of this quantitative study are presented in this chapter. The study purpose was to examine the demographics and professional-related characteristics of Illinois secondary and post-secondary public automotive teachers. The data gathered from the study will primarily be used to describe Illinois automotive teacher demographics and illustrate what these instructors deem as important professional-related activities and how they assess their abilities for each activity. Professional development need is suggested based on the examination of the importance and self-assessment data. Study participants were given the opportunity to rank how important they perceived each of the 32 professional related activities were to their continued success as an automotive instructor, and then they could rank how they assessed their ability to perform each activity. The 32 activities fall into one of five categories essential for professional practitioners: instructional activities, curriculum activities, promotional activities, professional activities, and technology activities (Table 3).

Table 3

*Survey Instrument Professional Activities*

| Professional Practitioner Activity Categories |
|---|
| *Instructional Activities* |
| Provide individual and group instruction. |
| Prepare effective current instructional materials. |
| Utilize classroom arrangements for instructional effectiveness. |
| Modify instructional materials based on student and industry assessment and feedback. |
| Manage student conflicts in the classroom. |
| Provide information or referrals to meet individual needs. |
| Provide accommodations for students with special needs. |
| Recognize diverse learning styles and develop appropriate plans. |
| Utilize “hands-on” (contextual teaching and52 learning strategies) in the curriculum. |

*Table Continues*

| Professional Practitioner Activity Categories |
|---|
| *Curriculum Activities* |
| Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans). |
| Create and utilize a variety of student assessment and evaluation techniques. |
| Integrate curriculum with other faculty and other instructional areas. |
| Identify and implement current industry standards and trends into the curriculum. |
| Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum. |
| Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity. |
| Participate in "back-to-industry" experiences to increase technical competence. |
| *Promotional Activities* |
| Conduct student recruitment activities. |
| Link with appropriate career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities. |
| Assist in developing a promotion/marketing plan for a specific program. |
| *Professional Activities* |
| Assist students with job placements. |
| Provide academic advising. |
| Provide career advising. |
| Collaborate and/or network with other technical faculty and staff. |
| Manage a program advisory committee. |
| Participate in departmental and school committees for improvement of programs and schools. |
| Participate in professional development activities that result in professional growth. |
| *Technology Activities* |
| Use a presentation software program (e.g., PowerPoint). |
| Use a spreadsheet software (e.g., Excel). |
| Use an organizational software program for student grades, rosters, etc. |
| Use a web-based course development software program (e.g., WebCT, Blackboard). |
| Teaching online. |
| Use technology for in-class instructional activities. |

Mean weighted discrepancy scores (MWDS) were used to determine the perceived professional development need for each of these activities for each respondent. The MWDS data was compared using various demographic data including: type of school the practitioner serves,

preparation method, automotive teaching experience, educational level, and teacher age. The professional activities were acquired from a related study conducted by Wallin and Smith (2005) within Georgia Technical Colleges. The full survey for this research, as well as the Wallin and Smith (2005) research, can be reviewed in Appendix A for this research and Appendix B for the Wallin and Smith survey.

Findings were generated from survey data collected from Illinois public secondary and post-secondary automotive teacher participants. The sample consisted of all public secondary and post-secondary teachers in Illinois. According to the Illinois State Board of Education (ISBE) and the Illinois Community College Board (ICCB), in 2019 there were 397 public automotive teachers. There were 231 secondary teachers and 166 post-secondary public automotive teachers in Illinois during the 2019-2020 school year. There were 139 teachers that responded to the survey. Twenty respondents did not answer the item that identified their school type. The state population of automotive teachers consisted of 58% secondary teachers, and 42% post-secondary teachers. The respondents in this study was made up, of 58% secondary teachers and 42% post-secondary teachers. The sample aligns with the population. This research was guided by the following research questions:

RQ1 What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation?

RQ2 What do practicing automotive teachers identify as important professional-related activities to their success as an educator?

RQ3 How do practicing automotive teachers self-assess their current level of performance in their professional-related activities?

RQ4 What are the differences in professional development needs for practicing automotive teachers based on the various demographic variables?

## Demographic Analysis

To answer the first research question, "What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation," I coded the participants that had less than a bachelor degree in education as alternatively prepared and those with at least a bachelor degree in education as traditionally prepared. The descriptive statistics comparing the demographics of the two groups of automotive instructors are presented in tables. Table 4 illustrates the distribution of degrees among the two groups of automotive instructors. The instructors reported any type of degree for this survey question, which included teacher education.

Table 4

*Demographic Characteristics of Study Participants*

| Demographic Variable | Alternatively Prepared | | Traditionally Prepared | |
|---|---|---|---|---|
| | Count | Percent | Count | Percent |
| *Level of education* | | | | |
| No degree | 11 | 22.4 | | |
| Associate | 11 | 22.4 | | |
| Bachelor | 19 | 38.8 | 16 | 17.8 |
| Master | 8 | 16.3 | 69 | 76.7 |
| Doctorate | | | 5 | 5.6 |
| *Teacher education path* | | | | |
| No education prep | 29 | 59.2 | | |
| Preparation, no degree | 20 | 40.8 | | |
| Bachelor | | | 29 | 32.2 |
| Master | | | 56 | 62.2 |
| Doctorate | | | 5 | 5.6 |



*Table Continues*

| Demographic Variable | Alternatively Prepared | | Traditionally Prepared | |
|---|---|---|---|---|
| | Count | Percent | Count | Percent |
| *Automotive teaching experience* | | | | |
| 0-5 years | 13 | 26.5 | 9 | 10.0 |
| 6-10 years | 13 | 26.5 | 11 | 12.2 |
| 11-15 years | 8 | 16.3 | 16 | 17.8 |
| 16-20 years | 7 | 14.4 | 21 | 23.3 |
| More than 20 years | 8 | 16.3 | 33 | 36.7 |
| *Age* | | | | |
| 21-29 years | 4 | 8.2 | 1 | 1.1 |
| 30-39 years | 9 | 18.4 | 30 | 33.7 |
| 40-49 years | 12 | 24.4 | 18 | 20.2 |
| 50 or more years | 24 | 49.0 | 40 | 44.9 |
| *School Type* | | | | |
| Secondary | 24 | 57.1 | 45 | 58.4 |
| Post-secondary | 18 | 42.9 | 32 | 41.6 |

Forty-nine percent of alternatively prepared respondents reported that they currently had less than a bachelor's degree at the time of the survey. Furthermore, 22% reported having no degree at the time of the study. The nature of the categorization of this independent variable (teacher education path) resulted in 100% of traditionally prepared teachers responding to having at least a bachelor's degree. Interestingly, 82% of traditionally prepared respondents had at least a master's degree.

Teacher education was the criteria that was used to delineate between alternatively and traditionally prepared automotive teachers. Nearly 41% of the alternatively prepared teachers reported that they participated in some teacher education preparation but did not receive an education degree (Table 4). Prior to 2017, industrial CTE teachers needed to obtain 20 credit hours to renew a provisional teaching license. This requirement was removed in 2017 (ISBE, n.d.a). The current minimum state requirement for a renewable provisional CTE license has the single requirement of 8,000 hours of document work experience (ISBE, n.d.b). Sixty-six percent

of the respondents reported having at least an undergraduate degree in education. This is significantly different than the 60% of automotive teachers nationally reported as having no teacher education preparation (Stephens 2015).

Automotive teaching experience is not proportionally distributed between the two preparation groups. The majority of alternatively prepared teachers that responded are skewed toward 10 years or less experience, whereas the majority of the traditionally prepared teachers are skewed toward 16 years or more experience (Table 4).

Interestingly, a high percentage of respondents reported to be 40 years old and older, with a higher percentage being in the 50 and older category (Table 4). Forty-nine percent of the alternatively prepared teachers that responded identified as being 50 or older, and 44.5% of traditionally prepared teachers identified as being 50 or older. Only a total of five teachers in the 21-29 responded to the survey. Approximately 14% ($n$=20) of respondents chose not to answer the demographic question that identified the type of school which they teach (Table 4). Seven of these respondents were alternatively prepared and 13 were traditionally prepared.

## Importance Rankings

To address the second research question, "What do practicing automotive teachers identify as important professional-related activities to their success as an educator," respondents were asked to rank how important each of the professional-related activities were to their continued success as automotive educators. Teachers were asked to rank the importance level for each of the 32 professional activities using the four-point Likert scale (1 "low" to 4 "very high").

The professional activities were ranked by 118 teachers. Activities that were ranked 3 or higher were deemed highly important to the continued success of the teachers. Twenty-three of the professional activities were ranked with a mean score of 3.0 or higher (Table 5).

Table 5

*Automotive Teacher Importance Ranking of Professional-Related Activities*

| Professional-related Competences | N | Mean | S.D. |
|---|---|---|---|
| *Instructional Activities* | | | |
| Utilize "hands-on" (contextual teaching and learning strategies) in the curriculum. | 118 | 3.75 | .569 |
| Provide Individual and group instruction. | 118 | 3.63 | .486 |
| Prepare effective current instructional materials. | 118 | 3.53 | .550 |
| Modify instructional materials based on student and industry assessment and feedback. | 118 | 3.36 | .608 |
| Utilize classroom arrangements for instructional effectiveness. | 118 | 3.19 | .773 |
| Recognize diverse learning styles and develop appropriate plans. | 118 | 3.17 | .754 |
| Manage student conflicts in the classroom. | 118 | 3.13 | .853 |
| Provide information or referrals to meet individual student needs. | 118 | 3.04 | .721 |
| Provide accommodations for students with special needs | 118 | 3.00 | .970 |
| *Curriculum Activities* | | | |
| Identify and implement current industry standards and trends into the curriculum. | 118 | 3.49 | .624 |
| Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum | 118 | 3.38 | .750 |
| Participate in "back-to-industry" experiences to increase technical competence. | 118 | 3.25 | .847 |
| Create and modify curriculum (i.e., course syllabus, course objectives, lesion plans). | 118 | 3.22 | .718 |
| Create and utilize a variety of student assessment and evaluation techniques. | 118 | 3.08 | .711 |
| Integrate curriculum with other faculty and other instructional areas | 118 | 2.31 | .950 |
| Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity | 118 | 2.25 | 1.012 |
| *Promotional Activities* | | | |
| Conduct student recruitment activities. | 118 | 3.21 | .836 |
| Link with appropriate career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities. | 118 | 3.02 | .901 |

*Table Continues*

| Professional-related Competences | N | Mean | S.D. |
|---|---|---|---|
| Assist in developing a promotion/marketing plan for a specific program | 118 | 2.87 | .966 |
| *Professional Activities* | | | |
| Participate in professional development activities that result in professional growth. | 118 | 3.31 | .781 |
| Provide academic advising | 118 | 3.24 | .884 |
| Provide career advising. | 118 | 3.24 | .884 |
| Collaborate and/or network with other technical faculty and staff. | 118 | 3.12 | .797 |
| Assist students with job placements. | 118 | 3.08 | .926 |
| Participate in departmental and school committees for improvement of programs and school. | 118 | 2.97 | .842 |
| Manage a program advisory committee | 118 | 2.91 | .978 |
| *Technology Activities* | | | |
| Use technology for in-class instructional activities. | 117 | 3.24 | .762 |
| Use presentation software program (e.g., PowerPoint). | 118 | 3.19 | .889 |
| Use an organizational software program for student grades, rosters, etc. | 118 | 3.14 | .809 |
| Use a spreadsheet software (e.g., Excel). | 118 | 2.34 | .808 |
| Use a web-based course development software program (e.g., WebCT, Blackboard). | 118 | 2.80 | .911 |
| Teaching online | 118 | 1.78 | .811 |

## Self-Assessment Rankings

When planning professional development, it is essential to understand what practitioners perceive to be necessary skills for them to persist in the profession. It is equally important to identify any kind of skill gaps that exist among those essential skills. For research question 3, "How do practicing automotive teachers self-assess their current level of performance in their professional-related activities," I attempted to identify where these skill gaps existed. The participating teachers were asked to assess their abilities for each professional activity as they were ranking how important each activity was to their continued success. Teachers were asked to

rank their ability level for each of the 32 professional activities using the four-point Likert scale (1 “low” to 4 “very high”).

Activities which produced a self-assessment mean score of less than 3.0 identify areas in which teachers feel less comfortable in their abilities. Twenty-two items received a ranking of less than three. Furthermore, six of the activities produced a Mean of less than two-and-a-half. Table 6 presents the mean self-assessment score for each of the activities; the table is in order of most efficacious to least efficacious.

Table 6

*Automotive Teacher Self-Assessment Ranking of Professional-related Activities*

| Professional-Related Competencies | N | Mean | SD |
|---|---|---|---|
| *Instructional Activities* | | | |
| Utilize “hands-on” (contextual teaching and learning strategies) in the curriculum. | 118 | 3.53 | .700 |
| Provide individual and group instruction. | 118 | 3.14 | .603 |
| Modify instructional materials based on student and industry assessment and feedback. | 118 | 3.04 | .684 |
| Prepare effective current instructional materials. | 118 | 3.03 | .698 |
| Manage student conflicts in the classroom. | 118 | 2.98 | .816 |
| Recognize diverse learning styles and develop appropriate plans. | 118 | 2.85 | .833 |
| Utilize classroom arrangements for instructional effectiveness. | 118 | 2.81 | .805 |
| Provide accommodations for students with special needs. | 118 | 2.81 | .981 |
| Provide information or referrals to meet individual needs. | 118 | 2.79 | .804 |
| *Curriculum Activities* | | | |
| Identify and implement current industry standards and trends into the curriculum. | 118 | 3.10 | .799 |
| Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans). | 118 | 3.01 | .734 |
| Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum. | 118 | 2.93 | 1.01 |
| Participate in “back-to-industry” experiences to increase technical competence. | 118 | 2.92 | .962 |

*Table Continues*

| Professional-Related Competencies | N | Mean | SD |
|---|---|---|---|
| Create and utilize a variety of student assessment and evaluation techniques. | 118 | 2.75 | .808 |
| Integrate curriculum with other faculty and other instructional areas. | 118 | 2.31 | .893 |
| Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity. | 118 | 2.13 | .920 |
| *Promotional Activities* | | | |
| Conduct student recruitment activities. | 118 | 2.77 | .999 |
| Link with appropriate career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities. | 118 | 2.75 | .989 |
| Assist in developing a promotion/marketing plan for a specific program. | 118 | 2.41 | 1.05 |
| *Professional Activities* | | | |
| Participate in professional development activities that result in professional growth. | 118 | 3.04 | .928 |
| Provide career advising. | 118 | 2.95 | .959 |
| Collaborate and/or network with other technical faculty and staff. | 118 | 2.87 | .902 |
| Assist students with job placements. | 118 | 2.73 | 1.00 |
| Participate in departmental and school committees for improvement of programs and schools. | 118 | 2.65 | 1.01 |
| Provide academic advising. | 117 | 2.64 | 1.05 |
| Manage a program advisory committee. | 118 | 2.47 | 1.12 |
| *Technology Activities* | | | |
| Use a presentation software program (e.g., PowerPoint). | 118 | 3.15 | .864 |
| Use technology for in-class instructional activities. | 117 | 3.12 | .882 |
| Use an organizational software program for student grades, rosters, etc. | 118 | 3.12 | .859 |
| Use a web-based course development software program (e.g., WebCT, Blackboard). | 118 | 2.58 | 1.03 |
| Use a spreadsheet software (e.g., Excel). | 118 | 2.42 | 1.01 |
| Teaching online. | 118 | 1.71 | .979 |

Activities with self-assessment rankings of less than three were almost evenly distributed among the five professional categories. There were five activities in the instructional and

professional categories, four in promotional and curriculum, and only three activities ranked below 3.0 in the technology category.

## Comparing Professional Development Need

There were multiple strategies used to address research question 4, "What are the differences in professional development need for practicing automotive teachers based on various demographic variables." The variables used to examine differences in professional development need were: teacher preparation path, school type, automotive teaching experience, level of education, and age. The first strategy applied the use of descriptive statistics to rank professional development need for each professional category using the independent variable groups "alternatively prepared" and "traditionally prepared" teachers. Then, the MWDS for each professionally-related activity was compared for the variables, teacher preparation path and school type, by using independent sample *t*-tests for each activity. For the variables, automotive teaching experience, level of education, and age, the MWDS data had to be analyzed using one-way ANOVA. ANOVAs were conducted for each of these three independent variables because each variable consisted of three or more response categories.

Table 7 presents the MWDS data for the alternatively prepared teachers. The table is sub-divided by the sections found within the survey instrument: instructional activities, curriculum activities, promotional activities, professional activities, and technology activities. The table presents the respondents MWDS ranking from highest professional development need to lowest need; each section is ranked independently. Table 8 presents the same information for the traditionally prepared teachers.

Table 7

*Alternatively Prepared Teachers Professional Development Activities MWDS*

| Professional Development Need | *n* | MWDS |
|---|---|---|
| *Instructional Activities* | | |
| Provide individual and group instruction. | 46 | 2. 23 |
| Prepare effective current instructional materials. | 46 | 1.71 |
| Recognize diverse learning styles and develop appropriate plans. | 46 | 1.24 |
| Utilize classroom arrangements for instructional effectiveness. | 46 | 1.02 |
| Provide accommodations for students with special needs. | 46 | 0.92 |
| Utilize hands-on (contextual learning strategies) in the curriculum. | 46 | 0.88 |
| Modify materials based on student and industry feedback. | 46 | 0.87 |
| Provide information or referrals to meet individual needs. | 46 | 0.75 |
| Manage student conflicts in the classroom. | 46 | 0.33 |
| *Curriculum Activities* | | |
| Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum. | 46 | 1.57 |
| Identify and implement current industry standards and trends into the curriculum. | 46 | 1.35 |
| Participate in "back-to-industry" experiences to increase technical competence. | 46 | 0.92 |
| Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans). | 46 | 0.83 |
| Create and utilize a variety of student assessment and evaluation techniques. | 46 | 0.78 |
| Integrate curriculum with other faculty and instructional areas. | 45 | 0.77 |
| Develop and evaluate curriculum materials with regard to gender. bias and cultural sensitivity. | 46 | 0.00 |
| *Promotional Activities* | | |
| Assist in developing a promotion/marketing plan for a specific program. | 46 | 1.45 |
| Conduct student recruitment activities. | 46 | 1.42 |
| Link with appropriate career and technical education programs through advisory committees, Tech prep consortia, and/or other activities. | 46 | 1.00 |

*Table Continues*

| Professional Development Need | *n* | MWDS |
|---|---|---|
| *Professional Activities* | | |
| Participate in departmental and school committees for improvement of the programs and school. | 46 | 1.47 |
| Manage a program advisory committee. | 46 | 1.32 |
| Provide academic advising. | 46 | 1.03 |
| Collaborate and/or network with other technical faculty and staff. | 46 | 1.01 |
| Assist students with job placements. | 46 | 0.66 |
| Participate in professional development activities that result in professional growth. | 46 | 0.64 |
| Provide career advising. | 45 | 0.57 |
| *Technology Activities* | | |
| Use a web-based course development software program (e.g., WebCT, Blackboard). | 46 | 1.11 |
| Use technology for in-class instructional activities. | 46 | 1.08 |
| Use a presentation software program (e.g., PowerPoint). | 46 | 0.42 |
| Teaching online. | 46 | 0.29 |
| Use a spreadsheet software (e.g., Excel). | 46 | 0.20 |
| Use an organizational software program for student grades, rosters, etc. | 46 | 0.07 |

Four Instructional Activities resulted in an MWDS greater than one. "Provide individual and group instruction" was the instructional area in which alternatively prepared teachers perceived the highest need for professional development, and that was closely followed by "Prepare effective current instructional materials." Table 8 illustrates that traditionally prepared teachers expressed a similar need for both "Provide individual and group instruction" and "Prepare effective current instructional materials."

Both alternatively prepared and traditionally prepared teachers expressed a similar need for professional development with the following two activities: "Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum" and "Identify and implement current industry standards and trends into the curriculum." Both

preparation groups expressed the need for professional development with the activities relating to "Assist in developing a promotion/marketing plan for a specific program" and "Conduct student recruitment activities." "Link with appropriate career and technical education programs through advisory committees, Tech prep consortia, and/or other activities" is also a need for alternatively prepared teachers; but did not result in an MWDS score of 1.0 or above for traditionally prepared teachers.

Alternatively prepared and traditionally prepared teachers had two areas of perceived professional development need in common in regard to professional activities. "Manage a program advisory committee" and "Provide academic advising" both resulted in a professional development need of greater than one. Alternatively prepared teachers also show a need with activities related to "Participate in departmental and school committees for improvement of the programs and school" and "Collaborate and/or network with other technical faculty and staff," whereas traditionally prepared teachers expressed more comfort with these activities. They on-the-other-hand, expressed a need for development in the areas of "Provide career advising" and "Assist students with job placements."

Alternatively prepared teachers, unlike the traditionally prepared teachers, expressed some need with technology related activities. They reported a need with "Use a web-based course development software program" and "Use technology for in-class instructional activities." Traditionally prepared teachers seemed to have a higher comfort level with these areas.

Table 8

*Traditionally Prepared Teachers Professional Development Activities MWDS*

| Professional Development Need | *n* | MWDS |
|---|---|---|
| *Instructional Activities* | | |
| Prepare effective current instructional materials. | 73 | 1.83 |
| Provide individual and group instruction. | 73 | 1.39 |
| Utilize classroom arrangements for instructional effectiveness. | 73 | 1.31 |
| Modify materials based on student and industry feedback. | 72 | 1.21 |
| Recognize diverse learning styles and develop appropriate plans. | 72 | 0.87 |
| Utilize hands-on (contextual learning strategies) in the curriculum. | 73 | 0.78 |
| Provide information or referrals to meet individual needs. | 73 | 0.77 |
| Manage student conflicts in the classroom. | 73 | 0.56 |
| Provide accommodations for students with special needs. | 73 | 0.42 |
| *Curriculum Activities* | | |
| Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum. | 73 | 1.47 |
| Identify and implement current industry standards and trends into the curriculum. | 73 | 1.35 |
| Create and utilize a variety of student assessment and evaluation techniques. | 72 | 1.20 |
| Participate in "back-to-industry" experiences to increase technical competence. | 73 | 1.14 |
| Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans). | 73 | 0.63 |
| Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity. | 73 | 0.45 |
| Integrate curriculum with other faculty and instructional areas. | 73 | 0.32 |
| *Promotional Activities* | | |
| Conduct student recruitment activities. | 73 | 1.45 |
| Assist in developing a promotion/marketing plan for a specific program. | 73 | 1.22 |
| Link with appropriate career and technical education programs through advisory committees, Tech prep consortia, and/or other activities. | 72 | 0.76 |

*Table Continues*

| Professional Development Need | *n* | MWDS |
|---|---|---|
| *Professional Activities* | | |
| Assist students with job placements. | 71 | 1.34 |
| Manage a program advisory committee. | 71 | 1.26 |
| Provide career advising. | 71 | 1.24 |
| Participate in professional development activities that result in professional growth. | 71 | 1.11 |
| Provide academic advising. | 70 | 1.11 |
| Participate in departmental and school committees for improvement of the programs and school. | 72 | 0.66 |
| Collaborate and/or network with other technical faculty and staff. | 72 | 0.62 |
| *Technology Activities* | | |
| Use a web-based course development software program (e.g., WebCT, Blackboard). | | 0.26 |
| Use an organizational software program for student grades, rosters, etc. | 73 | 0.09 |
| Teaching online. | 73 | -0.02 |
| Use a presentation software program (e.g., PowerPoint). | 73 | -0.04 |
| Use technology for in-class instructional activities. | 72 | -0.04 |
| Use a spreadsheet software (e.g., Excel). | 73 | -0.45 |

Individual independent-sample *t*-tests were conducted for each of the 32 professionally-related activities to evaluate the difference in group means between alternatively prepared teachers and traditionally prepared teachers. The only activity that resulted in a significant difference between the two groups' means was "Participate in 'back-to-industry' experiences to increase technical competence." There was a significant difference between alternatively prepared (M= 0.225, SD= 1.73) and traditionally prepared (M= 1.79, SD= 2.89), $t_{(47)}$= -2.376, $p$= 0.022 for this professionally-related activity. The *t*-value of -2.376 is significant because the *p*-value of 0.022 is <.05. Cohen's effect size value ($d$ = -.300) suggests medium practical significance.

Individual independent-sample *t*-tests were conducted for each of the 32 professionally-related activities to evaluate the difference in group means between teachers practicing in secondary schools and those practicing in post-secondary schools. The only activity that resulted in a significant difference between the two groups' means was "Prepare effective current instructional materials." There was a significant difference between secondary school teachers (M= 1.22, SD= 2.08) and post-secondary school teachers (M= 2.12, SD= 2.68), $t_{(117)}$= -2.062, $p$= 0.041 for this professionally-related activity. The *t*-value of -2.062 is significant because the *p*-value of 0.041 is <.05. Cohen's effect size value ($d$ = -.375) suggests medium practical significance.

ANOVAs were conducted to evaluate the relationship between professional development need (for each of the 32 professionally-related activities) and number of years of automotive teaching experience. The independent variable, automotive teaching experience, included five levels (0-5 years, 6-10 years, 11-15 years, 16-20 years, and over 20 years). The dependent variable for each of the 32 ANOVA tests was the MWDS for the respective professionally-related activity. Three of the ANOVA tests were significant at the .05 level and one at the .057 level.

The first significant ANOVA was for the professional development need for "Provide individual and group instruction." The ANOVA was significant, $F_{(4,134)} = 3.580$, $p = .008$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with 6-10 years of automotive teaching experience and the group with 16-20 years of experience. The effect size value, $\eta^2 = .10$, suggests a medium practical significance.

The second significant ANOVA was for the professional development need for "Use a presentation software." The ANOVA was significant, $F_{(4,134)} = 2.445$, $p = .050$. Post hoc

comparisons (Bonferroni) could not identify significant differences in the means between the five independent variable groups. The effect size value, $\eta^2 = .07$, suggests a medium practical significance.

The third significant ANOVA was for the professional development need for "Use technology for in-class instructional activities." The ANOVA was significant, $F_{(4,134)} = 3.349$, $p = .012$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with 0-5 years of automotive teaching experience and the group with 16-20 years of experience. The effect size value, $\eta^2 = .09$, suggests a medium practical significance.

The ANOVA mean comparisons which resulted in significant differences are presented in Table 9.

Table 9

*One-Way Analysis of Variance for Professional Development Need as a Function of Years Teaching*

| | Automotive Teaching Experience Groups | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 yrs. | | 6-10 yrs. | | 11-15 yrs. | | 16-20 yrs. | | > 20 yrs. | | ANOVA | |
| Professional Activities | M | SD | M | SD | M | SD | M | SD | M | SD | $F_{(4,134)}$ | p-value |
| Provide individual and group instruction. | 2.12 | 2.12 | 2.38 | 2.23 | $1.19_a$ | 2.03 | $.51_a$ | 1.89 | 1.41 | 1.78 | 3.58 | .008 |
| Assist students with job placements. | 0.99 | 1.76 | 1.57 | 2.46 | 1.44 | 2.78 | -0.12 | 1.98 | 0.85 | 2.11 | 2.36 | .057 |
| Use a presentation software (e.g.; PowerPoint) | 0.87 | 2.99 | -.53 | 2.03 | -.80 | 2.35 | 0.34 | 2.00 | 0.47 | 1.96 | 2.44 | .050 |
| Use technology for in-class instructional activities. | $1.65_a$ | 3.01 | .68 | 2.34 | -.13 | 2.23 | $-0.46_a$ | 1.70 | 0.23 | 1.81 | 3.35 | .012 |

Note: Means in a row sharing subscripts are significantly different at $p<.05$.

ANOVAs were conducted to evaluate the relationship between professional development need (for each of the 32 professionally-related activities) and automotive teacher level of

education. The independent variable, level of education, included five levels (some college, Associate, Bachelor, Master, and Doctorate). The dependent variable for each of the 32 ANOVA tests was the MWDS for the respective professionally-related activity. Eight of the ANOVA results were statistically significant at the .05 level.

The first significant ANOVA was for the professional development need for "Provide individual and group instruction." The ANOVA was significant, $F_{(4,134)} = 2.623$, $p = .038$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with associate degrees and the group with master's Degrees. The effect size value, $\eta^2 = .07$, suggests a medium practical significance.

The second significant ANOVA was for the professional development need for "Provide accommodations for students with special needs." The ANOVA was significant, $F_{(4,134)} = 2.814$, $p = .028$. Post hoc comparisons (Bonferroni) could not identify significant differences in the means between the five independent variable groups. The effect size value, $\eta^2 = .08$, suggests a medium practical significance.

The third significant ANOVA was for the professional development need for "Participate in departmental and school committees for improvement of the programs and school." The ANOVA was significant, $F_{(4,134)} = 3.890$, $p = .005$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with bachelor's degrees and the group with master's degrees. The effect size value, $\eta^2 = .10$, suggests a medium practical significance.

The fourth significant ANOVA was for the professional development need for "Use a presentation software program." The ANOVA was significant, $F_{(4,134)} = 3.704$, $p = .007$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with

some college and the group with master's degrees. The effect size value, $\eta^2 = .10$, suggests a medium practical significance.

The fifth significant ANOVA was for the professional development need for "Use a spreadsheet software." The ANOVA was significant, $F_{(4,134)} = 4.192$, $p = .003$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with some college and the group with master's degrees. The effect size value, $\eta^2 = .11$, suggests a medium practical significance.

The sixth significant ANOVA was for the professional development need for "Use an organizational software program for student grades, rosters, etc." The ANOVA was significant, $F_{(4,134)} = 3.311$, $p = .013$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with master's degrees and the group with doctoral degrees. The effect size value, $\eta^2 = .09$, suggests a medium practical significance.

The seventh significant ANOVA was for the professional development need for 'Use a web-based course development software program." The ANOVA was significant, $F_{(4,134)} = 3.093$, $p = .018$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with bachelor's degrees and the group with master's degrees. The effect size value, $\eta^2 = .09$, suggests a medium practical significance.

The eighth significant ANOVA was for the professional development need for "Teaching online." The ANOVA was significant, $F_{(4,134)} = 2.737$, $p = .031$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group with bachelor's degrees and the group with master's degrees. The effect size value, $\eta^2 = .10$, suggests a medium practical significance. The ANOVA mean comparisons which resulted in significant differences are presented in Table 10.

Table 10

*One-Way Analysis of Variance for Professional Development Need as a Function of Level of Education*

| | Automotive Teacher Level of Education Groups | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Some College | | Associate | | Bachelor | | Master | | Doctorate | | ANOVA | |
| Professional Activities | M | SD | M | SD | M | SD | M | SD | M | SD | $F_{(4,134)}$ | p-value |
| Provide individual and group instruction. | 1.93 | 1.85 | 3.22$_a$ | 2.48 | 1.33 | 1.76 | 1.27$_a$ | 2.10 | .73 | 1.62 | 2.623 | .038 |
| Provide accommodations for students with special needs. | .55 | 1.22 | 1.37 | 1.58 | 1.21 | 2.46 | .16 | 1.77 | -.61 | 1.36 | 2.814 | .028 |
| Participate in departmental and school committees for improvement of the programs and school. | .28 | .93 | .56 | 2.30 | 1.99$_a$ | 2.55 | .35$_a$ | 2.11 | 1.77 | 1.62 | 3.890 | .005 |
| Use a presentation software program (e.g., PowerPoint) | 1.74$_a$ | 3.31 | .29 | 1.73 | .09 | 1.64 | -.29$_a$ | 2.21 | 2.55 | 3.49 | 3.704 | .007 |
| Use a spreadsheet software (e.g., Excel) | .85$_a$ | 1.57 | .63 | 1.83 | .00 | 1.38 | -.58$_a$ | 1.53 | .94 | 1.28 | 4.192 | .003 |
| Use an organizational software program for student grades, rosters, etc. | 1.16 | 2.16 | .00 | 2.86 | .17 | 2.16 | -.29$_a$ | 1.61 | 2.49$_a$ | 3.41 | 3.311 | .013 |
| Use a web-based course development software program (e.g., WebCT, Blackboard). | 1.54 | 2.32 | 1.54 | 2.32 | .56$_a$ | 2.12 | .07$_a$ | 1.90 | 2.20 | 3.00 | 3.093 | .018 |
| Teaching online. | .52 | 1.24 | 1.04 | 1.32 | -.17$_a$ | 1.43 | .04$_a$ | 1.18 | .66 | .91 | 2.737 | .031 |

Note: Means in a row sharing subscripts are significantly different at $p<.05$.

ANOVAs were conducted to evaluate the relationship between professional development need (for each of the 32 professionally-related activities) and automotive teacher age. The independent variable, teacher, included four ranges (21-29 years old, 30-39 years old, 40-49 years old, and over 50 years old). The dependent variable for each of the 32 ANOVA tests was the MWDS for the respective professionally-related activity. Three of the ANOVA tests were significant at the .05 level.

The first significant ANOVA was for the professional development need for "Prepare effective current instructional materials." The ANOVA was significant, $F_{(4,134)} = 2.961$, $p = .035$. Post hoc comparisons (Bonferroni) could not identify significant differences in the means between the four independent variable groups. The effect size value, $\eta^2 = .06$, suggests a medium practical significance.

The second significant ANOVA was for the professional development need for "Provide accommodations for students with special needs." The ANOVA was significant, $F_{(4,134)} = 3.415$, $p = .019$. Post hoc comparisons (Bonferroni) could not identify significant differences in the means between the four independent variable groups. The effect size value, $\eta^2 = .07$, suggests a medium practical significance.

The third significant ANOVA was for the professional development need for "Participate in departmental and school committees for improvement of the programs and school." The ANOVA was significant, $F_{(4,134)} = 5.500$, $p = .001$. Post hoc comparisons (Bonferroni) found significant differences in the means between the group of automotive instructors between the ages of 21-29 and the other three groups (30-39, 40-49, & 50 and up). The effect size value, $\eta^2 = .11$, suggests a medium practical significance. The ANOVA mean comparisons which resulted in significant differences are presented in Table 11.

Table 11

*One-Way Analysis of Variance for Professional Development Need as a Function of Age Group*

| | Automotive Teacher Age Groups | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 21-29 yrs. | | 30-39 yrs. | | 40-49 yrs. | | 50 yrs. or older | | ANOVA | |
| Professional Activities | M | SD | M | SD | M | SD | M | SD | $F_{(4,134)}$ | p-value |
| Prepare effective current instructional materials. | 2.77 | 1.55 | 1.28 | 2.25 | 2.46 | 2.45 | 1.16 | 2.20 | 2.961 | .035 |
| Provide accommodations for students with special needs. | 2.42 | 1.35 | .47 | 1.78 | 1.11 | 2.32 | .14 | 1.83 | 3.415 | .019 |
| Participate in departmental and school committees for improvement of programs and school. | $4.25_{a,b,c,d}$ | 2.71 | $.31_{a, b}$ | 2.37 | $1.30_{a, c}$ | 2.19 | $.66_{a, d}$ | 1.98 | 5.500 | .001 |

Note: Means in a row sharing subscripts are significantly different at $p<.05$.

# CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

Career and technical education is influenced by many things including the economy and local and national funding. Funding has had the most dramatic effect, and many policies and policy updates are tied to funding. Accountability for teaching and learning has taken center stage since the passing of the Perkin's Career and Technical Education Act in 2006, and even more so with the Strengthening Career and Technical Education for the 21st Century Act (Perkin's V). This research focused on learning the professional demographic characteristics of Illinois secondary and post-secondary automotive teachers as well as investigating their professional development needs. Regional and district administrators can use the knowledge of the professional development needs reported by these instructors to support teacher growth as well as develop retention frameworks to reduce attrition. At first glance it may appear that attrition is not an issue with this group of CTE instructors, but the aging workforce will soon require the recruitment and retention of new teachers. The state of Illinois has also lowered the licensing standards for industrial educators, so attrition may become a real issue in the next several years. This research was guided by the following research questions:

RQ 1. What are the differences in demographic characteristics between automotive technology teachers that have completed traditional teacher education preparation and those that have completed some type of alternative preparation?

RQ 2. What do practicing automotive teachers identify as important professional-related activities to their success as an educator?

RQ 3. How do practicing automotive teachers self-assess their current level of performance in their professional-related activities?

RQ 4. What are the differences in professional development needs for practicing automotive teachers based on the various demographic variables?

**Findings - Research Question 1**

Results from this study suggest that the Illinois automotive teaching workforce is aging. Forty-six percent of the respondents reported to be over 50 years old, this is much higher than the 29% of Illinois public school teachers that reported being in this same age group during the implementation of the National Teacher and Principal Survey (NTPS) (National Research Center for Education Statistics, n.d.). An additional 22% indicated that they were between 40 and 49 years old. Combined, 68% of respondents indicated they were 40 years old or older which is still higher than the 56% reported in the NTPS. On-the-other-hand, these results are similar to the studies conducted by Cannon et al. (2010) in Idaho and Moon (2014) in Oregon, who also examined CTE teachers.

The results are concerning because of the decline of traditional preparation programs. Reduced access to traditionally prepared candidates will force districts and colleges to appoint teachers that have been prepared for the classroom by alternative means, and it will become increasingly imperative to keep the teachers that are hired. According to the Illinois State Board of Education (2018), there was a 15% decrease in the number of completers within secondary teacher education preparation programs between the years of 2014 and 2017. As reported by the National Teacher Preparation Data Title II report, from 2010 to 2016 53% fewer people completed a teacher preparation program in Illinois (National Teacher Preparation Data, n.d.).

With fewer teachers completing teacher preparation programs, emphasis should be placed on the quality of the preparation programs and retention frameworks should be constructed which should include quality relevant professional development. Latham, Mertens, and Hamann (2015)

stated “Many reports over the past decade have highlighted the fact that 50% of new teachers leave by their fifth year” (p.80). They go on to argue that specialized Professional Development School (PDS) teacher education models had an influence to reduce teacher attrition. These PDS teacher preparation frameworks place an emphasis on the teaching experience teacher candidates undertake.

Fifty-three percent of the alternatively prepared teachers had less than 10 years of experience. While nearly 78% of traditionally prepared teachers had 11 or more years of automotive teaching experience. While this study cannot determine the cause of this result, one could wonder if this phenomenon is linked to the preparation and induction process. This could also be linked to the fact that many CTE teachers choose teaching as a second career after working in industry. Especially since 73% of the alternatively prepared teachers are 40 and above.

Ruhland (2001) argued that teachers remaining in the field were committed to the profession, but career related stress contributed to the decision to leave the profession. Ruhland added that a poor induction process and support during the first year of teaching increases the chance of attrition. Su, Dainty, and Sandford indicated that inherent abilities in communication, prior academic success, creativity, and professionalism contribute to the retention of teachers. Illinois automotive teachers reported that professional activities were important, and the research suggests that development is needed with all of the professional activities listed within the survey. All of the professional activities require good communication with multiple stakeholders. McCandless and Sauer (2010) found a higher attrition rate for two-year alternative prepared CTE instructors. McCandless and Sauer recommend supporting these teachers with professional development during the first year of teaching.

CTE content areas are not currently listed within the ISBE designated teacher shortage area list. Although according to ISBE, 28 industrial occupation teaching positions went unfilled between 2017 and 2019. At first glance this number seems low compared to the 4,831 teaching positions that went unfilled for the current year (ISBE, n.d.b), but when one considers that this is 12% of the total secondary automotive teachers in Illinois, the number looks much higher. This number is likely to increase as a high percentage of automotive teachers near retirement. As costs increase and budgets decrease, districts may have to make tough decisions about the current automotive programs if they find it difficult to find replacement teachers.

**Findings - Research Question 2**

Illinois automotive teachers ranked 23 of the professional activities as high importance or very high the importance to their continued success as an educator. Fourteen of the professional activities were either instructional activities or curriculum activities. As a matter of fact, only two of the curriculum activities were not ranked with high importance. The professional activities "Integrate curriculum with other faculty and other instructional areas" and "Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity." Illinois automotive teachers seem to understand that instructional and curriculum skills are important to their continued success.

The automotive teachers also seem to feel very accountable for their programs based on the importance rankings of the promotional activities. Two of the three promotional activities, "Conduct student recruitment activities" and "Link with appropriate career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities," were ranked with high to very high importance.

## Findings - Research Question 3

Similar to what Moon (2014) found with Oregon Industrial and Engineering Teachers, Illinois automotive teachers tended to be more confident in their abilities with activities that they ranked as important. The top 10 ranked professional abilities were all ranked by the teachers as highly important to their continued success as educators.

## Findings - Research Question 4

The current study suggests that there is little difference in the professional development needs between alternatively prepared and traditionally prepared teachers. Both groups had a similar need for professional pedagogical professional development. The most significant differences were between the five different groups of education levels.

Eighty-four percent of the respondents had at least a bachelor's degree, and 65% had at least a bachelor's degree in the field of education. This number is higher than reported by Stephens (2015), but lower than the state average for all teachers.

Teachers with some college but no degree reported to be more efficacious with providing individual and group instruction than those with an Associate degree. They also reported the same with the ability to use organizational software for grading and rosters, but this time more than all four other degree categories. As a matter of fact, in all cases where a significant difference in professional development need was found between the five different groups of education level, those without a degree reported needing less professional development than at least one group of higher educated teachers. This group also reported to be almost exclusively over the age of 50. There could be many contributing factors for this group being over the age of 50 such as: the teachers moving to teaching as an encore career or a result of relaxed certification requirements. Time in industry could explain the confidence in certain activities.

As stated earlier, there are similar professional development needs for both groups of teacher preparation paths. Both groups reported lower efficacy in areas within four of the five professional activity categories. Districts and colleges that focused effective professional development with any of the following activities could expect professional growth for their automotive teachers. Two instructional activities, "Provide individual and group instruction" and "Prepare effective current instructional materials" were ranked as the highest need. "Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum" and "Identify and implement current industry standards and trends into the curriculum" were curriculum activities that respondents indicated required some development. Many teachers feel a burden to develop their programs due to the increasing pressure for enrollment. Professional activities that were identified for professional development need for both groups were "Assist in developing a promotion/marketing plan for a specific program" and "Conduct student recruitment activities."

## Implications for Practice

Policymakers, educational leaders, and educators can use the results of this study to construct professional development activities and plans. The instructors perceived that their abilities were higher with the professional activities that they deemed important, but with nearly every activity they ranked their ability lower than they rated its importance. For example, alternatively prepared teachers ranked their ability lower than they rated their perceived importance with 31 of 32 professionally related activities, and they ranked it even on the only outlying activity. The traditionally prepared teachers did the same for 28 of the 32 professionally related activities. The remaining four were ranked inversely (negative professional development need), and they were all found within the technology category. There were a combination of

factors that contributed to the inverse ranking. "Use presentation software" and "Use technology for in-class instructional activities" were ranked as important activities, but the mean self-assessment were high at 3.19 and 3.21 respectively. "Teaching online" and "Use a spreadsheet software" were ranked as moderate or low importance to their success. The ability rankings were higher than the importance rankings at 1.66 and 2.38 respectively. These findings are similar to the Oregon industrial and engineering teachers who ranked their abilities lower than their perceived importance on all 35 activities listed within the survey (Moon, 2014). Wallin and Smith (2005) had comparable findings with teachers in Georgia's technical colleges. Georgian teachers ranked their abilities lower than their perceived importance on all 50 of the professional activities surveyed. Comparable to the teachers in these related studies, Illinois automotive instructors require professional development with nearly all of professional development activities listed within the research.

Fortunately the teachers also ranked "Participate in professional development activities that result in professional growth" very high (3.25). This seems to indicate that they would participate in custom plans aimed at increasing pedagogical competence. Custom professional development strategies could be developed for the unique needs of the different groups of instructors. With the exception of technology activities, these automotive teachers report gaps in all other categories surveyed with this research.

According to Wallin and Smith (2005), technical colleges are a driving force for the economy, and in 2016 there were over 75,000 automotive jobs that went unfilled (Unrau, 2017). Successful professional development frameworks are imperative to grow and maintain the pool of effective educators in the automotive classrooms of Illinois public institutions. Meaningful professional development has been reported to have a significant positive influence on teacher

retention (Drage, 2010). Carefully planned and executed professional development will help to support the needs of the current and future automotive educators who will then be able to excel as educators. These effective educators will be more able to facilitate learning and advise students who can go into our communities to meet the needs of the automotive industry that so desperately needs quality technicians.

## Limitations

The survey responses were based on perception by the respondents. This meant that the automotive teachers had to make value judgments. Two assumptions were made in order to conduct the survey. The first assumption was that each teacher could accurately rate their perceived abilities on all of the professional-related activities. The other assumption was that the respondents would be truthful when rating their perceived importance of each activity, and that they were truthful with rating their abilities.

The survey window was only open for a short time, from October 17, 2019 until November 5, 2019. There could have been professional or private events that conflicted with participation in the survey. The survey did not include an open-ended question that would allow participants to report what their perceived professional development needs were. The anonymous nature of the survey did not allow for personalized reminder emails.

This research had a lower response rate than some of the other CTE projects. There were 139 total respondents. There were 231 secondary teachers in the population and 166 post-secondary teachers in the population. More teachers responded to the demographic questions than the professional activity needs assessment raking questions. Thirty-five percent responded to the Demographic Questioning, and 30% responded to the Importance ranking and self-assessment ranking items. Cannon, Tenuto, and Kitchel (2013) had a 50% response rate when

dealing with principals that supervised CTE teachers. Moon (2014) had a 58.5% response rate with industrial and engineering teachers in Oregon. Wallin and Smith (2005) 38% respond from Georgia technical colleges. McAdoo (2018) acquired a 29% response rate from CTE teachers within the Georgia metropolitan technical schools. More traditionally prepared teachers responded (*n*=90) than alternatively prepared (*n*=49). In spite of the limitations, the results of this study can be used as foundational research for future professional development needs assessments, specifically, for automotive or other industrial CTE content areas.

## Recommendations for Future Research

Nearly half of the alternatively prepared respondents were 50 or older, and 17 of these 27 teachers reported to having more than 10 years of experience. Stakeholders could benefit from further research of beginning alternatively prepared instructors due to the fact that a large percentage of Illinois automotive teachers are nearing retirement age.

There were several teachers that did not have a degree and many that had less than a bachelor's degree. Some of their responses to "level of importance" and their "self-assessment" leaves questions as to whether they fully understand all of the requirements of a professional teacher. Identifying gaps between what these teachers discern as important and what activities are essential to continuing as a successful educator could benefit Illinois stakeholders. This could be said for other groups of the respondents. For example, the respondents ranked "Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity" second least important to their continued success. The only activity that they ranked less important was "Teaching online." This is surprising because of the research that highlights the prevalence of gender bias and microaggressions in traditionally male careers within career and technical education (Rowe, 2008; Sue et al. 2007). Williams (2015), from the National Alliance

for Partnerships in Equity, argued that a lack of diversity, cultural and gender stereotypes, implicit bias, and micro-messaging serve as barriers for students to choose careers and education pathways.

Retention, attrition, and recruitment all play contributing roles in staffing teacher openings in CTE content areas. Future research should focus on the contributing factors for deactivation and removal of automotive programs in Illinois public schools. District and college leaders must make decisions about the futures of the districts and colleges that they oversee. Understanding the factors that contribute to the loss of CTE programs could help to support the programs before elimination is necessary, especially if staffing of these programs is a factor.

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# APPENDIX A: SURVEY INSTRUMENT

You are being asked to participate in a research study conducted by Shane Lange, a doctoral candidate in the School of Teaching and Learning at Illinois State University. The purpose of this study is to examine the professional development needs of Illinois automotive instructors.

**Why are you being asked?**

You have been asked to participate because you teach an automotive course at an Illinois public school. Your participation in this study is voluntary. You will not be penalized if you choose to skip parts of the study, not participate, or withdraw from the study at any time.

**What would you do?**

If you choose to participate in this study, you will complete the following anonymous survey. In total, your involvement in this study will last approximately 15 minutes.

**Are any risks expected?**

We do not anticipate any risks beyond those that would occur in everyday life.



**Will your information be protected?**

Your responses will be anonymous. There is nothing in the survey that will identify you and link you to your responses. The findings from this study may be presented in an educational setting at a conference or briefing.

**Who will benefit from this study?**

Data will be used to explore the professional development needs of Illinois automotive instructors. Results could be used to develop or improve professional development for teachers.

**Whom do you contact if you have any questions?**

If you have any questions about the research or wish to withdraw from the study, contact Shane Lange (swlange@ilstu.edu) or Dr. Steve Mertens (smerten@ilstu.edu).

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If you have any questions about your rights as a participant, or if you feel you have been placed at risk, contact the Illinois State University Research Ethics & Compliance Office at (309) 438-5527 or IRB@ilstu.edu.

DOCUMENTATION OF CONSENT

Click “I consent” below if you are 18 or older and willing to participate in this study.

You can print this form for your records.

- ○ I consent, begin the study
- ○ I do not consent, I do not wish to participate

## Demographic Information

Indicate the type of school where you are currently employed.

- ○ Secondary (High School)
- ○ Post-secondary (Community College, University)

How many years have you taught automotive courses?

Number of Years

How many years have you taught in your current position?

Number of Years

Indicate the highest level of school you have completed or the highest degree you have received.

- ○ Less than high school degree
- ○ High school graduate (high school diploma or equivalent including GED)
- ○ Some college but no degree
- ○ Associate degree in college (2-year)
- ○ Bachelor's degree in college (4-year)
- ○ Master's degree
- ○ Doctoral degree

What best describes your formal teaching education?

- ○ No teacher education coursework
- ○ Some completed teacher education coursework but no degree
- ○ Bachelor's degree in Education
- ○ Master's Degree in Education
- ○ Doctoral Degree in Education

What certifications/licensures do you currently possess? (Check all that apply)

- ☐ State Teaching License (Illinois State Board of Education)
- ☐ Emergency/Provisional License (Illinois State Board of Education)
- ☐ Industry Credential (ASE Certification)
- ☐ _____ Other

Which best describes your age?

- 21-29 30-39 40-49
- 50 or older
-
-

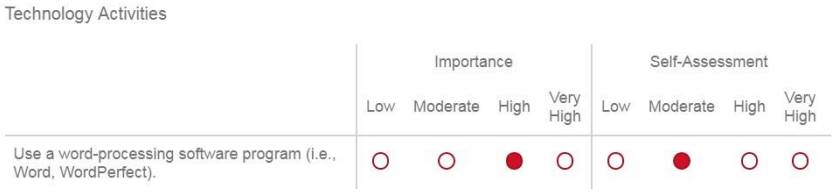
Which best describes your gender?

- Male
- Female
- Other
- I prefer not to answer

**Student Support and Guidance Activities**

We are interested in how **important** each of the following professional-related activities is to your continued success as an Automotive Educator. In addition, we ask that you **self-assess** your current level of performance in each professional activity. In the left column, you will click the response that best reflects your perceived level of importance of the professional activity. In the right column, you will click the response that best indicates your self-assessment in performing the professional activity.

The following example shows this person indicated that the importance of word processing use is high for their continued success. Their self-assessment shows moderate ability in performing the professional activity:



A. Instructional Activities

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 1. | Provide individual and group instruction. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. | Prepare effective current instructional materials. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. | Utilize classroom arrangements for instructional effectiveness. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. | Modify instructional materials based on student and industry assessment and feedback. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. | Manage student conflicts in the classroom. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. | Provide information or referrals to meet individual student needs. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. | Provide accommodations for students with special needs. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 8. | Recognize diverse learning styles and develop appropriate plans. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9. | Utilize "hands-on' (contextual teaching and learning strategies) in the curriculum. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

B. Curriculum Activities

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 1. | Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans). | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. | Create and utilize a variety of student assessment and evaluation techniques. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. | Integrate curriculum with other faculty and other instructional areas. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. | Identify and implement current industry standards and trends into the curriculum. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. | Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. | Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. | Participate in "back-to-industry" experiences to increase technical competence. | | | | | | | | |

C. Promotional Activities

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 1. | Conduct student recruitment activities. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. | Link with appropriate career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. | Assist in developing a promotion/marketing plan for a specific program. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

D. Professional Activities

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 1. | Assist students with job placements. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. | Provide academic advising. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. | Provide career advising. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. | Collaborate and/or network with other technical faculty and staff. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. | Manage a program advisory committee. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. | Participate in departmental and school committees for improvement of the programs and school. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. | Participate in professional development activities that result in professional growth. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

E. Technology Activities

| | | Importance | | | | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Low | Moderate | High | Very High | Low | Moderate | High | Very High |
| 1. | Use a presentation software program (e.g.,PowerPoint). | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. | Use a spreadsheet software (e.g., Excel). | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. | Use an organizational software program for student grades, rosters, etc. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. | Use a web-based course development software program (e.g., WebCT, Blackboard). | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. | Teaching online. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. | Use technology for in-class instructional activities. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

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## PROFESSIONAL DEVELOPMENT IN THE TECHNICAL COLLEGES OF GEORGIA

### A Survey of the Faculty

The University of Georgia and the Georgia Department of Technical and Adult Education are collaborating on a survey to determine faculty professional-development needs. The results of the survey will be used to enhance faculty-development opportunities. Your participation is very important and appreciated. The professional-related activities listed below for a faculty member in the Technical College System of Georgia have been prepared after reviewing studies on the state and national level and with assistance of an advisory committee composed of the most recent Rick Perkins Award winners.

**Directions:** We are interested in how **important** each of the following professional-related activities is to your continued success as a Technical College Educator. In addition, we ask that you **self-assess** your current level of performance in each professional activity. In the left hand column check (✓) the response that best reflects your perceived level of importance of the professional activity. In the right-hand column check (✓) the response that best indicates your self-assessment in performing the professional activity.

| **Importance** | | | | | **Self-Assessment** | | | |
|---|---|---|---|---|---|---|---|---|
| Low | Moderate | High | Very high | ***Example*** | Low | Moderate | High | Very high |
| | | ✓ | | Develop community support. | ✓ | | | |

This person perceived the professional activity "develop community support" to be of **High Importance** and perceived **Low Self-Assessment** in performing this professional activity.

| Importance | | | | Professional Activities for Technical-College Faculty | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|
| Low | Moderate | High | Very high | | Low | Moderate | High | Very high |
| | | | | **Technology activities** | | | | |
| | | | | Use a word-processing software program (i.e., Word, WordPerfect). | | | | |
| | | | | Use e-mail. | | | | |
| | | | | Use a presentation software program (i.e., PowerPoint). | | | | |
| | | | | Use a database software program (i.e., Access). | | | | |
| | | | | Use a spreadsheet software program (i.e., Excel). | | | | |
| | | | | Use an organizational software program for student grades, rosters, etc. (i.e., Banner). | | | | |
| | | | | Use a web-based course development software program (i.e., WebCT, Blackboard). | | | | |
| | | | | Use the Internet for professional and personal research and nstructional resources. | | | | |
| | | | | Teach utilizing on-line web-based courses. | | | | |
| | | | | Teach utilizing distance-learning technology (i.e., GSAMS). | | | | |
| | | | | Use technology for in-class instructional activities. | | | | |
| | | | | Other: _____ | | | | |
| | | | | **Student support and guidance activities** | | | | |
| | | | | Provide information or referrals to meet individual student needs. | | | | |
| | | | | Assist students with job placements. | | | | |
| | | | | Provide academic advising. | | | | |
| | | | | Provide career advising. | | | | |
| | | | | Serve as a student organization advisor. | | | | |
| | | | | Implement student retention programs. | | | | |
| | | | | Other: _____ | | | | |
| | | | | **Instructional activities** | | | | |
| | | | | Provide individual and group instruction. | | | | |
| | | | | Prepare effective current instructional materials. | | | | |

(*Continued*)

(Continued)

| Importance | | | | Professional Activities for Technical-College Faculty | Self-Assessment | | | |
|---|---|---|---|---|---|---|---|---|
| Low | Moderate | High | Very high | | Low | Moderate | High | Very high |
| | | | | **Technology activities** | | | | |
| | | | | Utilize classroom arrangements for instructional effectiveness. | | | | |
| | | | | Modify instructional materials based on student and industry assessment and feedback. | | | | |
| | | | | Manage student conflicts in the classroom. | | | | |
| | | | | Provide accommodations for students with special needs. | | | | |
| | | | | Recognize diverse learning styles and develop appropriate plans. | | | | |
| | | | | Utilize instructional techniques that develop higher order skills in students (i.e., critical thinking skills). | | | | |
| | | | | Implement writing skills across the curriculum. | | | | |
| | | | | Ut lize "hands-on" (contextual teaching and learning strategies) in the curriculum. | | | | |
| | | | | Other: _____ | | | | |
| | | | | **Promotional activities** | | | | |
| | | | | Conduct student recruitment activities. | | | | |
| | | | | Link with secondary career and technical education programs through advisory committees, Tech Prep consortia, and/or other activities. | | | | |
| | | | | Assist in developing a promotion/marketing plan for a specific program. | | | | |
| | | | | Other: _____ | | | | |
| | | | | **Administrative and management activities** | | | | |
| | | | | Participate in budget development. | | | | |
| | | | | Assist with writing and implementing grants and targeting financial resources. | | | | |
| | | | | Participate in innovative program development. | | | | |
| | | | | Document and communicate student grading policies. | | | | |

Provide input into secondary/postsecondary articulation agreements for instructional programs.
Develop and maintain relationships with business and industry.
Address institution and student safety issues (i.e., violence, terrorism, severe weather).
Address legal issues (i.e., student privacy act, sexual harassment).
Address health and medical related issues (i.e., CPR, stress management, wellness).
Other: _____

**Curriculum activities**

Create and modify curriculum (i.e., course syllabus, course objectives, lesson plans).
Create and utilize a variety of student assessment and evaluation techniques.
Integrate curriculum with other faculty and other nstructional areas.
Identify and implement current industry standards and trends into the curriculum.
Work with advisory committee and employers to meet changing needs of the program and industry to modify curriculum.
Develop and evaluate curriculum materials with regard to gender bias and cultural sensitivity.
Participate in "back-to-industry" experiences to increase technical competence.
Other: _____

**Professional environment activities**

Collaborate and/or network with Technical College faculty and staff.
Manage a program advisory committee.
Participate in departmental and college committees for improvement of the programs and the college.
Participate in professional development activities that result in professional growth.
Other: _____

# APPENDIX C: ILLINOIS STATE UNIVERSITY IRB APPROVAL


Oct 10, 2019 4:14 PM CDT

Steven Mertens
Teaching & Learning

Re: Exempt - Initial - IRB-2019-580 EXAMINING CAREER AND TECHNICAL EDUCATION: PRACTITIONER PREPARATION AND PROFESSIONAL DEVELOPMENT NEEDS OF ILLINOIS AUTOMOTIVE INSTRUCTORS

Dear Dr. Steven Mertens:

Illinois State University Institutional Review Board has rendered the decision that your study qualifies for exempt determination.

Selected Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

The Exempt Status does not relieve the investigator of any responsibilities relating to the research participants. Research should be conducted in accordance with the ethical principles, (1) Respect for Persons, (ii) Beneficence, and (iii) Justice, as outlined in the Belmont Report.

Any change to the protocol or study materials that might affect the Exempt Status must be submitted in Cayuse IRB. Depending on the changes, you may be required to apply for either Expedited or Full Review. Please contact the Human Subject Research Specialist to determine if your modifications meet these criteria at 309-438-5527 or irb@ilstu.edu.

Sincerely,

Illinois State University Institutional Review Board

## Automotive Teacher Professional Development Needs

You are being asked to participate in a research study conducted by Shane Lange, a doctoral candidate in the College of Teaching and Learning at Illinois State University. The purpose of this study is to examine the professional development needs of Illinois automotive instructors.

**Why are you being asked?**
You are being asked to participate in this research study because you teach an automotive course at an Illinois public school. Your participation in this study is voluntary. You will not be penalized if you choose to skip parts of the survey, not participate, or withdraw from the survey at any time.

**What would you do?**
If you choose to participate in this study, you will complete the following anonymous survey. In total, your involvement in this study will last approximately 15 minutes.

**Are any risks expected?**
We do not anticipate any risks beyond those that would occur in everyday life.

**Will your information be protected?**
Your responses will be anonymous; nothing that will identify you will be linked to your responses. The findings from this study may be presented in an educational setting during a conference or briefing.

**Who will benefit from this study?**
Data will be used to explore the professional development needs of Illinois automotive instructors. Results could be used to develop or improve professional development for automotive instructors.

**Whom do you contact if you have any questions?**
If you have any questions about this research study or wish to withdraw from the study, contact Shane Lange (swlange@ilstu.edu) or Dr. Steve Mertens (smerten@ilstu.edu).

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If you have any questions about your rights as a participant, or if you feel you have been placed at risk, contact the Illinois State University Research Ethics & Compliance Office at (309) 438-5527 or IRB@ilstu.edu.

O I consent, begin the study.

O I do not consent, I do not wish to participate.