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Relationship Between Technology Student Association Participation and Soft Skills Development, Controlling for Gender

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RELATIONSHIP BETWEEN TECHNOLOGY STUDENT ASSOCIATION PARTICIPATION AND SOFT SKILLS DEVELOPMENT, CONTROLLING FOR GENDER

by

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ABSTRACT

RELATIONSHIP BETWEEN TECHNOLOGY STUDENT ASSOCIATION PARTICIPATION AND SOFT SKILLS DEVELOPMENT, CONTROLLING FOR GENDER

Lauren M. Lapinski
Old Dominion University, 2021
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The purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills necessary for gainful employment. This study specifically sought information on relationships between soft skills development and (a) time spent on Technology Student Association activities; (b) competitive event success; (c) assumption of leadership roles; (d) gender. Data were provided by Pennsylvania Technology Student Association and consisted of survey responses from middle and high school students who are active Technology Student Association members across the state (n = 229).

In addition to descriptive data, a multiple linear regression analysis was performed to determine the relationship between the independent variables and the dependent variable of soft skills score. As part of the regression analysis, a correlation analysis was also performed to determine the relationship between the independent variables. The independent variables collectively accounted for a significant 16% (R^2 = .16) of the variance in soft skills score. Time spent per week was a significant predictor of soft skills score (β = .19) as was the assumption of leadership roles (β = .22). Gender was also a significant predictor of soft skills score as females scored 12.18 points higher than males, after controlling for leadership roles assumed, competitive event success, time spent per week, and years of participation. Additionally,

significant relationships were found between the following variables: leadership roles assumed and years of participation (r [227] = .52, $p < .001$), leadership roles assumed and time spent per week (r [227] = .18, p =.005), leadership roles assumed and competitive event success (r [227] = .50, $p < .001$), leadership roles assumed and soft skills score (r [227] = .23, $p < .001$), time spent per week and soft skills score (r [227] = .23, $p < .001$), time spent per week and competitive event success (r [227] = .14, p =.039), and years of participation and competitive event success (r [227] = .54, $p < .001$).

This dissertation is dedicated to my parents. You have instilled in me, in all three of us really, core values that have brought me here. Always leading by example, you consistently demonstrate that unparalleled satisfaction can come from hard work. You remind me of the need for balance, that all work and no play is no way to live. You foster generosity, showing that life is richest when we take our gifts and use them to help others. Thank you for your support throughout this process and for all the sacrifices you made to ensure we always felt well loved.

I love you, Mom and Dad.

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The acknowledgements section in any document is the worst when it offers a list of generic thank yous and includes nothing personal. I can offer no citation for that, only my preference. It is my hope to provide something more meaningful, now that I have the chance to craft my own acknowledgements section. Here goes.

I would like to begin by expressing my gratitude to my committee. Dr. Owings, I appreciate your willingness to jump on board and value the educational experience you have willingly lent to this process. Dr. Reed, your technology education expertise is superior and consistently challenges me to better understand and articulate this field that we both love so much. Thank you for introducing me to this program at ODU, for the vast knowledge you have imparted throughout class, and for the detailed feedback that has made me a better writer. Dr. Kosloski, early on in this process I clearly remember you saying that this was my ship to steer, that you would be the advisor I needed you to be, and you have done just that. I always knew I had your support (the SP moniker made it hard not to!) yet I never felt micromanaged or like I was lacking ownership in this endeavor. Thank you for your willingness to get to know me, to adopt a style of advising that suited me perfectly, and for the copious, detailed notes on my various drafts. You are a true professional, Dr. K, and I consider myself incredibly lucky to have taken this journey with you as my guide. I owe you all margaritas for life.

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LIST OF ACRONYMS

ABET	American Board for Engineering and Technology
ACTE	Association for Career and Technical Education
AIAA	American Industrial Arts Association
AIASA	American Industrial Arts Student Organization
AVA	American Vocational Association
CTE	Career and Technical Education
CTSO	Career and Technical Student Organization
CTTE	Council on Technology Teacher Education
FCCLA	Family, Career and Community Leaders of America
FBLA-PBL	Future Business Leaders of America – Phi Beta Lambda
HOSA	Health Occupations Students of America
ITEEA	International Technology and Engineering Educators Association
NSF	National Science Foundation
OCTAE	Office of Career, Technical, and Adult Education
OECD	Organisation for Economic Co-operation and Development
STEM	Science, Technology, Engineering, and Math
TSA	Technology Student Association
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The term “soft skills” is commonly found in today’s educational and workplace literature, sometimes referred to as social-emotional skills, life skills, people skills, or employability skills. By definition, a skill is “the ability to access knowledge from a domain-specific knowledge base and use that knowledge to perform an action or carry out a task” (Matteson, et al., 2016, p.74). It is important to differentiate between skills and traits, or dispositions. A trait or disposition is innate, whereas skill implies an ability that can be developed over time (Katz, 1986). Hurrell et al. (2012) define soft skills as “nontechnical and not reliant on abstract reasoning, involving interpersonal and intrapersonal abilities to facilitate mastered performance in particular contexts” (p. 162). Soft skills can be categorized best as interpersonal and intrapersonal (Katz, 1986; Laker & Powell, 2011; Levasseur, 2013; U.S. Department of Labor, 2004). Interpersonal soft skills deal with human interaction and include skills such as teamwork, conflict resolution, oral and written presentation, social awareness, and empathy. Intrapersonal skills rely heavily on self-awareness and include skills such as flexibility, creativity, professionalism, facility with language, motivation, and problem-solving. This is not an all-inclusive list, but rather concrete examples of the types of skills within the categories of interpersonal and intrapersonal.

Soft skills matter increasingly in today’s evolving economy. No longer is it prudent to focus solely on preparing students to be economically productive (Cimatti, 2016). Instead, soft skills must be taught in conjunction with hard skills to produce individuals capable of competing in the modern workforce. Heckman (2012), American economist and Nobel laureate, stated "soft skills predict success in life” (p. 451). Within the last two decades, the American Board for Engineering and Technology (ABET; 2019) modified accreditation requirements for global engineering programs. This modification included a significant increase in the attention paid to an engineering program's efforts to develop soft skills in students. Even Binet and Simon (1916), psychologists and creators of the original IQ test at the beginning of the 20th century, stated more than cognitive development must be considered when predicting success in school, and by extension, career and personal life. In today's global job market, technical skills will earn an applicant further attention, but well-developed soft skills are quickly becoming the determining factor in who gets hired (Klaus, 2007).

With the importance of soft skills established, the discussion moves on to how best teach and assess their development. There is ardent agreement that soft skills are best developed when integrated with the learning of hard skills. In other words, soft skills should not be viewed as an additional curricula, but instead as a methodology employable when teaching hard skills (Cimatti, 2016; Levasseur, 2013; Merz, 2015). When students are provided with information on the desired soft skill, given opportunities to use the skill in an authentic environment, and then provided feedback on their performance, the chance that the skill has been learned and will be transferred to future situations rises significantly (Anthony & Garner, 2016; Matteson et al., 2016). It is important to note that soft skill development is best viewed as a continuum and as something that should be cultivated in K-12 education, in higher education, and in the workplace. While Katz (1986) contends that the degree of soft skills required of an employee varies dependent largely on the stage of the employee's career, soft skills are a necessity for all employees, regardless of type of work. As soft skills are a human endeavor, regardless of pedagogical methodology, the support of experts, mentors, coaches, and teachers is essential to successful soft skill development (Broh, 2002; Cimatti, 2016; Heckman & Kautz, 2012; Jackson, 2012; Kautz et al., 2014). Unlike the measurement of hard skills, the assessment of soft skills proves difficult and time-consuming as traditional methods fall short in accurately measuring these human abilities (Balcar, 2016; Kautz et al., 2014; Matteson et al., 2016).

As experiential learning provides the strongest context for the successful development of soft skills, it is only logical that career and technical education, and subsequently career and technical student organizations, be examined for their contribution to soft skills development. Hands-on learning, work-related activities, and opportunities to engage in authentic applications are the hallmarks of career and technical education (Alfeld et al., 2007). Career and technical student organizations have always been an integral part of career and technical education. While the 11 career and technical student organizations recognized by the U.S. Department of Labor (Office of Career, Technical, and Adult Education, Division of Academic and Technical Education [OCTAE], 2018) vary in focus, they all promote the exploration of career paths while preparing students to become productive citizens and leaders in their communities (Reese, 2003). To date, research exists touting the overall benefits of career and technical education and career and technical student organization participation. Specific research on the connection between career and technical student organization participation and the development of soft skills is sparse, and what is available is mostly anecdotal in nature (Alfeld et al., 2007). As the diverse nature of the 11 career and technical student organizations would make research unwieldy and potentially biased (Camp et al., 2000), one specific organization, Technology Student Association, has been the focus of this study for its impact on soft skills development, with the potential to replicate the study with other career and technical student organizations to determine each organization's unique contribution to soft skills development. Attempting to study all 11 career and technical student organizations as one would likely require the researcher to disregard the characteristics that make each organization unique and valuable.

Problem Statement

The purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills necessary for gainful employment.

Research Questions

The following questions were designed to focus the research of this study:

- RQ_1: What relationship exists between the amount of time participating in Technology Student Association and soft skills development?
- RQ_2: What relationship exists between Technology Student Association competitive event success and soft skills development?
- RQ_3: What relationship exists between participation in Technology Student Association leadership roles and soft skills development?
- RQ_4: What relationship exists between gender and soft skills development for Technology Student Association members?

Background and Significance

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" (Advance CTE, 2019, para. 1). The work of career and technical education is supported heavily by career and technical student organizations, which have been in existence for nearly as long as career and technical education itself. Career and technical student organizations are co-curricular or intracurricular, which differs from the more traditional term extracurricular in that co-curricular or intracurricular implies an integral part of the formal curriculum, whereas extracurricular indicates there may be little connection to the formal curriculum (Camp et al., 2000; Great Schools Partnership, 2013). The 11 career and technical student organizations, as recognized by the U.S. Department of Labor are: Business Professionals of America, DECA, Educators Rising, Family, Career and Community Leaders of America (FCCLA), Future Business Leaders of America – Phi Beta Lamda (FBLA-PBL), Health Occupations Students of America (HOSA), National FFA, National Postsecondary Agricultural Student Organization (PAS), National Young Farmer Educational Association, Technology Student Association (TSA), and Skills USA, (Association for Career & Technical Education [ACTE], 2019a; OCTAE, 2018). Each organization is connected to at least one program area of career and technical education. See Table 1.1 for a listing of the 11 career and technical student organizations and corresponding program area. Separate career and technical student organizations exist “to provide the greatest benefit for student participants by fostering interests and by providing pertinent and realistic liaisons with appropriate and applicable companies and industry partners” (Camp et al., 2000, p. 11). All career and technical student organizations aim to engage students in four organizational elements: leadership, professional development, competitions, and community service (Alfeld et al., 2007; Aragon et al., 2013).

Technology Student Association is the career and technical student organization aligned with the career and technical education area of technology education. Technology education as a subject area evolved from industrial arts in the mid-1980s (Dugger, 2013). Similar to most career and technical education, technology education strives to provide students with contextual learning to hone problem-solving and critical thinking skills. Using the design and problem-solving process, students tackle real-world challenges in various areas of technology including medicine, agriculture and biotechnology, energy and power, information and communication, transportation, manufacturing, and construction, with the additional intention of developing cognizance for the interactions between technology, humans, and the environment (International Technology Education Association, 2007). According to a statement about Technology Student Association members from the National Technology Student Association (2018):

> The Technology Student Association (TSA) is a national organization of students engaged in science, technology, engineering and mathematics (STEM). Open to students enrolled in or who have completed technology education courses, TSA's membership includes more than 250,000 middle and high school students across the United States. TSA is supported by educators, parents and business leaders who believe in the need for a technologically literate society. Members learn through exciting competitive events, leadership opportunities and much more. A wide range of activities makes TSA a positive experience for every student (paras. 1-2).

Within the organization, each school is referred to as a chapter. All chapters are affiliated with the national Technology Student Association office in Reston, VA, and most follow a calendar of events that starts with the opening of school in the fall and culminates with the annual National conference in early summer (Hess, 2010; Miller, 1989). Participation in Technology Student Association takes on a variety of formats and varies from state to state and from chapter to chapter. Some chapters take a true co-curricular or intracurricular approach, implementing Technology Student Association activities within the walls of the existing career and technical education classroom (Haynie et al., 2005). Other chapters, constrained by limitations such as time, more rigid school-designated curricula, or funding issues, work first to use Technology Student Association activities as a springboard for learning within the classroom, and then capitalize on time after school to work with students.

Table 1.1

Career and Technical Student Organizations

Career and technical student organization	Program area
Business Professionals of America	Business and Information Technology Education
DECA	Marketing Education
Educators Rising	Education and Training
Family, Career and Community Leaders of America (FCCLA)	Family and Consumer Studies
Future Business Leaders of America – Phi Beta Lamda (FBLA-PBL)	Business and Information Technology Education
Health Occupations Students of America (HOSA)	Health Education Occupations
National FFA	Agricultural Education
National Postsecondary Agricultural Student Organization (PAS)	Agricultural Education
National Young Farmer Educational Association	Agricultural Education
Technology Student Association (TSA)	Technology Education
Skills USA	Trade and Industrial Education

While leadership, professional development, and community service are all featured in Technology Student Association conferences, the primary focus of these conferences is competitive events. Working individually and collaboratively, students have the opportunity to participate in over 90 competitive events (Taylor, 2006). Regardless of the competitive event's specific focus, all competitive events require students to use soft skills such as teamwork, time management, conflict resolution, and perseverance to find success (Hess, 2010; Miller, 1989).

Chapters generally first compete locally, sometimes within the school or with other schools located in the same geographic region. Those competitors who are successful earn the opportunity to compete at the state conference. Winners from the state conference move on to competition at the national conference.

The state of Pennsylvania ranked sixth nationally in Technology Student Association membership size for the 2020-21 school year (TSA, 2021). Of Pennsylvania's 104 affiliated chapters, nearly 87% participated in regional, state, or national conferences, indicating just how central competitive events are to this career and technical student organization (Technology Student Association [TSA], 2018). Like other career and technical student organizations, Technology Student Association utilizes adults skilled in career and technical education to act as advisors to students. These supportive adults are hypothesized by Alfeld et al. (2007) as one of the primary reasons Technology Student Association, and career and technical student organizations in general, are beneficial to students. While limited research exists on the overall effects of career and technical student organization participation, Alfeld et al. (2007) found career and technical student organizations "do have beneficial effects on the experience of high school students, though in general not more than other types of classes" (p. 30).

The concept of soft skills is not new. In 1994, the World Health Organization (WHO) released the document *Life Skills Education for Children and Adolescents in Schools.* Defined as "…abilities for adaptive and positive behavior, that enable individuals to deal effectively with the demands and challenges of everyday life" (World Health Organization, p. 1), the life skills of nearly three decades ago bear a striking resemblance to today's soft skills. In fact, the World Health Organization lists decision making, problem-solving, creative thinking, critical thinking, effective communication, interpersonal relationship skills, self-awareness, empathy, coping with emotions, and coping with stress as the core set of skills critical to health and well-being (1994). The overlap between this list and the ones provided more recently by the U.S. Department of Labor (2004), Organisation for Economic Co-operation and Development [OECD] (2017), and ManpowerGroup (2018) is beyond coincidence. With the progression of time comes an increase in research on soft skills, centered mostly in the United States and Europe (Cimatti, 2016). If the lens is widened to regard employability skills as closely related to soft skills, then the corresponding data for employability skills can be extrapolated to have similar meaning for soft skills. In 2014, the U.S. Department of Education's Office of Career, Technical, and Adult Education (OCTAE) launched *The Employability Skills Framework*. This initiative outlines strategies for "integrating core employability skills into high-quality career and technical education" in response to a rising level of competition for jobs (Knowles, 2014, para. 2). Among a short list of other skills, *The Employability Framework* recognizes the importance of interpersonal and intrapersonal soft skills (OCTAE, 2018). The modern workplace requires not only hard skills and technical knowledge, but also the ability to apply those skills and knowledge in creative ways (Vogler et al., 2017). According to a survey of global employers, 27% report that applicants lack the hard skills or human strengths necessary to fill job openings (ManpowerGroup, 2018). While recent initiatives focus on technical skill deficits, the research has only just begun on why individuals are lacking soft skills. Preliminary research, as well as anecdotal speculation, can be found as to why soft skills are lacking. Some blame increased usage of technological devices and decreased personal interaction (Dunckley, 2016), others point to generalized failures in education systems (Hurrell, 2016), and still others claim gender differences – females are more naturally "soft" and males are more likely to be characterized as "hard" – as the reason for soft skills deficits (Hong, 2016; Taylor, 2006).

Limitations

The limitations for this study are as follows:

- National Technology Student Association membership is determined by the way in which a school affiliates with the organization. According to the national organization (TSA, 2018), a member is defined as:

  > Any student who is benefiting from TSA services and materials… For example, if TSA materials are being used in a classroom, then all students in that class must be rostered TSA members. Alternatively, all students who participate in a before or after school TSA chapter must be rostered TSA members (para. 1).

  At both the state and national levels, Red Chapter Affiliation and White Chapter Affiliation require schools to specify the exact number of students to join and payment for membership is made at a per-student rate. Red Chapter Affiliation limits the number of members to 10 or less and White Chapter Affiliation is for 11 or more members. Blue Chapter Affiliation registers the entire school for Technology Student Association membership. While Blue Chapter Affiliation may be appealing for schools in which students in technology education classes rotate for a portion of the year and financially enticing for those schools that tend to have a larger number of active participants, it inflates organization membership as not all members are competing members. A school affiliated as a Blue Chapter may have 1,000 students enrolled but only 25 of those students might be active Technology Student Association participants. Additionally, while Technology Student Association boasts active members in 48 states, data for this study were collected exclusively from the state of Pennsylvania.

- As with all career and technical student organizations, a degree of their facilitation and engagement is left to the discretion of each school's advisor. Accordingly, Technology Student Association experiences will be different from school to school and from student to student. The results will not be indicative of measuring identical Technology Student Association experiences. The sample size was designed to be large enough to capture all types of Technology Student Association participation.
- The sheer existence of 11 nationally recognized career and technical student organizations implies the diverse nature of these groups. As noted by Kosloski (2010), "Caution should be taken with regard to projecting the conclusions of this study to other career and technical student organizations" (p. 9). While it is plausible that the information gleaned from the study might be applicable to other career and technical student organizations, a limitation of this research is that not all 11 career and technical student organizations were studied.
- As the researcher did not collect the data but instead was provided the data by Pennsylvania Technology Student Association, it is impossible to guarantee that consistent procedures were followed during the administration of the survey to all participants.
- The COVID-19 pandemic impacted the Technology Student Association experience for members in varying ways. Conferences were cancelled for the 2020 school year and conducted in a virtual format for the 2021 school year. The number and type of competitive events offered at conferences was reduced. Advisors and competitive events judges were forced to adapt to new ways of facilitating Technology Student Association events. While impossible to know the full extent of this impact as the pandemic is

ongoing, the fact that the Technology Student Association experience has been disrupted will be a limitation of this study.

Assumptions

- Survey participants will be self-reporting data. This methodology has been selected for ease of collection. It is assumed that all participants will answer truthfully.
- Technology Student Association members' participation varies significantly in terms of time and level. Some students participate exclusively in competitive events while other students split their time between competitive events and the pursuit of leadership skills and community service endeavors. Some students participate in Technology Student Association starting in middle school and continue through high school graduation and some students participate for a limited number of years. It is assumed that the data collected in this study are reflective of all degrees of Technology Student Association participation.

Procedures

The data utilized for this study were collected by the Pennsylvania Technology Student Association, making it an existing data set. The researcher was granted permission by the organization to use these data for the purposes of this study (Appendix A). The following information is offered as an explanation of how the organization obtained the data.

At the 2020 annual summer meeting of the Pennsylvania Technology Student Association Board of Directors, plans were made to collect data on student membership. Mr. Chris Roth, State Advisor for Pennsylvania Technology Student Association, alerted the membership to this via email blast and posting on the Pennsylvania Technology Student Association website at the start of the school year. The following February (2021), a second communication reiterated this message and provided background information regarding the survey, as well as instructions for how to participate, and a deadline for completion of the survey.

To complete the survey, chapter advisors provided their students with instructions to visit the provided website address and log in using their Pennsylvania Technology Student Association identification number. The timing of the survey was purposeful so as to take advantage of the fact that all students are issued an identification number for competitive event participation. The survey was available for completion between the date of the last regional conference and two weeks after completion of the state conference, meaning all students were already familiar with their unique identification number.

The first portion of the survey gathered the following data: gender, year in school, regional affiliation, level (middle school or high school), number of years of Technology Student Association experience (present year included), estimated time spent on Technology Student Association activities (hours per week), competitive event awards received, and leadership roles held. The remainder of the survey was adopted from the *Employability Skills* instrument utilized by Alfeld et al. (2007) as part of the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study and the *Youth Leadership Life Skills Development Scale* developed by Seevers et al. (1995). The first portion of the instrument collected information relevant to the study's independent variables: years of involvement, weekly hours of participation, competitive event results, leadership roles, and gender. The second portion of the instrument yielded for each participant a soft skills score, the dependent variable for this study.

Once data were collected, they were compiled and aggregated. Descriptive statistics were reported. Multiple linear regression was used for its ability to explain variation in a single dependent variable when acted upon by multiple independent variables (Keith, 2015). A regression analysis was performed with soft skills score as the dependent variable and years of involvement, time spent participating per week, competitive event results, leadership roles, and gender as the independent variables. The significance of the relationship between soft skills score and time spent participating, competitive event results, leadership roles, and gender were explored collectively. Each independent variable was then examined for its relationship with the dependent variable, via correlation analysis.

Definition of Terms

The following terms are defined to assist the reader with comprehension of the study:

- *Advisor* – Each Technology Student Association chapter requires the active participation of at least one adult. This adult, often a teacher employed by the school, serves as the liaison between the students and the regional, state, and national levels. In addition to ensuring the safety of the students while participating in Technology Student Association activities, the advisor also acts a role model for students at all times, both personally and professionally. Many chapters benefit from the experience and dedication of multiple advisors. Ideally, Technology Student Association advisors would have strong Career and Technical Education backgrounds. Additionally, each of the 48 states that participate in the Technology Student Association has a person designated as State Advisor to act as a liaison between the state and the national organizations.
- *Career and Technical Education* – According to the Strengthening Career and Technical Education for the 21st Century (Perkins V) Act of 2018:

  > The term ‘career and technical education’ means organized educational activities that (A) offer a sequence of courses that (i) 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 the challenging State academic standards adopted by a State under 4 section 1111(b)(1) of the Elementary and Secondary Education Act of 1965; (ii) provides technical skill proficiency, or a recognized postsecondary credential, which may include an industry-recognized credential, a certificate, or an associate degree; and (iii) may include prerequisite courses (other than a remedial course) that meet the requirements of this subparagraph; (B) include competency-based, work-based, 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, and knowledge of all aspects of an industry, including entrepreneurship, of an individual; (C) to the extent practicable, coordinate between secondary and postsecondary 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 credit transfer agreements that provide postsecondary credit or advanced standing; and (D) may include career exploration at the high school level or as early as the middle grades (as such term is defined in section 8101 of the Elementary and Secondary Education Act of 1965). (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 4)

- *Career and Technical Student Organization* – According to the Strengthening Career and Technical Education for the 21st Century (Perkins V) Act of 2018:

> The term ‘career and technical student organization’ means an organization for individuals enrolled in a career and technical education program that engages in career and technical education activities as an integral part of the instructional program. (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 4)

- *Chapter* – Within the Technology Student Association, each participating school is referred to as a chapter. All chapters are affiliated with the national Technology Student Association office in Reston, VA.
- *Competitive events* – Central to Technology Student Association, competitive events provide students opportunities to use and improve their STEM skills in team and individual events (TSA, 2018, paras. 3-4). Each competitive event is structured by a written set of guidelines that detail procedure, materials, criteria, and constraints.
- *Industrial arts* – This term is dated and refers to the educational program that existed prior to technology education. Industrial arts focused more on the study of industry and technology and their impacts on society and culture whereas as technology education emphasizes technology and the human-designed world (Bensen, 1995). The official shift in terminology came in 1985 when the professional organization dedicated to this curricular area voted to change its name (Herschbach, 2009).
- *Soft skills* – Soft skills are non-technical abilities that can be categorized as interpersonal and intrapersonal. These skills, sometimes referred to as employability skills, differ from traits and dispositions as soft skills are not innate but rather something that can be developed with time and experience (Hurrell, et al., 2012; Katz, 1986).

- *Technology education* – Technology education is a curricular area that some states, including Pennsylvania, now refer to as technology and engineering education. According to the International Technology and Engineering Educator's Association (2020), "the goal of technology and engineering education is to develop students with a breadth of knowledge and capabilities who see the interactions between technology, engineering, and society and can use, create, and assess current and emerging technologies" (p. 4).
- *Technology Student Association* –Technology Student Association, often referred to as TSA, is a nationally-recognized intracurricular career and technical student organization that caters to students interested in science, technology, engineering and mathematics. Through competitive events and focused leadership training, students in middle school and high school develop technological literacy and employability skills. Technology Student Association is a non-profit organization and encourages student participation in community service projects (TSA, 2018).
- *Vocational Education* - This dated term was used to refer to the area of education now known as career and technical education. The official shift in terminology came in 1998 when the American Vocational Association voted to change its name to the Association for Career and Technical Education (ACTE, 2019b).
- *Vocational Student Organization* – When vocational education shifted to career and technical education, the terminology for the associated student groups also changed. Career and technical student organization replaced the term vocational student organization.

Summary and Overview

Chapter I introduced the concept of soft skills and their importance in the workplace. Soft skills are nontechnical and can be best categorized as interpersonal and intrapersonal. Soft skills are best learned through context, making them a natural fit with career and technical student organizations. Chapter I provided a brief overview of career and technical education and career and technical student organizations. More detailed information regarding one particular career and technical student organization, Technology Student Association was included. While much anecdotal research exists touting the benefits of participation in career and technical student organizations, specific research on the relationship between career and technical student organizations and soft skills development is lacking. Chapter I also established the problem statement, research questions, background and significance of the study, limitations and assumptions of the study, procedures used to complete the study, and defined key terms used throughout the study.

Chapter II will review literature on information pertinent to the study including: an historical overview of career and technical education, technology education, and career and technical student organizations, the potential effects of Technology Student Association participation, and soft skills including history, importance, methods to teach and assess, and connection to career and technical student organizations. Chapter III will detail the methods and procedures used to conduct this study. Chapter IV will present the results of the study. Chapter V will offer a summary, conclusions, and recommendations based on the study findings.

CHAPTER 2

REVIEW OF LITERATURE

In today's global economy, workforce demands are not being met (ManpowerGroup, 2018). While a variety of reasons exist for this deficit, employers increasingly identify employees' lack of soft skills as a significant factor (National Academies of Sciences, Engineering, and Medicine, 2016). To date, soft skills development has received little examination; however, the limited research shows soft skills must be fostered concurrently with hard skills in order for the potential of both to be maximized (Balcar, 2016; Cimatti, 2016; Dixon et al., 2010; Kautz et al., 2014; OECD, 2015). Career and technical education, technology education, and career and technical student organizations are natural settings for soft skills development as all require participants to use problem-solving, teamwork, communication, creativity, and other soft skills in the context of a hard skill task or scenario (Alfeld et al., 2007; Aragon et al., 2013). Of the 11 federally recognized career and technical student organizations, Technology Student Association is the sole organization dedicated exclusively to technology education (Howell & Busby, 2002). A closer examination of the relationship between Technology Student Association participation and soft skills development was the ultimate goal of this study.

This literature review first explores the historical origins of career and technical education, technology education, and career and technical student organizations. Next, existing literature on the effects of Technology Student Association participation is examined, with particular scrutiny placed on time investment, leadership roles, awards and recognition, and gender. As Technology Student Association research is limited, literature on the broader scheme of extracurricular, co-curricular, and intracurricular organizations is also included. Finally, the current literature on soft skills is surveyed and critiqued, including common definitions, importance and relevance, development and assessment, and relationship with career and technical student organization participation.

Career and Technical Education, Technology Education, and Career and Technical Student Organizations: An Historical Overview

Much like adolescent siblings struggling to create their own identities, career and technical education and technology education possess a rich, complicated, and intertwining history. Shared roots make it impossible to ever truly separate from one another and both fields benefit from the labors of their common parents – including but not limited to the Smith-Hughes Act, the Manual Training Movement, the work of John Dewey, and society's overarching need for productive citizens (Gordon, 2014; Herschbach, 2009). As Gray and Walter (2001) point out "it was and is a marriage of convenience" (p. 16) that unites the diverse career and technical education fields, one that can be originally sourced to a need for political power and federal funding. Both career and technical education and technology education feature strong historical connections to civil rights and both continue to advocate today for the needs of all students. While impossible to predict the future of education, career and technical education and technology education will almost certainly play strong roles in meeting the needs of 21st century learners.

Common Origins

The earliest traces of career and technical education, originally known as vocational education, and technology education, originally known as industrial arts, can be found in the works of 18th century Swiss philosophers Jean-Jacques Rousseau and Johann Heinrich Pestalozzi. Both men emphasized the practical over the theoretical and believed hands-on work to be the best way to explore the world (Gordon, 2014). John Runkle and Calvin Woodward, drawing inspiration from Russian tool instruction that Runkle witnessed at the 1876 Centennial Exposition in Philadelphia, developed what eventually would be known as the Manual Training Movement in the United States (Herschbach, 2009). This type of instruction involved classes in traditional, classical subjects with the addition of hands-on, stand-alone technical exercises. Shortly thereafter, the Sloyd system emerged in Sweden and eventually migrated to the USA. Sloyd consisted of "the manufacture of fifty models involving eighty-eight exercises" (Keim, 1966, p. 18) and unlike the isolated, abstract technical exercises of manual training, the Sloyd models were of useful objects, thus sowing the earliest seeds of the importance of interdisciplinary, authentic connections for career and technical education and technology education.

John Dewey, educator, philosopher, and psychologist, lent his voice in support, albeit cautious support, of vocational education and industrial arts education at the start of the 19th century. According to Herschbach (2009), "Dewey contended that instruction was most meaningful when individuals actively engaged in applying abstract concepts to real-life situations" (p. 14). He believed vocational education could stimulate much needed change in the larger educational system but argued vehemently against the separation of education into academic and occupational tracks, instead promoting an equal education for all students (Gray, 2004). Contemporaries of Dewey, David Snedden and Charles Prosser were instrumental in garnering support specifically for career and technical education. Prosser developed a set of theorems that captured their philosophy of career and technical education: conscious integration of theory and practice would lead to learning and productivity. Interestingly, Prosser's theorems would act as precursors to today's workplace competencies and foundational skills (Gordon, 2014). It is noteworthy this time period shows the start of significant fissures between career and technical education and technology education.

Seeds of Division

The beginning of the 20th century proved to be a tumultuous time for vocational education and industrial arts education. Prior to the mid-1800s, secondary and postsecondary education were designed for those seeking careers exclusively in law, medicine, teaching, the ministry, or engineering (Barrella & Wright, 1981). It was not until the Morrill Act of 1862, which established land-grant institutions across the country in support of vocational education that an alternative to these five limited pathways became available (Gordon, 2014). At the transition from 19th to 20th centuries, U.S. secondary school enrollment increased significantly, resulting largely from the enforcement of compulsory attendance laws (Herschbach, 2009). For some, staying in school was made possible by increased family prosperity (Gray, 2004), whereas others stayed in school as means to find a job, as employment was difficult to obtain after the Great Depression (Herschbach, 2009). Regardless of the reason, more students were in school and educators quickly saw the need for options to suit all learners. The addition of career and technical education to high schools created one of the first divisions between academic or classical subjects and job-specific skill development. Supporters of the Progressive Movement, like Dewey, advocated a blending of the two and in many places were successful in achieving it for a period of time (DeFalco, 2016). At this time, the objectives of vocational education and industrial arts were so similar that the two were viewed as one and the same (Herschbach, 2009).

By the end of the 1920s, however, educators were beginning to recognize that despite offering both vocational and college preparatory options, the needs of all students were not being met, resulting in behavior problems and high drop-out rates for nearly half the student population. In hopes of retaining what was dubbed at the time “the new 50%,” schools began to offer what was known as a general education track, designed for those individuals who would enter the workforce upon completion of secondary school and assume jobs that required little or no vocational training (Herschbach, 2009). This is when the first true schism between vocational education and industrial arts education emerges, as industrial arts education was a featured component of this new general education track and vocational education occupied its own track. Both vocational education and industrial arts education moved further away from those students heading on to college.

By the 1930s, vocational education became known for its job-specific skill development whereas industrial arts education was defined by more broad, generalizable objectives and skills (Gordon, 2014; Herschbach, 2009). The American Vocational Association (AVA), the predecessor to the Association for Career and Technical Education (ACTE), established an Industrial Arts division in 1932 with Robert Selvidge to act as vice-president for the division (Herschbach, 2009). Selvidge viewed industrial arts through a vocational lens, which in many ways was appealing to teachers and school systems as it resulted in shared resources and common staffing. This perspective, however, caused friction with those who believed industrial arts deserved its own identity. Opposition to Selvidge’s vision was led by William Everett Warner. Warner, a student of other contemporary vocational education and industrial arts education leaders such as Frederick Bonser, Snedden, Prosser, and Dewey, had a reputation as hard-driving, egotistical, and impatient with those unwilling to change at his pace (Latimer, 1974). Met by opposition within the AVA, Warner established a new professional organization in 1939, the American Industrial Arts Association (AIAA). While this precursor to today’s International Technology and Engineering Educators Association (ITEEA) was intended to advance the field of industrial arts, its immediate result was to further fracture the field, driving a larger wedge between career and technical education and technology education (Herschbach, 2009).

The middle part of the 19th century saw a sharp increase in criticism of public education – too soft, too anti-intellectual, too differentiated – and a demand for a shift “back to basics” (Gordon, 2014). This essentialist movement spelled troubled for vocational education and industrial arts education and only gained more momentum with the Reagan administration’s “A Nation at Risk” report in 1983 and with the establishment of the No Child Left Behind Act of 2001. Both voiced support for career and technical education and technology education but contradicted this message by placing emphasis on core subjects, standardized testing, and a universal curriculum (Herschbach, 2009). It was not until 2009 when political support for career and technical education and technology education began to return. In sharp contrast to the “college for all” mantra, President Obama challenged Americans to at least one year of post-secondary education or career training, thus opening the door for career and technical education and technology education to once again be considered a viable alternative to traditional four-year colleges (Symonds et al., 2011). The 2018 approval of the Strengthening Career and Technical Education for the 21st Century (Perkins V) Act, indicates support for career and technical education and technology education will continue (OCTAE, 2018).

Both career and technical education and technology education capitalized on opportunities to rebrand themselves in the latter part of the 20th century. The AVA changed its name to the ACTE in 1998, removing all traces of the phrase “vocational education” from future publications, in hopes of escaping an inaccurate stigma (Timberman, 1999). The shift from industrial arts to technology education occurred officially in 1985 when the AIAA voted to change its name to the International Technology Education Association (Herschbach, 2009). The membership of ITEA voted to change its name once again in 2010, this time adding “engineering” to become the International Technology and Engineering Educators Association, a move prompted by a desire to better position “the association to deal with the “T” & “E” of a strong STEM education” (ITEEA, 2010, para. 4). Accordingly, some states, including Pennsylvania, shifted all references to the field from technology education to technology and engineering education.

Social Impact

Career and technical education and technology education suffer from a long-standing stigma: the idea that these fields are inferior to other traditional academic disciplines. The origins of this negative stereotype can be traced all the way back to the famous debates between Booker T. Washington and W.E.B. DuBois at the end of the 19th century. Washington encouraged the black population to take advantage of the vocational education that was readily available to them as a means to prosperity and peaceful racial equality, whereas DuBois advocated for higher academic education for black people to enable genuine intellectual competition with majority race counterparts (DuBois, 1932; Gordon, 2014). These conflicting viewpoints did little to break down the idea that career and technical education training is inferior to academic education and if anything, strengthened the idea among minorities that career and technical education is “something for someone else’s children” (Gordon, 2014, p. 35). While discussing race and career and technical education, it is important to note the Second Morrill Act in 1890 further developed land-grant colleges and specifically designated money to fund college education for African Americans and other minorities (Gordon, 2014).

One goal of career and technical education was to keep students enrolled in school and one way of accomplishing this was to provide a viable pathway for special-needs populations. The federal government defines special-needs populations as:

> (A) individuals with disabilities; (B) individuals from economically disadvantaged families, including low income youth and adults; (C) individuals preparing for nontraditional fields; (D) single parents, including single pregnant women; (E) out-of-workforce individuals; (F) English learners; (G) homeless individuals; (H) youth who are in, or have aged out of, the foster care system; and (I) youth with a parent who is a member of the armed forces. (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 7)

Career and technical education and technology education do a superior job of meeting the needs of these diverse learners and often serve as the starting point for a positive journey on a meaningful career path. Unfortunately, while not responsible for the stigma that career and technical education and technology education are for the less academically capable, the successful relationship between these fields and special-needs populations does little to assuage this negative stereotype.

Despite the fact that career and technical education and technology education continue to be male-dominated fields, historically, women have found inroads toward equality in these fields. Early land-grant colleges established by the Morrill Acts provided women with a pathway to higher education, albeit a limited one (Gordon, 2014). The Smith-Hughes Act of 1917 provided federal funding for public school programs, including home economics designated specifically for females (Gordon, 2014). The iconic Rosie the Riveter represented the vast number of women who assumed industry roles during World War II, some even earning unprecedented equal pay to men and continuing their vocational training well after the end of the war (ACTE, 2002). Today, much of career and technical education continues to be sex-typed but continued efforts are underway to encourage the dismantling of gender-biased barriers. (Gordon, 2014). Technology education enrollment tends to be more equal in terms of gender, due in large part to some state mandates requiring all students of public education to participate (Herschbach, 2009).

The industry-created socio-economic division of the late 19th century presented another challenge for education and an opportunity for career and technical education and technology education. Education was no longer something reserved for the wealthy elite but instead something that society was viewing as increasingly necessary for all to ensure economic stamina and harmony amongst diverse population sects (Barella & Wright, 1981). Dewey and other members of the progressive movement capitalized on this societal need to use schools as an "instrument of social reform," demanding all participants have access to a well-rounded intellectual activities-based education (Herschbach, 2009, p. 15). According to DeFalco (2016), "Vocational education is a topic that is connected with broader ethical and political questions about the education of students, the kind of society they will live in, and how the schools can be part of the answer" (p. 54).

Career and Technical Student Organization Origins

While arguments could be made that informal student groups have existed as long as career and technical education itself, FFA, known at the time as Future Farmers of America, chartered nationally in 1928. This marks the official start to career and technical student organizations (Reese, 2003). Federal funding for career and technical students organizations began in 1946 with the George-Barden Act, which allocated specific funds to support youth organizations in agriculture (Gordon, 2014). Shortly thereafter, Public Law 81-740 was passed in 1950. This act of legislation marked the first time career and technical student organizations were associated with the U.S. Office of Education, as it served to federally incorporate the Future Farmers of America. This precedent eased the battle for national recognition and funding of other future career and technical student organizations (Camp et al., 2000; Gordon, 2014).

Similar to career and technical student organizations as whole, Technology Student Association started informally in 1958 as an activity run by the American Industrial Arts Association (AIAA). In 1978, the organization installed its first Board of Directors and published Articles of Incorporation and Bylaws. This move earned the organization recognition by the U.S. Office of Education, under the name American Industrial Arts Student Association (AIASA), and allowed it to officially join the ranks of other federally recognized career and technical student organizations (Miller, 1989; TSA, 2018). A decade later, the organization changed its name from AIASA to Technology Student Association (TSA), a move prompted by a desire to better acknowledge the importance of technological literacy and the role the organization plays in developing such literacy in its members (Miller, 1989; Reese, 2003).

Technology Student Association Participation

Compared to other career and technical student organizations, Technology Student Association is still in its adolescent years. Despite noteworthy membership growth in recent years, little research exists on the effects of Technology Student Association participation. Taylor (2006) sought to "analyze perceptions of TSA members about select TSA activities in regard to their effects on skill development and the development of technological literacy" (p. 58). Other studies involving Technology Student Association have focused more on the organization's co-curricular impact (Haynie et al., 2005) or on gender preferences for competitive events (Mitts, 2008). Accordingly, the lens has been widened here to include research on participation effects for other career and technical student organizations, as well as extracurricular activities.

Time Investment

As with any organization, the amount of time an individual member invests can vary tremendously as motivational factors can be diverse. Given the structure of Technology Student Association, each chapter may institute different parameters regarding time commitment. It is left to the discretion of each school, chapter advisor, and student members to determine what requirements be set regarding time and what consequences should follow to enforce these requirements (Hess, 2010; Reese, 2003). With this in mind, the degree of involvement in extracurricular activities and organizations affects outcomes (Holland & Andre, 1987).

Generally speaking, a student's strong involvement in a career and technical student organization and/or extracurricular activity correlates to various positive outcomes. Through a federally funded grant project, Alfeld et al. (2007) produced a report entitled *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience.* Among other findings, this report demonstrated a positive relationship between the "amount of CTSO participation and academic motivation, academic engagement, grades, career self-efficacy, college aspirations, and employability skills" (p. iii). In other words, the more a student is involved in the career and technical student organization, the better the results. Kosloski and Ritz (2014) found that DECA members who participated for multiple years showed greater academic grade point average increases than those who participated for a single year. In another measure of academic performance gains, Everson and Millsap (2005) show a positive relationship between students' levels of extracurricular participation and meaningful gains in SAT scores, controlling for socioeconomic status and academic achievement. In another DECA-focused study, Kosloski (2008) identified increased preparation time as the leading predictor in competitive event success.

In addition to these objective measures, research also shows a positive relationship with the perceptions of those involved. Taylor (2006) reported that the more time Technology Student Association students spend preparing for competitions, the more likely the students are to demonstrate positive perceptions about skill development. As the number of extracurricular organizations a student participates in increases, the student's sense of powerlessness decreases (Holland & Andre, 1987). It is important to make clear that while these correlations exist, the researchers were all careful to note that correlation does not equal causality. Additionally, time invested in career and technical student organizations and extracurricular activities is not guaranteed to be time well spent. Marsh and Kleitman (2002) found that too much time spent on extracurricular activities can have a negative impact on academic and non-academic outcomes.

Leadership Roles

Leadership is a critical component for all career and technical student organizations as evidenced by its inclusion in each organization's mission statement (Betts, 1989; Reese, 2008). The Technology Student Association mission statement reads: "The Technology Student Association enhances personal development, leadership, and career opportunities in science, technology, engineering, and math (STEM), whereby members apply and integrate these concepts through intracurricular activities, competitions, and related programs" (TSA, 2018). Technology Student Association students receive leadership training both informally through competitive event participation and formally through nationally-sponsored leadership programs. Most recently, Technology Student Association has launched the *21st Century Skills for TSA* program. This virtual resource is available to all Technology Student Association members. (TSA, 2018). Given changes to Technology Student Association programs and activities due to the COVID-19 pandemic, the potential impact of this program is not yet known.

Nearly all career and technical student organizations also use a formal cabinet of designated student leaders at the local, state, and national level. These select students are appointed or elected by their peers to serve the organization for a period of time. Regional, state, and national Technology Student Association officers are elected at the corresponding level conferences and serve their delegations for a term of one year. At the national level, the officer team is comprised of president, vice president, secretary, treasurer, reporter, and sergeant-at-arms (Miller, 1989; TSA, 2018). Responsibilities include the facilitation of the annual business meeting and representation of the organization in a professional, business-like manner.

Assuming a leadership role as part of career and technical student organization participation is thought to be beneficial. To date, however, this assertion is based almost entirely on anecdotal records and has been supported only by weak or limited methodologies (Camp et al., 2000). It is important to clarify that substantial research supports a positive relationship between leadership development *in general*, and career and technical student organization participation (Alfeld et al., 2007; Dormody & Seevers, 1994; Kosloski, 2010; Wingenbach & Kahler, 1997), yet little attention has been dedicated to the specific effects of assuming a leadership role or position within a career and technical student organization. In a study focused on FFA participation, researchers found that those in FFA leadership positions showed increases in their abilities to work with others, in their self-confidence, in their public speaking abilities, in their desire to set and achieve goals, and in their resistance to complacency (Rose et al., 2016). On the contrary, Alfeld et al. (2007) found that having a career and technical student organization leadership position did not significantly affect any outcomes. This result was surprising to the researchers and provoked a call for more vigorous research to address a growing desire to measure and leverage the effects of career and technical student organization participation on leadership.

Awards and Recognition

Adding “challenge and excitement to classrooms and student conferences,” competitive events exist as a fundamental part of career and technical student organizations (Litowitz, 1995, p. 25). Each competitive event is structured by a written set of guidelines that detail procedure, materials, criteria, and constraints (Squier, 1989). The goal of the competitive events is to evaluate both hard and soft skills through authentic problem scenarios created with industry input and academic knowledge integration (Alfeld et al., 2007). Technology Student Association competitive events specifically challenge students “to use and improve their STEM skills in team and individual events in areas such as: technology, communication, design and engineering, environmental systems, transportation, and manufacturing” (TSA, 2018, para. 1). Competitive event success equates to recognition for participants (Alfeld et al., 2007; Aragon et al., 2013; Squier, 1989). Many career and technical student organizations conclude their local, state, and national conferences with a formal awards ceremony that provides top competitors with recognition and awards such as pins, medals, and trophies. Competitive event success at the local and state level also leads to advancement to higher-level competition.

Awards and recognition play a decidedly important role in initially attracting students to participate in a career and technical student organizations as students clamor to have their names on a plaque or to take home the coveted top trophy (Squier, 1989; Curry Jr., 2017). Success begets success. Questions remain, however, as to whether the preliminary attraction of flashy awards and accompanying praise endure as time progresses. Research shows that rewards can be effectively used to stimulate motivation but questions remain as to what extent extrinsic motivation may affect intrinsic motivation, particularly after external rewards subside (National Academies of Sciences, Engineering, and Medicine, 2018). Blakely et al. (1993) found that FFA students ranked competitive event success last in a study focused on the perceived value of FFA contests, prizing soft skills such as teamwork, responsibility, and communication, considerably higher. Additional anecdotal evidence shows that students and advisors value other aspects of CTSO participation higher than awards and recognition (Van Dyke, 1989; Hess, 2010; Litowitz, 1995; Reese, 2008).

Regardless of the role awards and recognition play in influencing career and technical student organization participation, there is evidence to support the argument that competitive events influence participation and soft skill development. In *Looking Inside the Black Box,* Alfeld et al. (2007) found "…of the four organizational elements of CTSOs (leadership, community service, competitions, and professional development), competitions were found to have the most positive effects" (p. iii). More specifically, researchers cite "significantly positive effects on academic engagement and career self-efficacy, [and] slight positive effect…on grades, college aspirations, and employability skills" for competitive event participants (Alfeld et al., 2007, p. 27). Kosloski (2008) also found that participation in other non-athletic clubs and organizations correlated with DECA competitive event success. In other words, DECA students were more successful in competitive events when they also participated in other non-athletic extracurricular organizations, thus furthering the idea that variables other than awards and recognition must be considered when examining competitive event success.

Gender

While career and technical student organization and extracurricular participation is generally viewed as beneficial to members (Alfeld et al., 2007; Aragon et al., 2013; Everson & Millsap, 2005; Threeton & Pellock, 2010), the benefits reaped from participation differ for males and females (Aragon et al., 2013). Considerably more males than females participate in extracurricular sports (Broh, 2002), and career and technical education as a whole continues to struggle with gender-based barriers and stereotypes (Gordon, 2014). Career and technical student organization participation, however, is notably more balanced between the genders.

Extracurricular activity participation research shows that few differences exist between female participants and female non-participants (Holland & Andre, 1987). However, research that focuses more specifically on career and technical student organization participation shows different results. In a study focused exclusively on the benefits of career and technical student organization participation for females and minorities, Aragon et al (2013) arrived at the following conclusions: (a) females reported statistically significant higher levels of academic motivation, academic engagement, career self-efficacy, civic responsibility, and educational aspirations than males; (b) females who participate in a career and technical student organization cited higher levels of academic motivation than males or females who did not participate in a career and technical student organization and; (c) females who participate in a career and technical student organization show higher levels of civic engagement than males, regardless of the males' career and technical student organization participation. Additionally, the same study also stated that males who participate in a career and technical student organization report higher levels of academic and civic engagement than non-career and technical student organization males (Aragon et al., 2013). These positive relationships serve to support the argument that career and technical student organization participation should be viewed favorably, regardless of gender.

In addition to the ways in which career and technical student organization participation benefits males and females differently, the ways in which the genders approach participation diverges as well. According to Mitts and Haynie (2010), both male and female Technology Student Association participants favor team activities while female Technology Student Association participants prefer socially relevant and socially significant activities to those activities that are more technically skill-based. Moreover, female Technology Student Association participants more often select competitive events that focus on design, communication, and leadership than competitive events that focus on utilization of technical skills (Mitts, 2008). While Balcar (2016) holds that soft skills are gender neutral, it must be considered that this variance in activity and competitive event preference may play a role in the soft skill development of males and females.

Soft Skills

Hurrell et al. (2012) define soft skills as “nontechnical and not reliant on abstract reasoning, involving interpersonal and intrapersonal abilities to facilitate mastered performance in particular contexts” (p. 162). OECD’s *Skills for Social Progress* (2015) provides an overlapping and more digestible definition for social and emotional skills, describing them as “the kind of skills involved in achieving goals, working with others and managing emotions” (p. 34). In reviewing the literature regarding common definitions for the term soft skills, the only substantial point of contention appears to be focused on the differences between skills and traits or abilities. Balcar (2016) begins to delve into this debate by defining soft skills as “learned behaviour based on individual’s predispositions” (p. 454) and stating they are more like acquired skills than psychological traits. Kautz et al., (2014) state that skills “give people the tools with which to shape their lives, to create new skills and to flourish” (p. 10) whereas the older psychological term traits conveys “a sense of immutability or permanence, possibly due to their heritable nature” (p. 10). While some researchers call it a problem rooted in semantics (Balcar, 2014; Karrbom et al., 2014), Cunha and Heckman (2007) go a step further, saying “the traditional ability-skills dichotomy is misleading” and that “the ‘nature versus nurture’ distinction is obsolete” (p. 31). This sentiment is echoed by Matteson et al. (2016) and Kautz et al. (2014). Regardless, current literature supports the argument that soft skills development is a dynamic process and that a person can develop, learn, and apply soft skills at various life stages (Andriotis, 2018; Cunha & Heckman, 2007; Heckman, et al., 2006; Katz, 1986; Kautz et al., 2014; OECD, 2015).

Common Definitions

The examples of soft skills provided in the literature is extensive and inconclusive, making it difficult to determine which skills are definitively soft. With this in mind, Table 2.1 shows the twelve soft skills that are cited repeatedly. This is not an exhaustive list.

Importance and Relevance

The chief goal of public education is to provide every student with the chance to “live a meaningful and productive life, which includes earning a wage sufficient to support a small family” (American College Testing, 2006, p. 2). To reach this goal, outcomes other than just academic achievement must considered (Binet & Simon, 1916; Heckman & Kautz, 2012; Kautz et al., 2014; National Research Council, 2014). Today, in both schools and the workplace, hard and soft skills matter. According to the OECD (2015), “evidence from an analysis of longitudinal studies in nine OECD countries shows that both cognitive and social and emotional skills play a significant role in improving economic and social outcomes" (p. 13). Heckman et al., (2006) echo this statement, asserting "both cognitive and noncognitive abilities determine social and economic success" (p. 477). Additionally, research supports the argument that not only are soft skills of equal or greater importance than hard skills when it comes to determining social and economic success, but also that improving soft skills has a more meaningful impact than similar improvements in hard skills (Heckman et al., 2006; OECD, 2015).

Table 2.1

Soft Skills, by Source

skill	APM, 2006	Balcar, 2016	CTTE, 1989	Dixon et al., 2010	Gibert et al., 2017	Lazarus, 2013	Lewis, 2019	Robles, 2012	SCANS, 2004	WEF, 2018	WHO, 1994
communication	X	X	X	X		X		X			X
conflict management	X	X			X				X		
creativity		X					X			X	X
decision making				X	X						X
emotional intelligence			X		X					X	X
flexibility		X					X	X			
leadership	X	X	X			X			X	X	
learning and development	X	X	X							X	
problem-solving		X	X	X						X	X
professionalism	X		X			X		X			
teamwork	X		X	X				X	X		
work under pressure		X	X	X							X

Workforce needs. Workforce needs are not being met. According to the ManpowerGroup (2018), a global corporation that focuses on staffing, recruitment, and other workforce needs, talent shortages are higher than they have been in over a decade and more than a quarter of employers worldwide say applicants lack hard and/or soft skills to fill positions. A similar theme emerged during the National Science Foundation's (NSF) 2015 workshop entitled Developing a National STEM Workforce Strategy:

> There is often a significant gap between the knowledge, skills, and abilities most often sought by employers (e.g., data analysis skills, problem-solving skills, creativity, and employability skills such as teamwork and interpersonal communication) and the knowledge, skills, and abilities that students bring into the workforce immediately upon graduation. (National Academies of Sciences, Engineering, and Medicine, 2016, p. 6)

Given that the number of jobs a person will hold during their lifetime is on the rise (U.S. Department of Labor, Bureau of Labor Statistics, 2019) and job loss due to automation is a growing threat (OECD, 2019; World Economic Forum, 2018), skills that are transferable are quickly becoming more valuable than single-application technical skills. Petrone (2018) of LinkedIn, an American business and networking service, reported that 57% of business leaders value soft skills more than hard skills. Teaching soft skills is a recommended strategy to support the growth and development of a workforce prepared for success well into the future as these skills have more diverse application and are more likely to weather a rapidly changing employment landscape (Itani & Srour, 2016; Oleson et al., 2014). Graduates who can demonstrate soft skills are "better equipped to enter the workforce, become a valuable asset to their employer, and as a result increase their economic stability" (Martin, 2008, p. 31).

Economic value. Gainful employment provides economic stability and financial independence. While honed technical skills have historically correlated with increased wages, little research has been conducted on the correlation between well-developed soft skills and wage returns. Balcar (2014), while cautioning that soft skills have no value unto themselves but only in conjunction with other skills, found that soft skills determine wages as much as hard skills. This idea is reaffirmed through the work of Heckman et al. (2006) who stated that soft skills "raise wages through their direct effects on productivity, as well as through their indirect effects on schooling and work experience" (p. 413). Conflicting research exists on the effects of soft skills and wage returns based on gender (Balcar, 2016; Heckman et al., 2006).

Social value. While the connection between soft skills and social value may be viewed as predictable, a review of the current literature is worthwhile. Soft skills are increasingly necessary to succeed in the labor market and lead to elevated civic engagement and overall life satisfaction, including "better health, improved subjective well-being and reduced odds of engaging in conduct problems" (OECD, 2015, p. 3). Citing their universal value across cultures, religions, and societies, soft skills share a positive relationship with increased social inclusion and social mobility (Kautz et al., 2014). With these expected outcomes in mind, not all soft skills align with positive effects. According to a longitudinal study conducted by the OECD (2015), in Switzerland, an increase in the soft skill of persistence correlated with an increase in problems with the police and school delinquency, and in Norway, an increase in the soft skill of extraversion came at the cost of an increase in obesity.

Development and Assessment

Historically, soft skill development has received little attention, often relegated to secondary status in favor of hard skill development. Workers were expected arrive to their jobs already in possession of soft skills, implying this skill set was meant to be learned at home (Trilling & Fadel, 2009). Designated soft skill training was rarely a part of any curriculum, formal or informal, until 1994 when the WHO published a document outlining guidelines to facilitate the development of life skills. Since then, many other initiatives have formally recognized soft skill development as an important component to an educational program (ABET, 2019; Cimatti, 2016; Dixon et al., 2010; Saleh et al., 2017), despite incongruity as to who should ultimately be responsible for soft skill development (Taylor, 2016). Differences aside, there is firm agreement that hard and soft skills interact, influence one another, and accordingly, efforts should be made to address them together (Balcar, 2016; Cimatti, 2016; Dixon et al., 2010; Kautz et al., 2014; OECD, 2015). According to the OECD's *Skills for Social Progress,* "social and emotional skills do not play a role in isolation, they interact with cognitive skills, cross-fertilise, and further enhance children's likelihood of achieving positive outcomes later in life" (p. 14). The best course of action would be an educational system that allows for the concurrent acquisition of soft and hard skills (Anthony & Garner, 2016; Balcar, 2016), with the recognition that soft and hard skills develop differently (Botke et al., 2018; Laker & Powell, 2011).

Measurement. Speculation as to why limited attention has been paid to soft skill development focuses almost entirely on difficulty of measurement. Unlike hard skills, which are easier to train for and measure, soft skills develop at a slower rate and are difficult to assess (Balcar, 2016; Botke et al., 2018; Cimatti, 2016; OECD, 2015). To date, the best methods to gauge soft skill development include self-reporting, observation, interviews, and reports from peers and supervisors; these data sources would ideally be triangulated to improve accuracy. While optimal, these methods often prove logistically challenging, costly, and constrained by subjective interpretations of ambiguous definitions of the term soft skills (Balcar, 2016; Cimatti, 2016; Kautz et al., 2014; Matteson et al., 2016). Globally-speaking, in most of the OECD countries, assessment of soft skills is not presently connected to academics or promotion but instead is more formative and reported separately from grades for subjects (OECD, s2015).

Factors that influence development. During an NSF workshop, Kirsch argued “that the United States is becoming a country that is educated, but also one in which far too many students graduate without skills” (National Academies of Sciences, Engineering, and Medicine, 2016). In other words, educational attainment does not necessarily equate to skill development. This is especially true when it comes to soft skills development as most countries feature soft skills as a peripheral component to hard skills, and lack purposeful systems aimed at bolstering soft skills (Balcar, 2016; OECD, 2015). While schools are important and undoubtedly play a role in the development of both hard and soft skills, they are not the primary source for soft skill development (Kautz et al., 2014). Extracurricular participation, volunteering, and work experience have proven to be more valuable settings for soft skills development (Alfeld et al., 2007; Balcar, 2016; Botke et al., 2018; Covay & Carbonaro, 2010; Kautz et al. 2014; Khasanzyanova, 2017; OECD, 2015).

The consensus seems to be that soft skills are more malleable than hard skills at any stage of life; however, there is evidence to suggest critical time periods for soft skills development exist. Hard and soft skills development both show considerable gains during early childhood, whereas soft skills development outshines hard skills development during adolescence before development of both skill sets begins to taper off in later adulthood (Cunha & Heckman, 2007; Kautz et al. 2014, OECD, 2015). This is not to say there is a point at which no new hard or soft skills development is possible, simply that the rate of acquisition slows as a person gets older and that the rate slows faster for hard skills development than soft skills development. Additionally, continued investment in soft skills is necessary to maximize development (Cunha & Heckman, 2007). According to the OECD (2015), investments in soft skills reap benefits in the future for both hard and soft skills whereas investments in hard skills show no impact on future soft skills. Muzio and Fisher (2009) relate hard and soft skill development to Maslow's hierarchy of needs model (1943), stating that hard skills can develop when the lower levels of the hierarchy (physiological, safety) are met whereas soft skills development is only possible when a person has moved into the upper levels (love/belonging, esteem, self-actualization) of Maslow's model.

The role of mentors, parents, teachers, and environment in students' soft skills development must be considered. For soft skill development, Kautz et al. (2014) found mentoring to offer the most promise because in a mentor-mentee relationship, the focus is less on academic curriculum and more on soft skills like "showing up for work, cooperating with others, and persevering on tasks" (p. 33). Broh (2002) and Heckman et al. (2006) agree that parental involvement plays a substantial role in soft skill development, which is logical given soft skills were originally the responsibility of the home environment. Teachers make more of an impact on soft skills than hard skills, according to a study by Jackson (2012). Bandura's Social Learning Theory (1977) holds that people learn from one another through observation, imitation, and modeling. Accordingly, parents and teachers are well-positioned to impact students' soft skills development.

Apprenticeship and other work-related experiences have the potential to develop both hard and soft skills (Balcar, 2016; Botke et al., 2018; Kautz et al. 2014). By working in an authentic or simulated environment, students gained occupational skills but also showed improvements in soft skills as they learned to navigate the workplace (Kautz et al. 2014). As earlier evidenced, career and technical education and career and technical student organizations feature hands-on learning, work-related activities, and opportunities to engage in authentic applications (Alfeld et al., 2007), thus making career and technical education and career and technical student organizations ideal environments to cultivate soft skills.

Relationship to Career and Technical Student Organizations

Limited research exists on the correlation between career and technical education, technology education, and career and technical student organization participation and soft skill development (Alfeld et al., 2007; Aragon et al., 2013), yet there is hearty agreement that soft skills are best developed in conjunction with hard skills and develop more successfully in authentic, real-world contexts (Anthony & Garner, 2016; Balcar, 2016; Cimatti, 2016; Kautz et al., 2014; OECD, 2015). Research shows extracurricular participation has a significant positive relationship with soft skill development (Covary & Carbonaro, 2010; OECD, 2015). Career and technical education, technology education, and career and technical student organizations provide opportunities for authentic, contextual participation (Aragon et al., 2013; Camp et al., 2000; Kosloski & Ritz, 2014; Reese, 2003). By simulating the real-world more than a traditional classroom, the environments offered by career and technical education, technology education, and career and technical student organizations give students the chance to apply knowledge and skills gleaned from academic lessons in a way that minimizes risk and promotes both academic and social growth. In the Council on Technology Teacher Education’s annual yearbook, Betts (1989) states that “student organization activities put the priority on the development of people” (p. 41).

When looking specifically at career and technical student organizations, Alfeld et al. (2007) found that career and technical student organization participation resulted in increases in motivation, engagement, achievement, self-efficacy, and employability skills. Aragon et al.

(2013) reported higher levels of motivation, engagement, self-efficacy, and civic responsibility for career and technical student organization students compared to non-career and technical student organization participants. Additional anecdotal evidence exists to support the connection between career and technical student organization participation and leadership development, community service involvement, motivation, workplace skills, and employability skills (Colelli et al., 2019; Hess, 2010; Reese, 2003; Taylor, 2006; Van Dyke, 1989).

Conversely, not all studies have found participation in career and technical student organizations or extracurricular activities to have a positive impact. In a study focused more broadly on extracurricular activity participation, Marsh and Kleitman (2002) found that vocational education clubs have negative effects on academic and non-academic outcomes. Broh (2002) identified participation in vocational clubs to be detrimental to achievement. In both studies, however, the term vocational club was not operationalized, meaning the research could be referring to something other than an intracurricular career and technical student organization, and the portion of the sample that participated in vocational clubs was remarkably small. Aragon et al. (2013) also questioned the extent to which the view that students who "participate in CTSOs were 'good students' to begin with" (p. 109) may skew the impact of career and technical student organization participation.

Summary

The goal of this literature review was to provide historical and contemporary context for the current study that examines the relationship between Technology Student Association participation and soft skills development. To that end, the first section on the historical origins of career and technical education, technology education, and career and technical student organizations, served to provide background knowledge and to establish these three entities as authentic and logical settings for soft skills development. The second section focused on the effects of participation in Technology Student Association and other related extracurricular, co-curricular, and intracurricular organizations. While research exists on participation effects, a clear gap in the literature emerges when specifically considering participation's relationship with soft skills development. The third and final section of this literature review examined the topic of soft skills as it relates to this study's variables. By demonstrating the need for soft skills, examining current means of development and assessment, and reviewing identified connections with career and technical student organizations, the literature review laid the groundwork for exploration of the study's research questions. Chapter III will detail the methods and procedures used to conduct this study, including information about the study sample, research variables, instrumentation, methods of data collection, and statistical analysis.

CHAPTER 3

METHODOLOGY

This chapter is dedicated to the methodology and procedures utilized in this study. It describes the sample participants, including demographic information. This chapter also discusses the research variables, instrument adoption and usage, data collection methods and procedures, and the statistical analyses employed by the researcher.

Sample

As Technology Student Association is a career and technical student organization, and accordingly must maintain ties to at least one career and technical education program area, students must be presently enrolled in or have previously been enrolled in technology and engineering education courses to be eligible for membership (Pennsylvania Technology Student Association, 2019). Given the Pennsylvania State Board of Education requires all public education students to take part in a technology and engineering course during their tenure in school, the number of students eligible to be Technology Student Association members in Pennsylvania is quite high (Pennsylvania Code, 2020). Technology Student Association membership is not limited to public education students. Student members from public and private schools were included in the data for this study. For the 2020-21 school year, Pennsylvania Technology Student Association had a membership of 10,247 students from 104 chapters across the state. As sample size is a function of the number of predictors, the size of the effect, and desired power, G*Power was used to determine the sample size for this research study (UCLA Statistical Consulting Group, 2021).

Variables

Research variables were aligned with the research questions (Table 3.1). The dependent variable was soft skills score. This was a continuous variable. Each participant received a soft skills score through completion of the study instrument, which was adopted from the *Employability Skills* instrument utilized by Alfeld et al. (2007) as part of the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study and the *Youth Leadership Life Skills Development Scale* developed by Seevers et al. (1995). More information regarding the instrument can be found in the Instrument section.

The first independent variable was years of Technology Student Association involvement, including the present year. This was a continuous variable. Participants were asked to self-report their years of involvement, as defined by Technology Student Association membership. The minimum number of years was one and the maximum number of years was eight. Given Technology Student Association is a secondary career and technical student organization, students can participate in middle and high school. As school districts structure their grades in different ways, it is possible for a student to participate in Technology Student Association as early as fifth grade and continue through twelfth grade, hence a maximum of eight years of participation.

The second independent variable was weekly hours of Technology Student Association participation. While this variable could be considered continuous, for ease of data collection, the Pennsylvania Technology Student Association chose to provide ranges of hours as options to study participants, thus making it a categorical variable. Participants were asked to self-report the number of hours they participate in Technology Student Association activities during an average week. Directions encouraged students to include time per week spent engaged in Technology

Student Association activities both at school and away from school. Students could select from six options for this question: 0-3 hours, 4-6 hours, 7-9 hours, 10-12 hours, 13-15 hours, or 16 or more hours.

The third independent variable was competitive events results. This was a categorical variable. Participants were asked to first respond to whether or not they were a competitive event finalist for one or more competitive events at the regional, state, and national level during the whole of their time as a Technology Student Association member. If the answer was affirmative, participants were then asked to specify whether or not they placed within the top three places at the same levels. To be a competitive event finalist means that the student would have placed within the top ten places and would have been recognized at an awards ceremony.

The fourth independent variable was the participants' involvement in leadership roles within Technology Student Association. This was a categorical variable. Participants were asked to self-report any leadership roles they may have assumed during their entire time as a Technology Student Association member. While no official ranking system for Technology Student Association leadership roles exists, the order of involvement from least to most based on time commitment and size of delegation served is as follows: committee member, committee chairperson, voting delegate, chapter officer, regional officer, state officer, national officer. Participants were asked to select all that applied, as it is possible for a Technology Student Association member to hold more than one of these leadership positions, particularly for those members who have been involved in the organization for multiple years. Participants could also indicate they had not participated in any leadership roles to date.

The fifth and final independent variable was gender. This was a categorical variable. While some research advocates using a free-text response box for this variable as a means to be open and inclusive (Lindqvist et al., 2018), other research urges a multiple-choice option so as to limit measurement errors and discourage ridiculing responses (Broussard et al., 2018). Participants in this study could select one of the following options for this variable: male, female, non-binary, decline to answer. Non-binary was included as an option in an effort to be inclusive of those who "experience a gender identity that is neither exclusively male nor female, is a combination of male and female or is between or beyond genders" (Losty & O'Connor, 2018, p. 40).

Instrument

As data were collected by Pennsylvania Technology Student Association, the instrument used contained information not pertinent to this study. The sections germane to this study are detailed here. A copy of the instrument sections relevant to this study can be found in Appendix B.

The first section of the instrument collected information related to number of years of participation, weekly hours of participation, competitive events results, leadership roles, and gender. Participants were asked to self-report these items. This information corresponds to the independent variables of this study and was used by the researcher to explore relationships between these factors and the dependent variable, soft skills score.

Collectively, the second and third sections were used to determine soft skills score, the dependent variable. The second section of the instrument was adopted from the *Employability Skills* instrument utilized by Alfeld et al. (2007) as part of the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study. The *Black Box* instrument contained multiple sections: extracurricular activities, volunteer and work time, civic engagement, academic engagement, academic motivation, career self-efficacy, employability skills, demographics, and degree of participation in CTSO. After pilot testing, revision, and more pilot testing, the instrument as a whole met with acceptable reliability ($\alpha > .80$) in 2005 (Alfeld et al., 2007). For this study, the entire instrument was not used but instead the *Employability Skills* section was isolated and employed. As each section of the Alfeld et al. instrument was checked for reliability independent of the others, the survey's integrity was not compromised by this action. The *Employability Skills* survey includes 18 indicators and showed acceptable reliability ($\alpha = .99$), thus making it a tested, reliable instrument (Alfeld et al., 2007). No alterations were made to the existing indicators.

The third section of the instrument was adopted from the *Youth Leadership Life Skills Development Scale (YLLSDS)* developed by Seevers et al. (1995). Originally created as a way to measure leadership development in 4-H and FFA members in New Mexico, this survey contains seven subscales and 30 indicators. The subscales are: (1) communication, (2) decision-making, (3) getting along with others, (4) learning skills, (5) management skills, (6) understanding self, and (7) working with groups. The correlation between these seven subscales and the earlier referenced 12 soft skills most frequently identified in the literature (Table 2.1) makes the YLLSDS instrument appropriate for this study. The YLLSDS was assessed for and found to have face and content validity, and construct validity through item analysis, internal structure construct validity, and cross structure construct validity. The instrument also has high reliability ($\alpha = .99$; Seevers, et al., 1995). No alterations were made to the existing indicators.

Methods of Data Collection

The data utilized for this study were collected by the Pennsylvania Technology Student Association, thus making it an existing data set. The researcher was granted permission by the organization to use these data for the purposes of this study (Appendix A). The following information offers an explanation as to how the organization obtained the data.

During the Pennsylvania Technology Student Association's annual board of directors meeting in the summer of 2020, the organization planned to collect data on membership. Accordingly, Mr. Chris Roth, State Advisor for the organization, alerted the membership via email blast and website posting. Additionally, student participation forms included parental permission for minors to participate in the survey (see Appendix C). Plans were made to collect data in February of 2021, as this would allow Technology Student Association membership to have been established and participants would have had the opportunity to participate in at least one level of competitive events by this point in time. In February 2021, an email was sent by Roth to all Pennsylvania chapter advisors. This correspondence provided a reminder as to the survey's purpose, instructions for how to participate, and a deadline for completion. Duplicate information was posted on the organization's website and included in the bi-weekly advisor electronic newsletter.

In order to complete the survey, chapter advisors gave students instructions to visit the provided website and to log in using their Pennsylvania Technology Student Association identification number. In addition to the aforementioned reasons regarding the timing of the survey, the February-March-April data collection window also took advantage of the fact that all students were already familiar with their state-issued identification number used for competitive event participation.

Statistical Analysis

In order to perform statistical analyses, new variables had to be computed, namely for soft skills score, weekly hours of participation, competitive event success, leadership roles assumed, and gender. First, the soft skills score was arrived at by tallying the responses. Possible soft scores could range from 0-144. Next, as the variable for weekly hours of participation was offered as six ranges of hours within the survey conducted by Pennsylvania Technology Student Association, it was necessary to transform this categorical variable. The lowest number of hours per week was valued at one and the greatest number of hours per week was valued at six. Given this shift, this variable will now be known as time spent per week. The categorical variables of competitive event results and involvement in leadership roles were transformed by applying progressive weighting for involvement at the chapter/regional level, state level, and national levels and then tallying the number of indicators selected by the respondent. This is consistent with the methodology used by Kosloski and Ritz (2014). Competitive event success at the regional level was coded lower than success at the state level, which was coded lower than success at the national level. Involvement in leadership roles at the chapter/regional level was coded lower than involvement at the national level. Finally, for the categorical variable of gender, dummy codes were created to categorize participants as female or male. The low response rate for non-binary and decline to answer made statistical analysis unnecessary. See Table 3.1. This work was completed in Microsoft Excel and IBM SPSS. Statistical analysis then began with a detailed report of descriptive statistics including demographics, years of involvement, weekly hours of participation, competitive event results, leadership roles, and gender.

Table 3.1

Study Variables and Transformations

Research Question	Variable	Type of Variable	Categories	Code
RQ_1, RQ_2, RQ_3, RQ_4	Soft Skills Score	Continuous	0-144	N/A
RQ_1	Years of Participation	Continuous	1-8	N/A
RQ_1	Weekly Hours of Participation	Categorical	0-3	1
			4-6	2
			7-9	3
			10-12	4
			13-15	5
			16+	6
RQ_2	Competitive Event Results	Categorical	Regional finalist	1
			Regional 1st-3rd place	2
			State finalist	3
			State 1st-3rd place	4
			National finalist	5
			National 1st-3rd place	6
RQ_3	Involvement in Leadership Roles	Categorical	committee member – chapter or regional level	1
			committee chairperson – chapter or regional level	2
			committee member – state level	3
			committee chairperson – state level	4
			committee member – national level	5
			committee chairperson – national level	6
			voting delegate – chapter or regional level	1
			voting delegate – state level	2
			voting delegate – national level	3
			chapter officer	3
			regional officer	4

Research Question	Variable	Type of Variable	Categories	Code
			state officer	5
			national officer	6
			no leadership roles to date	0
RQ_4	Gender	Categorical	female	0
			male	1
			non-binary	N/A
			decline to answer	N/A

Note. Not applicable (N/A) is listed under code for the continuous variables of soft skills score and years of participation. It is also listed for the non-binary and decline to answer options within the categorical variable of gender, as the low response rate did not necessitate coding.

Multiple linear regression was selected for use in this study for its ability to accommodate both categorical and continuous variables, and for the ease with which it can incorporate multiple independent variables (Keith, 2015). A correlational research design using multiple linear regression was an appropriate statistical analysis for this study, given the single dependent variable being acted upon by multiple variables (Sprinthall, 2012). Forced entry regression was used for its value in explanatory research to determine the influence of multiple variables on the outcome (Keith, 2015). The researcher performed a regression analysis with soft skills score as the dependent variable and years of involvement, time spent participating per week, competitive event results, leadership roles, and gender as the independent variables. The total variance accounted for by the collective independent variables was first evaluated. As part of the regression, correlational analysis was also performed to identify significant relationships between variables. This analysis allowed the researcher to address the research questions of this study, as each independent variable was then examined for its relationship with the dependent variable.

Summary

Chapter III detailed the methodology and procedures of this study. The chapter began with a description of the study population and demographics. Research variables were then named, categorized, and an explanation for how corresponding data would be collected was offered. The dependent variable was soft skills score. The independent variables were years of involvement, time spent participating per week, competitive event results, leadership roles, and gender. Variable transformations and coding were described. Next, instrumentation was discussed. The survey began by collecting participant information pertinent to this study. The remainder of the survey, aimed at determining a soft skills score for each participant, was adopted from the *Employability Skills* instrument utilized by Alfeld et al. (2007) as part of the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study and the *Youth Leadership Life Skills Development Scale* developed by Seevers et al. (1995). The next part of Chapter III explained how the researcher was granted usage of the data set by Pennsylvania Technology Student Association, the organization responsible for data collection. Information is provided as to the procedures the organization used to obtain the data. The chapter closes with an overview of the statistical analyses used by the researcher to interpret the data. The findings of the data collection and analysis will be reported in the next chapter.

CHAPTER 4

RESULTS

The purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills necessary for gainful employment. Four research questions were used to guide this study:

- RQ_1: What relationship exists between the amount of time participating in Technology Student Association and soft skills development?
- RQ_2: What relationship exists between Technology Student Association competitive event success and soft skills development?
- RQ_3: What relationship exists between participation in Technology Student Association leadership roles and soft skills development?
- RQ_4: What relationship exists between gender and soft skills development for Technology Student Association members?

The findings of this study are presented in this chapter, including response rate, descriptive data, regression analysis, and correlation analysis.

Response Rate

The data utilized for this study were collected by the Pennsylvania Technology Student Association, thus making it an existing data set. The researcher was granted permission from the Pennsylvania Technology Student Association to access these data (Appendix A). Permission was received by Old Dominion University's Human Subjects Committee to proceed with this existing data set (see Appendix D) for the purposes of this study. Two hundred and forty five participants responded to the survey. Of the 245 responses, 16 were removed from the study. Eight of the responses began with false identification numbers. As described in earlier chapters, a state-issued identification number used for competitive event participation was required as the first field in the survey. The identification numbers provided by these eight respondents did not correspond with a Pennsylvania Technology Student Association chapter or member and thus could not be validated as responses provided by a Pennsylvania Technology Student Association member. Another eight responses were eliminated from inclusion in the study as they were duplicate submissions. This left a useable sample of 229. As sample size is a function of the number of predictors, the size of the effect, and desired power, G*Power was used to calculate the sample size for this study (UCLA Statistical Consulting Group, 2021). The sample size computes to 107 ($f^2 = .15$, $\alpha = .05$, $1\text{-}\beta$ prob = .95, 5 predictors); 229 exceeds this recommended sample size, thereby validating the sample. The investigator was also provided with survey response data from Pennsylvania Technology Student Association alumni and advisors; that information was not used in the current study.

Descriptive Data

The sample included students from sixth grade through twelfth grade. The survey was open to fifth grade students; none responded. Demographic information for study participants including grade and gender is provided in Table 4.1. For the variable of gender, 112 participants identified as female and 110 identified as male. The number of participants who selected non-binary or decline to answer was low. One participant selected the non-binary option and six participants selected the decline to answer option. Accordingly, statistical analysis was not performed on these indicators as results would not be meaningful given the low response rate.

Table 4.1

Demographic Information for Survey Participants

	Grade								
Gender	5	6	7	8	9	10	11	12	Total
Female	0	8	17	10	13	24	22	18	112
Male	0	11	6	20	15	16	25	17	110
Non-binary	0	0	0	1	0	0	0	0	1
Decline to answer	0	1	1	0	1	2	0	1	6
Total	0	20	24	31	29	42	47	36	229

Descriptive statistics for the continuous variables of years of participation, time spent per week, competitive event success, leadership roles assumed, and soft skills score are provided in Table 4.2. The average number of years of Technology Student Association participation was 2.69 (M = 2.69) and the minimum number of years cited was one and the maximum number of years was 7. The amount of time spent per week showed a mean of 2.18. It is important to note that this does not mean participants were working on Technology Student Association activities for an average of 2.18 hours per week. Given the earlier mentioned variable transformations, this corresponds instead to the second option of four to six hours per week on Technology Student Association activities. The range for competitive event success was a minimum of zero, meaning participants had not experienced any competitive event success and a maximum of 21, which would indicate success at all levels competition ($M_{competitive\ event\ success}$ = 8.96). Given the variable transformations and the progressive nature of competitive event success, this most likely means the average participant reported success at the regional and state level. For the variable of leadership roles assumed, the mean score was 3.18 (minimum = 0, maximum = 28). Given variable transformations and weighting, a participant earning a high score likely participated in multiple leadership roles at all levels of the organization whereas a score of zero indicated no leadership roles assumed to date. The mean score is likely indicative of minimal leadership roles assumed and/or participation limited to the chapter/local level. Soft skills score was a continuous variable that required no transformation or interpretation; indicators were tallied. The average soft skills score was 102.79, the lowest score participant score was 24, and the highest participant score was 144, which coincides with maximum score achievable via the instrument.

Table 4.2

Descriptive Statistics for Variables

Variable	*M*	*SD*	Minimum	Maximum
1. Years of Participation	2.69	1.61	1	7
2. Time Spent per Week	2.18	4.09	1	6
3. Competitive Event Success	8.96	1.46	0	21
4. Leadership Roles Assumed	3.18	1.46	0	28
5. Soft Skills Score	102.79	10.72	24	144

n = 229

Statistical Analysis

To address the research questions, a multiple linear regression analysis was performed to determine the relationship between the independent variables and the dependent variable of soft skills score. As part of the regression analysis, a correlation analysis was also performed to determine the relationship between the independent variables.

Regression Analysis

A regression of soft skills score on leadership roles assumed, competitive event success, time spent per week, years of participation, and gender explained a significant 16% ($R^2 = .16$) of the variance in soft skills score; F (7, 221) = 5.99, MSE = 466.88, $p < .001$. Collectively, the variables of leadership roles assumed, competitive event success, time spent per week, years of participation, and gender account for 16% of the variance in soft skills score. Conversely, 84% of the variance in soft skills score is unexplained or cannot be attributed to these collective variables.

The multiple linear regression coefficients identified several significant predictors of soft skills score. See Table 4.3 for a summary of the coefficients. Specifically, time spent in weekly participation of Technology Student Association activities was a significant predictor of soft skills score ($\beta_{time\ spent\ per\ week}$ = .19, p = .003, 95% CI [1.35, 6.46]), which indicates that a one standard deviation unit increase in time spent per week led to a .19 standard deviation unit increase in soft skills score, after controlling for leadership roles assumed, competitive event success, and years of participation. The assumption of leadership roles was also a significant predictor of soft skills score ($\beta_{leadership\ roles\ assumed}$ = .22, p = .005, 95% CI [.29, 1.60), which indicates that a one standard deviation unit increase in years of participation led to a .22 standard deviation unit increase in soft skills score, after controlling for time spent per week, competitive event success, and years of participation.

Additionally, gender was a significant predictor of soft skills scores, after controlling for leadership roles assumed, competitive event success, time spent per week, and years of participation (b_{male} = -12.18, p < .001, 95% CI [-17.92, -6.44]). Females were 12.18 points or 8.5% higher, on average, than males in their mean statistics for soft skills scores, after controlling for leadership roles assumed, competitive event success, time spent per week, and years of participation.

Finally, competitive event success and years of participation were not significant predictors of soft skills scores after controlling for time spent per week, leadership roles assumed, and gender ($b_{competitive\ event\ success}$ = .01, p = .98, 95% CI [-.63, .64]; $b_{years\ of\ participation}$ = -.15, p = .90, 95% CI [-2.49, 2.19]).

Table 4.3

Multiple Linear Regression Coefficients

Independent variable	*b*	*β*	*p*	*CI*
Gender	-12.18	-.26	<.001	-17.92, -6.44
Years of Participation	-.15	-.01	.90	-2.49, 2.19
Time Spent per Week	3.90	.19	.003	1.35, 6.46
Competitive Event Success	.01	.00	.98	-.63, .64
Leadership Roles Assumed	.98	.22	.005	.29, 1.60

Note. Dependent Variable: Soft Skills Score
R^2=.16

Correlation Analysis

A correlation analysis yielded several significant relationships. The leadership roles a Technology Student Association member assumes shows significant positive correlations with the years of participation (*r* [227] = .52, *p* < .001), with time spent per week (*r* [227] = .18, *p* =.005), with competitive event success (*r* [227] = .50, *p* < .001), and with soft skills score (*r* [227] = .23, *p* < .001). The time spent per week a Technology Student Association member spends on Technology Student Association activities correlates positively and significantly with soft skills score (*r* [227] = .23, *p* < .001) and competitive event success (*r* [227] = .14, *p* =.039). Additionally, the relationship between years of participation and competitive event success was positive (*r* [227] = .54, *p* < .001). Given the Pearson *r* conveys associational strength, effect size can also be determined by examination of *r* values (Sprinthall, 2012, p. 305). The effect size was large for the correlations between leadership roles assumed and years of participation (*r* = .52), leadership roles assumed and competitive event success (*r* = .50), and years of participation and competitive event success (*r* = .54). All other correlations were small in effect size. See Table 4.4 for an interpretation of *r* values as effect sizes.

Table 4.4

Effect Sizes

r Value	Effect Size
± .1	small effect
± .3	medium effect
± .5	large effect

Note. Adapted from *Discovering Statistics Using IBM SPSS Statistics* by A. Field, 2013. SAGE Publishing.

No significant correlations were found between soft skills score and competitive event success (*r* [227] = .11, *p* = .10) or between soft skills score and years of participation (*r* [227] = .11, *p* = .10). Finally, no significant correlation was found between years of participation and time spent per week (*r* [227] = .11, *p* = .10). See Table 4.5 for a summary of the correlations.

Table 4.5

Summary of Pearson Correlations

Variable	1. Years of Participation	2. Time Spent per Week	3. Competitive Event Success	4. Leadership Roles Assumed	5. Soft Skills Score
1. Years of Participation	–				
2. Time Spent per Week	.11	–			
3. Competitive Event Success	.54**	.14*	–		
4. Leadership Roles Assumed	.52**	.18**	.50**	–	
5. Soft Skills Score	.11	.23**	.11	.23**	–

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)
c. Listwise *N* = 229

Summary

Chapter IV detailed the data screening, variable transformations and computations, as well as provided descriptive data and the results of data analysis. The data were analyzed according to their relationship with the research questions. RQ_1 explored the amount of time spent participating in Technology Student Association and soft skills development. Two independent variables measured the amount of time spent participating in Technology Student Association activities: years of participation and time spent per week. Time spent per week was a significant predictor of soft skills score ($\beta = .19$, $p = .003$). Additionally, years of Technology Student Association participation and time spent per week show a positive relationship with leadership roles assumed, another predictor of soft skills score.

RQ_2 sought to examine the relationship to competitive event success and soft skill development. While competitive event success was not a significant predictor of soft skills score, this variable does demonstrate a positive correlation with leadership roles assumed and both time variables.

RQ_3 looked at the relationship between participation in Technology Student Association leadership roles and soft skills development. The assumption of leadership roles was a significant predictor of soft skills score ($\beta = .22$, $p = .005$). Moreover, assuming leadership roles within Technology Student Association activities also showed a strong, positive correlation with competitive event success and both time variables, as noted in RQ_1 and RQ_2.

RQ_4 evaluated the relationship between gender and soft skills development. Gender proved to be a significant predictor of soft skills score, with females being 12.18 points higher, on average, than males in their mean statistics for soft skills scores, after controlling for the study's other independent variables.

A detailed analysis of these findings will be presented in Chapter V.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills necessary for gainful employment. This chapter summarizes the study, discusses the conclusions of the study, and provides recommendations based on the study findings.

Summary

Soft skills are necessary to gain and maintain employment in today's economy. Despite their importance and relevance, soft skills continue to be out-prioritized by traditional academic disciplines and technical skill-specific occupational training, receiving limited attention within formal educational programs. Solving this problem, however, is not as simple as adding a soft skills course to a program of study. Current research shows that soft skills are best acquired in conjunction with hard skills (Balcar, 2016; Cimatti, 2016; Dixon et al., 2010; Kautz et al., 2014; OECD, 2015), more likely to be retained when learned in real-world contexts (Alfeld et al., 2007; Balcar, 2016; Botke et al., 2018; Covay & Carbonaro, 2010; Kautz et al. 2014; Khasanzyanova, 2017; OECD, 2015), and often developed through relationships with mentors, teachers, and parents outside the traditional classroom (Bandura, 1977; Broh, 2002; Heckman et al., 2006; Jackson, 2012; Kautz et al., 2014). Career and technical student organizations provide a natural environment for the development of soft skills. While 11 career and technical student organizations exist, the relationship between soft skills development and Technology Student Association, the career and technical student organization associated with technology education, was the focus of this research.

The purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills necessary for gainful employment. The following questions were designed to focus the research of this study:

- RQ_1: What relationship exists between the amount of time participating in Technology Student Association and soft skills development?
- RQ_2: What relationship exists between Technology Student Association competitive event success and soft skills development?
- RQ_3: What relationship exists between participation in Technology Student Association leadership roles and soft skills development?
- RQ_4: What relationship exists between gender and soft skills development for Technology Student Association members?

This study has multiple limitations. First, given the way Technology Student Association determines membership, data will not be representative of all Technology Student Association members but instead representative of active Technology Student Association members. For financial and logistical reasons, some schools register their entire roster for Technology Student Association membership. While all students in these schools benefit from Technology Student Association curricular materials, only a portion of students select to be active members in the organization. Data were also collected exclusively from the state of Pennsylvania. A second limitation of this study is that no Technology Student Association experiences are identical as facilitation and engagement is determined by state and local variables. To offset this, the sample size was designed to be large enough to be inclusive of all types of Technology Student Association participation. Third, despite similarities, 11 career and technical student organizations exist to meet the diverse interests and needs of career and technical education students. A limitation of this research is that only one of the 11 career and technical student organizations was studied. While it is possible that information from this study may be applicable to other career and technical student organizations, care should be taken to avoid assuming Technology Student Association conclusions will be guaranteed for other career and technical student organizations (Camp et al., 2000; Kosloski, 2010). Fourth, as the researcher used an existing data set provided by Pennsylvania Technology Student Association for this study, there is no guarantee that the study instrument was administered to all participants in the same way or that other consistent protocols were followed during data collection. Finally, the ongoing COVID-19 pandemic has disrupted the Technology Student Association experience. While the extent of this disruption is unknown, a limitation of this study is that data will be impacted by the pandemic.

The national Technology Student Association boasts over 250,000 members. Pennsylvania Technology Student Association reported 10,247 members for the 2020-21 school year, ranking 6th among all 48 affiliated states. It is worth noting that membership in Pennsylvania dropped by nearly half between the 2019-20 and 2020-21 school years (TSA, 2021). This unexpected and unprecedented decline is likely attributed to the COVID-19 pandemic and the corresponding uncertain and ever-changing school format. Pennsylvania Technology Student Association collected data on their membership in the spring of 2021. The researcher was granted access to these data for the purposes of this study. A sample of 229 participants was used. All study participants were active Pennsylvania Technology Student Association members.

As the data were collected by Pennsylvania Technology Student Association, the survey contained sections not pertinent to this study. Three sections of the instrument were relevant.

First, information directly connected to the research variables was collected, namely number of years of participation, weekly hours of participation, competitive events results, leadership roles, and gender. The second and third sections were used to measure soft skills development and were adopted from existing, validated instruments: The *Employability Skills* instrument used by Alfeld et al. (2007) as part of the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study and the *Youth Leadership Life Skills Development Scale (YLLSDS)* developed by Seevers et al. (1995).

Data analysis began with an examination of descriptive data. The average number of years of Technology Student Association participation was just under three ($M_{years\ of\ participation}$ = 2.69). Most participants reported spending between four and six hours each week working on Technology Student Association activities ($M_{time\ spent\ per\ week}$= 2.18). Most students report achieving competitive event success at the regional and state level ($M_{competitive\ event\ success}$ = 8.96). The mean score for leadership roles assumed ($M_{leadership\ roles\ assumed}$ = 3.18) is indicative of minimal leadership roles assumed and/or participation limited to the chapter/local level for most study participants. The variables for time spent per week, competitive event success, and leadership roles were transformed as per the procedures described in Chapter 3 (see Table 3.1). Study participation was balanced in terms of gender (N_{female} = 112, N_{male} = 110, $N_{non\text{-}binary}$ = 1, $N_{decline\ to\ answer}$ = 6). The average soft skills score hovered at approximately 71% ($M_{soft\ skills\ score}$ = 102.79). This is slightly higher than the results reported by Alfeld et al. (2007) as the mean score for students involved in a career and technical student organization was approximately 60% and higher than the results reported by Hansen et al. (2003) as the mean score for students involved in community organizations and vocational clubs was approximately 54%. As explained in Chapter 3, the instrumentation used for this study was a combination of the surveys used by

Alfeld et al (2007) and Seevers et al. (1995) and any comparison between scores must be done so with this in mind.

To explore the research questions, a multiple linear regression analysis was performed with soft skills score as the dependent variable and years of involvement, time spent participating per week, competitive event results, leadership roles, and gender as the independent variables. Collectively, the independent variables account for a significant 16% ($R^2 = .16$) of the variance in soft skills score; F (7, 221) = 5.99, *MSE* = 466.88, $p < .001$. Three independent variables were significant predictors of soft skills score: time spent per week ($\beta_{time\ spent\ per\ week} = .19$, $p = .003$, 95% CI [1.35, 6.46]), leadership roles assumed ($\beta_{leadership\ roles\ assumed} = .22$, $p = .005$, 95% CI [.29, 1.60]), and gender ($b_{male} = -12.18$, $p < .001$, 95% CI [-17.92, -6.44]).

A correlation analysis revealed several significant relationships. Assuming leadership roles correlates significantly and positively with years of participation (*r* [227] = .52, $p < .001$), with time spent per week (*r* [227] = .18, *p* =.005), with competitive event success (*r* [227] = .50, $p < .001$), and with soft skills score (*r* [227] = .23, $p < .001$). The time spent per week a Technology Student Association member spends on Technology Student Association activities shows significant positive correlations with soft skills score (*r* [227] = .23, $p < .001$) and competitive event success (*r* [227] = .14, *p* =.039). Also, there is a significant, positive relationship between years of participation and competitive event success (*r* [227] = .54, $p < .001$). No significant relationships existed between the following variables: soft skills score and competitive event success (*r* [227] = .11, *p* = .10), soft skills score and years of participation (*r* [227] = .11, *p* = .10), or years of participation and time spent per week (*r* [227] = .11, *p* = .10).

Conclusions

As the purpose of this study was to determine the relationship between student participation in Technology Student Association and the development of soft skills, it is important to first note that the study yielded a statistically significant relationship when the independent variables were viewed together. Explaining approximately 16% of the variance ($R^2 = .16$), years of involvement, time spent participating per week, competitive event results, leadership roles, and gender, collectively, cannot be discounted for their impact on soft skills score. The correlation analysis also revealed many of these variables share significant relationships with each other.

RQ_1 focused on the relationship between the amount of time participating in Technology Student Association activities and soft skills development. Amount of time participating is measured by the independent variables of years of participation and time spent per week. Time spent on Technology Student Association activities per week was a significant predictor of soft skills score ($\beta = .19$, $p = .003$). This result aligns with current research. Alfeld et al. (2007) and Kosloski and Ritz (2014) found that a student's strong involvement in a career and technical student organization corresponds to various positive outcomes. While Kosloski and Ritz (2014) measured academic gains in the form of grade point average increases, Alfeld et al. (2007) also identified gains in soft skills such as motivation, engagement, and employability skills.

Years of participation was not a significant predictor of soft skills score ($\beta = -.01$, $p = .90$). The average number of years of participation was low ($M_{years\ of\ participation} = 2.69$, maximum = 8). As eight years of Technology Student Association participation are possible, less than three years of participation is well less than half. This could explain why no significant relationship exists between number of years and soft skills development. Perhaps, students who responded to the survey simply have not yet had the opportunity to see if an increase in years of participation is beneficial in terms of soft skills development. Years of participation and time spent per week, however, both share a significant positive relationship with leadership roles assumed ($r_{years\ of\ participation}$ = .52, p < .001; $r_{time\ spent\ per\ week}$ = .18, p = .005), a variable that is a significant predictor of soft skills score. The relationship between years of participation and leadership roles assumed shows a strong effect size whereas the relationship between time spent per week and leadership roles assumed shows a small approaching moderate effect size. The findings of this study provide evidence to support the idea that a significant positive relationship exists between the amount of time participating in Technology Student Association activities and soft skills development.

RQ_2 looked to examine the relationship between competitive event success and soft skills development. The results concerning this element of Technology Student Association participation were the most lackluster in that competitive event success was not a significant predictor of soft skills score (β = .002, p = .98) and only showed significant relationships with leadership roles assumed ($r_{leadership\ roles\ assumed}$ = .50, p < .001) and both time variables ($r_{years\ of\ participation}$ = .54, p < .001; $r_{time\ spent\ per\ week}$ = .14, p = .04). This finding is curious as it contradicts the findings of Alfeld et al. (2007) that showed "…of the four organizational elements of CTSOs (leadership, community service, competitions, and professional development), competitions were found to have the most positive effects" (p. iii). It also highlights a disconnect between soft skills development and the fact that competitive events are a central component to Technology Student Association membership, with nearly 87% of members participating in competitive events last year. If competitive events are the focus of this career and technical student organization, why does success in competitive events not correspond with soft skills gains? It is possible the value in competitive events is more process-based and less dependent on the end-product. Kosloski (2008) identified a correlation between time spent preparing for competitive events and competitive event success. That same finding is echoed in this study in that competitive event success correlates positively and significantly with both time variables: time spent per week (r [227] = .14, p =.039) and years of participation (r [227] = .54, p < .001). Additionally, given time spent per week is a significant predictor of soft skills development, the fact that competitive event success does not correlate with soft skills development could indicate that soft skills are developed through the process of preparing for competitive events and less reliant upon earning a top rank in a competitive event. This idea is further reinforced by Blakely et al. (1993) who found that FFA members valued competitive event success less than soft skills such as teamwork, responsibility, and communication and by the work of the National Academies of Sciences, Engineering, and Medicine (2018) that affirmed awards affect motivation but question the endurance of motivation spurred solely by awards. Similarly, Miller (2020) found that productive struggle led to soft skills growth whereas success without struggle showed no similar growth. The findings of this study indicate that while competitive event success does not share a direct relationship with soft skills development, time spent preparing for competitive events may positively influence soft skills development.

RQ_3 examined the relationship between assuming leadership roles within Technology Student Association and soft skills development. Assuming leadership roles was a significant predictor of soft skills score (β = .22, p = .005). This finding aligns with the work of Rose et al. (2016) but differs from that of Alfeld et al. (2007) who found that assuming a leadership position within a career and technical student organization did not have any significant outcomes. This discrepancy could be explained by several reasons. First, the Alfeld et al. (2007) study was conducted over a decade ago. In the time since then, the world has seen an increased recognition of the value of soft skills (Cimatti, 2016; Knowles, 2014, Vogler et al., 2017), which could impact students' exposure to and familiarity with soft skills. Second, the data collected and analyzed for this study were limited to a single career and technical student organization whereas the Alfeld et al. (2007) study utilized data from eight career and technical student organizations. While Technology Student Association was included in the Alfeld et al. (2007) sample, the narrower focus of the current study would likely affect outcomes as 11 career and technical student organizations exist to foster differing interests and various skills (Camp et al., 2000) and accordingly may impact soft skills development in varying ways. It is worth noting that the findings of this study address a concern raised by the *Looking Inside the Black Box* study (Alfeld et al., 2007). The researchers at the time noted the lack of significant outcomes related to leadership as surprising and indicative of a need for more vigorous research to validate anecdotal assertions of the benefits of assuming leadership roles within a career and technical student organization (Hess, 2010; Litowitz, 1995; Reese, 2008).

Additionally, taking on leadership roles within Technology Student Association also showed strong, positive correlations with competitive event success and both time variables, as noted in RQ_1 and RQ_2. This aligns with the volume of research that supports a positive relationship between leadership development in general and career and technical student organization participation (Alfeld et al., 2007; Dormody & Seevers, 1994; Kosloski, 2010; Wingenbach & Kahler, 1997). The findings of this study support the existence of a significant positive relationship between participation in Technology Student Association leadership roles and soft skills development.

RQ_4 focused on the relationship between gender and soft skills development for Technology Student Association members. On average, after controlling for years of involvement, time spent participating per week, competitive event results, and leadership roles, females showed scores 12.18 points or 8.5% higher than males in their soft skills scores. These findings align with those of Aragon et al. (2013), who found that career and technical student organization participation is more beneficial for females than males in terms of academic motivation, academic engagement, career self-efficacy, civic responsibility, and educational aspirations. The fact that females show greater gains in soft skills also could be attributed to their choices in competitive event participation. In a Technology Student Association-specific study, Mitts and Haynie (2010) discovered that female members prefer socially relevant and socially significant activities to those that are more technically skill-based. Preparing for and competing in events that focus more on soft skills than hard skills logically leads to an increase in soft skills development. The findings of this study indicate gender plays a role in soft skills development for Technology Student Association members, affecting females more than males.

Recommendations

Based on the findings of this study, the following are recommendations for researchers and practitioners.

Future Research

1. While this study focused on the relationship between soft skills development for current Technology Student Association members, this career and technical student organization has a strong alumni network and many advisors who have served their chapters for decades. Given the immense amount of time these individuals dedicate to Technology Student Association, their experiences are diverse and deep. Broadening the study to

include alumni and advisors could lead to rich, nuanced findings. As Pennsylvania Technology Student Association has already collected data from this population, analysis would be feasible. If this is pursued, caution should be exercised as this population may demonstrate bias and care should be taken to address a ceiling effect that may occur (Sprinthall, 2012). The existing data could also be used to examine potential differences in soft skills development for middle school and high school students. While the data are imbalanced ($N_{middle\ school}$ = 75, $N_{high\ school}$ = 154), analysis could yield information relevant to peak years for soft skills development. As Technology Student Association is a national organization, the study could also be replicated with the national organization as a whole or with any of the other 48 states that have delegations. Such replication would take into account the differences in membership structure between states.

2. More than a decade has passed since Alfeld et al. (2007) conducted the *Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience* study and eight years have passed since Aragon et al. (2013) used the same instrumentation to explore career and technical student organization outcomes for females and racial minority students. While both of these studies led to insights on soft skills development, those insights were only a small portion of the results. The passage of time and the findings of this current study make replication of this study with other career and technical student organizations a worthwhile endeavor. Repeating this study with other nationally recognized career and technical student organizations as the study population and sample would provide a stronger understanding of the connection between each career and technical student organization and soft skills development. Given the

importance of soft skills, exploring the connection between their development and career and technical student organization participation could lead to valuable conclusions.

3. As the world is just beginning to emerge from the COVID-19 pandemic, it is impossible to know the impact of this global health crisis. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO; 2020), more than 90% of worldwide learners have been away from schools during some portion of the last year in an attempt to curb the spread of COVID-19. It is assumed this unprecedented health crisis will have a lasting impact on school and all related activities, including career and technical student organization participation. Pennsylvania Technology Student Association saw membership drop by half during this time (TSA, 2021). State and national Technology Student Association conferences were cancelled for 2020 and the organization resorted to virtual conferences in place of in-person conferences in 2021, which may contribute to an adverse effect on soft skills development. While it is encouraging that career and technical student organization participation did not disappear entirely during this time, there is no doubt that the typical experience has been disrupted. It is recommended that this study be replicated if and/or when traditional elements of Technology Student Association participation have resumed.
4. The role of the advisor in a Technology Student Association chapter can be critical (Van Dyke, 1989). Based on the research of Kautz et al. (2014), the mentor-mentee relationship has the most potential to impact soft skills development. With the addition of one more variable, years of experience for a student's Technology Student Association advisor, it would be possible to explore the relationship between a student's soft skills development and the advisor's tenure. While it may be expected that a veteran advisor

would be well-versed in the facilitation of Technology Student Association activities and accordingly have more time to dedicate to students' soft skills development, it is possible that a novice advisor may bring a fresh perspective that could yield more growth in soft skills. It is recommended that any future replications of this study also include advisor's years of experience as an additional independent variable.

5. While this study measured a participant's soft skills at a single moment in time, a longitudinal study that measures soft skills at the beginning of Technology Student Association participation in middle school and then again measures soft skills upon conclusion of participation in the organization in high school would be beneficial and provide a different perspective on the relationship between soft skills development and Technology Student Association participation. As Cunha and Heckman (2007) recommend continued investment in soft skills to maximize development, an exploration of this sort is recommended to better understand the impact continued Technology Student Association participation may have on soft skills development.

Implications for Practitioners

The purpose of education is to prepare students for the future, focusing the development of the whole student (Betts, 1989). Educators strive, on a daily basis, to cultivate an environment in which students can gain knowledge and make meaning of that knowledge in order to live a happy, productive life (American College Testing, 2006). Career and technical education extends this by focusing on the development of skills and practices that are immediately applicable to the workplace. Career and technical student organizations take this a step even further by providing authentic contexts in which students can try out and refine hard and soft skills necessary for future occupations. Given career and technical student organizations provide an environment conducive to soft skills development, and given the findings of this study that show that participation in a career and technical student organization positively impacts soft skills development, educators should be encouraged to commence or continue facilitation of career and technical student organizations. While soft skills develop at all ages, career and technical student organization participation aligns with a period of adolescent development, middle and high school, which is particularly fertile for the development of soft skills (Cunha & Heckman, 2007; Kautz et al. 2014, OECD, 2015). Specifically, technology educators would be wise to explore participation in Technology Student Association, given the benefits of such participation detailed in this study. Additionally, as one of the best ways to develop soft skills is through time spent working with mentors, teachers, and parents (Bandura, 1977; Broh, 2002; Heckman et al., 2006; Jackson, 2012; Kautz et al., 2014), Technology Student Association participation should be supported as it provides a natural context for these valuable relationships to develop. Furthermore, as Technology Student Association participation provides significant benefits in terms of soft skills development for female members, efforts should be made to support existing female Technology Student Association members and to recruit new female members.

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APPENDIX A: PERMISSION TO USE DATA – PENNSYLVANIA TECHNOLOGY STUDENT ASSOCIATION

5/28/2021 Old Dominion University Mail - Request for PA-TSA membership data

OLD DOMINION UNIVERSITY
IDEA FUSION

LAUREN LAPINSKI <llapi001@odu.edu>

Request for PA-TSA membership data

2 messages

LAUREN LAPINSKI <llapi001@odu.edu> Wed, May 26, 2021 at 7:55 AM
To: jkofmehl@patsa.org

Hello Jason,
I am writing today to formally request access to the data Pennsylvania Technology Student Association (PATSA) collected on its membership this spring. This written request is a follow-up to prior conversations at meetings of the full PA-TSA Board of Directors in January 2021 and July 2020.

I am requesting access to this data for use in my doctoral dissertation research through Old Dominion University. Specifically, my research focuses on the relationship between TSA participation and soft skills development. I will be happy to share my findings with PA-TSA upon completion of the research, both in written format and oral presentation.

Please let me know if you have any questions or concerns. I appreciate your consideration of my request.

Sincerely,

Lauren Lapinski
PhD candidate
Old Dominion University

Jason Kofmehl <jkofmehl@patsa.org> Wed, May 26, 2021 at 8:27 AM
To: LAUREN LAPINSKI <llapi001@odu.edu>

Hello Lauren,
Thank you for contacting me. Please allow this email to serve as formal permission for you to access and use the data collected from our recent membership survey in pursuit of your doctoral dissertation research.

On behalf of the PA-TSA Board of Directors, thank you for pursuing this research. Anecdotally, we know PA-TSA is beneficial to students. It will be interesting to see what your research yields. We look forward to hearing of your findings at this summer's meeting.

Sincerely,

Jason Kofmehl
PA-TSA Board of Directors' President

Jason Kofmehl
Pennsylvania Technology Student Association
Board of
Directors
President Social
Media Manager

APPENDIX B: INSTRUMENT

To view the survey in its original format, click this link.

TSA Participation Survey

Please answer all questions with your TSA experience in mind.

* Required

1. What is your ID #? (####-###) *

2. I am a part of Region * *Mark only one oval.*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

3. What grade are currently you in? * *Mark only one oval.*

- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

4. What is your gender? * *Mark only one oval.*

- Female
- Male
- Non-binary
- Prefer not to answer

5. How many years have you participated in TSA (including this one)? *

Mark only one oval.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

6. How many hours a week do you spend participating in TSA activities (including attending meetings, working on projects, taking part in TSA service projects, etc.)? Make sure to include both time at school and outside of school. * *Mark only one oval.*

- 0-3
- 4-6
- 7-9
- 10-12
- 13-15
- 16 or more

7. In your year(s) of participation, were you ever a finalist at your Regional Conference? *

Mark only one oval.

- Yes
- No

8. If yes, did you place first, second, or third at your Regional Conference?

Mark only one oval.

- Yes
- No

9. In your year(s) of participation, were you ever a finalist at the State Conference? *

Mark only one oval.

- Yes
- No

10. If yes, did you place first, second, or third at the State Conference?

Mark only one oval.

- Yes
- No

11. In your year(s) of participation, were you ever a finalist at the National Conference? *

Mark only one oval.

- Yes
- No

12. If yes, did you place first, second, or third at the National Conference?

Mark only one oval.

- Yes
- No

13. What leadership roles have you held during your time in TSA? Check all that apply. *

Check all that apply.

- committee member - chapter or regional level
- committee chairperson - chapter or regional level
- committee member - state level
- committee chairperson - state level committee
- member - national level
- committee chairperson - national level
- voting delegate - chapter or regional level
- voting delegate - state level
- voting delegate - national level chapter officer
- regional officer
- state officer
- national officer
- no leadership roles to date

Please respond to the following questions based on your experiences in TSA.

The following questions were adopted from the Employability Skills instrument utilized by Alfeld et al. (2007) as part of the Looking Inside the Black Box: The Value Added by CTSOs to Students' High School Experience study.

14. I read new and challenging material *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

15. I write reports and papers that address real-world problems *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

16. I use math to solve real-life problems *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

17. I communicate in writing or verbally to others, not just teachers *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

18. I set goals for myself *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

19. I achieve my goals *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

20. I focus my attention *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

21. I observe how others solve problems and try to use those problem-solving techniques *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

22. I develop detailed plans for solving a problem *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

23. I practice self discipline *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

24. I learn about people from different backgrounds *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

25. I learn about helping others *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

26. I was able to change my school or community for the better *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

27. I work in groups where we sometimes have to compromise to succeed *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

28. I share responsibility for a project with others *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

29. I learn how my emotions and attitudes affect others in the group *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

30. I learn that it is not necessary to like people to work with them *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

31. I led groups or other students *

Mark only one oval.

- not at all
- a little
- quite a bit
- yes, definitely

As a result of my TSA experiences...

The following questions were adopted from the Youth Leadership Life Skills Development Scale (YLLSDS) developed by Seevers et al. (1995).

32. ... I can determine community needs * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

33. ... I am able to rely on my strengths * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

34. ... I respect what I am good at * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

35. ... I can set realistic goals *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

36. ... I can be honest with others *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

37. ... I can use information to solve problems *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

38. ... I understand stress from being a leader *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

39. ... I can set priorities *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

40. ... I am sensitive to others *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

41. ... I am open-minded * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

42. ... I consider the needs of others * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

43. ... I show a responsible attitude * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

44. ... I am willing to speak up for my ideas *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

45. ... I consider input from all group members *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

46. ... I can listen effectively *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

47. ... I can make alternative plans * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

48. ... I recognize the worth of others * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

49. ... I create an atmosphere of acceptance * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

50. ... I can think about alternatives * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

51. ... I respect others' feelings * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

52. ... I can solve problems as a team * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

53. ... I can handle mistakes *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

54. ... I can be tactful * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

55. ... I am flexible when making team decisions *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

56. ... I get along with others * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

57. ... I can clarify my values * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

58. ... I use rational thinking * *Mark only one oval.*

- no gain
- slight gain
- moderate gain
- a lot of gain

59. ... I understand what it takes to be a leader *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

60. ... I have good manners *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

61. ... I trust other people *

Mark only one oval.

- no gain
- slight gain
- moderate gain
- a lot of gain

Final thoughts

62. I think the most important thing I have learned through my participation in TSA is... *

APPENDIX C: STUDENT PARTICIPATION FORM – PENNSYLVANIA

TECHNOLOGY STUDENT ASSOCIATION

To view the participation forms in original format, click this link to form.

Region and State Conference Code of Behavior/Responsibility

All students must sign and obtain the signature of their parent/guardian on the PA-TSA Dress Code and Code of Behavior form. The completed form must be handed in to the chapter advisor prior to the conference, and the chapter advisor will maintain a copy of this form for the duration of the conference. This completed form must be available for the State Conference Director and/or the State Advisor upon request.

All members attending any TSA function are expected to comply with the regulations listed below:

1. All members attending any TSA activity must conduct themselves in an expected and appropriate way at all times.
2. Students must dress according to the Dress Code for the duration of the conference.
3. Students must wear identification badges at all times.
4. Students must keep their advisor/chaperone informed of their activities and whereabouts at all times.
5. Students should be prompt and prepared for all activities.
6. The possession and/or use of any controlled substance (i.e. alcohol, drugs, tobacco, etc.) is prohibited. Prescribed medications must be held and distributed by advisor/school nurse.
7. Gambling, of any kind, is prohibited.
8. Students must not leave the conference site or lodging area without the permission and/or accompaniment of their advisor/chaperone.
9. Students must attend all general sessions and activities for which they are assigned/registered. This includes workshops, competitive events, committee meetings, etc.
10. Students attending overnight conferences must observe the established curfew for that conference.
11. Students not staying at the hotel must leave the hotel grounds by curfew or immediately following the last scheduled event.
12. All room charges (incl phone bills) for hotel rooms will be shown on the individual room bills and must be paid by the student and/or chapter.
13. Students attending overnight conferences should only be in the sleeping rooms for which they are registered, unless advisor presence/permission is granted.
14. Defacing of public property is prohibited. Any damages to property, hotel room furnishings, or conference complex must be paid by the student and/or chapter responsible.
15. Students are reminded that the state and school weapon policies are in effect while attending the conference. Any student found in violation of these policies may face legal charges and/or expulsion upon return. (X-acto knives, utility knives, and other potentially dangerous tools should be kept by advisors and used only under adult supervision.)

16. All students are required to follow the instructions of any properly identified advisor, teacher, chaperone, or conference staff member.
17. Guests are permitted in open/authorized activities and should obtain a guest identification badge upon arrival to the conference. Guests are not permitted in hotel rooms.
18. Accident insurance is the responsibility of the student (parent/guardian).
19. A TSA Conference is an extension of the school day, thus all school rules/policies are in effect and anyone found in violation of these rules/policies will be dealt with accordingly.
20. PA-TSA prides itself on maintaining a culture of civility, tolerance, and respect. Accordingly, any behavior that fails to meet this expectation will be addressed by the chapter advisor, State Advisor, school principal, State Conference Planning Team and/or the PA-TSA Board of Directors.

Failure to comply with these rules may result in the student and/or chapter being sent home at their own expense. Depending on the violation, further dealings with the advisor, principal, State Conference Planning Team and/or the PA-TSA Board of Directors may be necessary.

Region and State Conference Dress Code

Students shall adhere to the following dress code requirements throughout the entire conference, including their travel to and from the conference. It is the responsibility of the Chapter Advisor to see that his/her delegation complies with the rules established for proper dress code.

The following guidelines are for ALL students and advisors.
Required dress will be listed with each event in the conference program.
ID Tags must be worn at all times, regardless of dress code category.

Category A – Official Dress	• *Blazer:* navy blue with official TSA patch • *Ties:* scarlet red imprinted with official TSA logo (for males ONLY) • *Shirt or blouse:* white, button-up with turn-down collar OR official blue TSA dress shirt/blouse • *Pants or skirt:* light gray (unacceptable: yoga pants or tights worn as pants) • *Socks:* black or dark blue (males) • *Shoes:* black dress shoes (unacceptable: athletic shoes, army boots, combat boots, or work boots) • *Sandals:* females only may wear black open-toe shoes or sandals
Category B – Professional TSA Attire	• *Shirt:* button-up with turn-down collar (unacceptable: t-shirt, polo, or golf shirt) • *Ties:* required for males and optional for females • *Pants or skirt:* dress pants (unacceptable: jeans, baggy pants, exterior pockets pants, yoga pants or tights worn as pants); skirts must be even with or longer than the tips of one's fingers • *Socks:* black or dark blue • *Shoes:* dress shoes or dress boots (unacceptable: athletic shoes, combat, or work boots) • *Sandals:* females may wear open-toe shoes or sandals
Category C – Business Casual TSA Attire	• *Shirt:* TSA t-shirt or collared shirt • *Pants:* dress slacks, skirt, or dress jeans (unacceptable: shorts) • *Shoes:* best possible
Category D – Casual Personal Time	• Casual dress permitted • Sneakers or some type of shoe • Unacceptable: tank tops, poor taste t-shirts
Items Never Permitted *this is an extension of the school day, school code in effect	• Weapons of any type (utility knives and x-acto knives must be used under adult supervision) • Any tobacco products, matches, lighters • Any controlled substances (alcohol or drugs)

"I HAVE READ AND FULLY UNDERSTAND THE **REGION AND STATE CONFERENCE CODE OF BEHAVIOR/RESPONSIBILITY** AND THE **REGION AND STATE CONFERENCE DRESS CODE** AND AGREE TO COMPLY WITH THESE GUIDELINES."

TSA Student Signature	*Date*
Parent/Guardian Signature	*Date*
Chapter Advisor Signature	*Date*
School Principal Signature	*Date*

Personal Liability and Medical Release

This form is required of all children, students, and adults who attend a Pennsylvania TSA Conference. Chapter advisors: You must maintain two copies of this form for each of your students throughout the entire conference, as well as travel to and from conferences. In case of emergency, the Conference Director and/or Emergency Personnel may request a copy.

STUDENT INFORMATION

Name of Student		Home Telephone	
Home Street Address		City/State/Zip	
Date of Birth			
School		School Telephone	
School Street Address		City/State/Zip	
Advisor			

MEDICAL INFORMATION

Allergies (drug, food, otherwise)	
Current Medication	
Describe any history of any major medical concerns (heart condition, diabetes, epilepsy, rheumatice fever, etc)	

Physician's Name		Physician's Telephone	

PARENT/GUARDIAN CONTACTS

Parent #1 Name		Parent #2 Name	
Home Phone #		Home Phone #	
Work Phone #		Work Phone #	
Cell Phone #		Cell Phone #	

"I hereby agree to release the PA Technology Student Association, its' representatives, agents, servants, and employees from liability for any injury to above-named person at any time while attending the PA Technology Student Association's conferences including travel to and from the conference, excepting only injury or damage resulting from willful acts of such representatives, agents, servants, and employees.

I do voluntarily authorize the PA Technology Student Association's conference director, assistants, or designees to administer or obtain routine or emergency diagnostic procedures or routine or emergency medical treatment for the above-named person as deemed necessary in medical judgment.

I agree to indemnify and hold harmless the PA Technology Student Association, and said conference director, assistants, and designees for any and all claims, demands, actions, rights of action, or judgments by or on behalf of the above-named person arising from or on account of said procedure or treatment rendered in good faith and according to accepted medical standards.

I hereby authorize any physician member of the Department of Emergency Medicine of an accredited hospital or any member of the medical staff of an accredited hospital to render medical treatment, which in his/her judgment is deemed necessary in the care of the above-named person while attending Pennsylvania TSA Conferences, including time traveling to and from the conferences.

I agree to allow the above-named person to participate in surveys and/or interviews conducted by PA Technology Student Association staff."

____ _________________

Parent/Guardian Signature *Date*

____ _________________

Student Signature *Date*

Event Consent Form

Name of TSA event/conference	
Date of TSA event/conference	
Location of TSA event/conference	

I hereby give my child permission to travel to and participate in the above TSA event/conference.

I understand that neither the above named student organization nor the Pennsylvania Department of Education assumes responsibility for accidents which might occur during the travel to and/or from a TSA event/conference. Nor do we ask the advisors/chaperones making the trip to assume responsibility for our son/daughter in the event of an accident/illness.

I hereby authorize, in advance, any necessary medical treatment by qualified medical staff as required while in attendance (including travel to and from) at the above TSA event/conference.

I hereby grant to PA-TSA the right to photograph and/or videotape my child during participation in a TSA event/conference. I further grant to PA-TSA the right to use such photographs and video as PA-TSA may desire for advertising and other promotions, without limitation or compensation.

Name of student	
Name of parent/guardian	
Relationship to student	
Signature of parent/guardian	

APPENDIX D: HUMAN SUBJECTS REVIEW APPROVAL – OLD DOMINION UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

Physical Address
4111 Monarch Way, Suite 203
Norfolk, Virginia 23508
Mailing Address
Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE: February 11, 2021

TO: Michael Kosloski, PhD
FROM: Old Dominion University Education Human Subjects Review Committee

PROJECT TITLE: [1707705-1] Relationship Between Technology Student Association Participation and Soft Skills Development, Controlling for Gender

REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: February 11, 2021

REVIEW CATEGORY: Exemption category # *4*

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Laura Chezan at (757) 683-7055 or lchezan@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

VITA

Lauren Lapinski

EDUCATION

Cabrini College, Radnor, PA *May 2009*
Master of Education

The College of New Jersey, Ewing, NJ *May 2003*
Bachelor of Science, Technology Education

PROFESSIONAL EXPERIENCE

Bala Cynwyd Middle School, Lower Merion School District, Ardmore, PA *Sept 2003-present*

- Teacher – Technology & Engineering Education, grades 6-8
- Designed and implemented innovative curriculum
- Designed and facilitated classroom renovation

ASSOCIATION MEMBERSHIP

Technology & Engineering Education Association *2003-present*

- member

International Technology & Engineering Education Association *2003-present*

- member

Technology Student Association *1993-present*

- member
- chapter advisor
- State Conference Director (2010-present)
    - Facilitate conference logistics, prior to and during 4-day conference
    - Coordinate 150+ judges for competitive events
    - Manage conference planning team for successful execution of conference for 2,300+ participants

PUBLICATIONS

Lapinski, L. (2019). Book Review: Skills for social progress: The power of social and emotional skills. *Journal of Technology Education, 31*(1), 66-68. DOI: http://doi.org/10.21061/jte.v31i1.a.5

HONORS

Dr. Thomas Winters Distinguished Service Award, PA-TSA *2015*
Distinguished Service Award, National TSA *2014*
Program Excellence Award, TEEAP & ITEEA *2012-2013*
TSA Advisor of the Year Award, National TSA *2009-2010*
Teacher Excellence Award, TEAP & ITEA *2008-2009*