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Educating 21st Century Technology Career Professionals: Perspectives on Soft Skills

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EDUCATING 21ST CENTURY TECHNOLOGY CAREER PROFESSIONALS: PERSPECTIVES ON SOFT SKILLS

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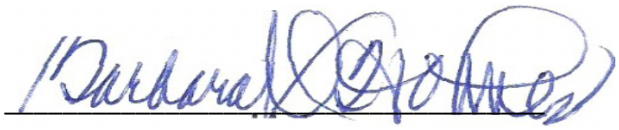
This dissertation, submitted by Scott Fillman in partial fulfillment of the requirements for the degree of Doctor of Education at Winona State University, Winona, Minnesota, is hereby approved by the committee under which the work was completed.

SIGNATURES:



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Abstract

This study used the theories of Pedagogical Constructivism, Transformative Learning, and Social and Cultural Capital to understand better the soft skills competencies that need to be imparted to adult learners to thrive in a technological world. The study was set at Midwest Tech Company, a suburban software technology company located outside of Minneapolis, Minnesota. The research design was qualitative, using a phenomenological approach. Data were collected within interviews, focus group activities, and from documents. Analysis of the data collected revealed lived experiences of career technology professionals that described effective communication, willingness to learn, and the value of mentorship within technology professional work.

Keywords: technology education, Winona State University, 21st century soft skills

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Dedication

The effort expended and resulting content herein are dedicated to all who aspire to a life of learning and reflection.

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Introduction

The critical need for upskilling the workforce to sustain the modern economy demands adult technology education's optimization to meet labor market trends (Frase et al., 2017). Post-secondary technology education programs in the United States are distributed asymmetrically across trade schools, community colleges, for-profit career schools, certification programs, and universities (Bariso, 2020; Butrymowicz & Kolodner, 2020; Frase et al., 2017; International Technology and Engineering Educators Association [ITEEA], 2021; Lewis, 1999). Workforce and vocational education programs are accountable for supplying the economy with a labor force with skills, creating an entry point into technical fields (American Association of Community Colleges, 2017; Frase et al., 2017; Niu et al., 2019).

A robust and vibrant technology sector depends on an agile technical workforce (Frase et al., 2017). Workforce education trains and supplies technologists, providing adult retraining for career shifts and skill enhancement necessary for professional growth and promotion (Frase et al., 2017). Employers value soft skills and repeatedly report the existing gap related to aptitudes that are less clearly delimited, such as communication abilities, persistence, collaboration, and the ability to thrive in ambiguity (Hora et al., 2018; Parker, 2011; Snape, 2017; Stewart et al., 2020). Educators have a role to play in improving the soft skills of individuals at work and in secondary and post-secondary institutions (Moye, 2019; Parker, 2011; Yohana & Wijiharta, 2021). Effective post-secondary and on-the-job technology education programs include supplementary curriculum elements to address non-technical aptitudes related to interpersonal communication, teamwork, facilitation, and resilience (Moye, 2019; Parker, 2011; Snape, 2017; Yohana & Wijiharta, 2021).

Aside from workforce needs, modern citizenship also relies heavily on technological literacy (Cianca, 2020; Davis et al., 2019; ITEEA, 2020). Mainstream science, technology, engineering, and math (STEM) programs and technology education initiatives designed to promote students' abilities to use systematic inquiry, logic, creative problem-solving, and critical thinking demonstrate the social equity of technological literacy (Cianca, 2020; Davis et al., 2019). Teaching students how to formulate and ask questions and define perplexing issues provides value beyond professional preparation (Cianca, 2020; Davis et al., 2019; ITEEA, 2020). The purpose of building STEM skills and technological literacy is to generate new knowledge and improve society (Cianca, 2020; Davis et al., 2019).

Technology education programs in the United States initially focused on preparing teachers to teach within industrial arts and design programs, even as technology and engineering changed to include digital software products (Ferguson, 2019; Volk, 2019). Technical versatility is crucial as organizations across industries witness the disruption of business models and tech-savvy startups bring fresh perspectives to the way people plan, shop, find recreation, and work (Kane et al., 2019). Companies seeking to digitally transform aim to mitigate the risk of being disrupted by new technology (Kane et al., 2019). Leadership and talent are vital focal points as organizations focus on maturing within the digital space (Kane et al., 2019). The changing nature of management and professional development within digital-first teams and organizations requires new skills and talent (Kane et al., 2019). Leaders need to be decisive, business-savvy, and able to execute, but they also need to inspire and create a collaborative environment that fosters innovation (Kane et al., 2019). Good leadership and a flatter organizational structure ensure that employees closest to the customer or end-user provide input, especially since

research reveals that those at the top tend to have less understanding of the end-user than those working more closely with customers and consumers (Kane et al., 2019).

A talent pool with top education is also an essential consideration for organizations seeking to thrive in the rapidly changing digital-first world (Kane et al., 2019; Wekelo, 2018). Employees and employers alike struggle when college-educated individuals fail to thrive in the workplace (Kane et al., 2019; Wekelo, 2018). A premature end of the employer-employee relationship, voluntarily or involuntarily, jeopardizes the trajectory of professionals, tarnishes the reputations of education programs, and impacts organizations (MacLeod et al., 2017; Wekelo, 2018). The swift pace and continuously evolving nature of technology have directly impacted organizations and institutions of higher education alike, causing a reappraisal of the competencies required for professionals to be viewed as valuable (Ianos & Brezeanu, 2020; Lewis, 2020). In addition to technical aptitude, "soft" considerations such as corporate culture, technology etiquette, rash judgment, adaptability, and poor communication can factor into professional success (Wekelo, 2018). For professionals with technical skill sets, "...scientific and technological skills alone are no longer enough to prosper as an employee in the 21st century" (King, 2012; Litzinger et al., 2011 as cited by Lynch, 2019, para. 1). Recent articles within entrepreneurial periodicals and career-focused publications deem written communication skills critical within digital and remote teams, further acknowledging the reappraisal of technology workers' education and training (Poague, 2020; Ranger, 2021; Ravisankar, 2020).

There are fewer new technology education faculty graduates today than at any time in the past four decades (Volk, 2019). Technology and engineering education have slowly integrated into the broader STEM subject areas, driven by the economy and the desire for normalization (Frase et al., 2017; Price & Dunagan, 2019; Volk, 2019). Modern STEM programs are

represented by computer science colleges within the university, associate of applied science programs in vocational schools, and boot camp-style training programs (Frase et al., 2017; Price & Dunagan, 2019). Curricula are weighted heavily towards technical understanding, with soft skills often taking a back seat (Frase et al., 2017; Price & Dunagan, 2019). Graduates of 4-year STEM-driven technology programs, such as engineers, are broadly understood within the United States (Frase et al., 2017). Several technical fields utilize engineers as technical resources (Frase et al., 2017). At the same time, vital, lesser-known practitioners of engineering technology supporting sales, planning, design, operations, and frontline management tasks contribute to technology firms, often with limited acknowledgment (Frase et al., 2017). Technologists engage in business and communication activities to a greater extent than traditional engineers (Frase et al., 2017). The unique blend of technical acumen, the ability to communicate effectively, collaborate, be agile, and adapt required for technologists highlights the need for soft skills to be a part of initial and ongoing education for technologists (Frase et al., 2017; Snape, 2017).

Colleges and universities are actively exploring ways to provide twenty-first-century skills, seeking to create resilient, critical thinking problem-solvers that adapt quickly, communicate, and seek the knowledge required to contribute to a project or initiative (Lewis, 2020; Snape, 2017). Higher education leaders are gauging, reflecting on, and addressing the need to better prepare individuals for twenty-first-century jobs (Gous, 2019; Urzillo, 2018; Yohana & Wijiharta, 2021). Novel approaches to online programs, science, and technology education, along with varying definitions of soft skills, are increasingly employed by colleges and universities (Gous, 2019; Yohana & Wijiharta, 2021). The International Technology and Engineering Educators Association (ITEEA) is a national professional body that creates standards and tools for enhancing STEM programs for elementary, middle, and secondary school

students (ITEEA, 2020). The ITEEA does not provide specific resources and professional development opportunities for college instructors or corporate training programs (ITEEA, 2012; ITEEA, 2020; ITEEA, 2021). 21st century post-secondary technology education should provide the skills necessary for individuals across age groups to thrive within digital product teams (Morris, 2019). Teams that develop digital software products exemplify the continuously-evolving nature of the modern economy (Morris, 2019). A patchwork of colleges and universities are experimenting and exploring ways to deliver twenty-first-century skills, producing additional research and building out and enriching the body of knowledge surrounding the skills gap (Ekpenyong & Edokpolor, 2016; Lynch, 2019).

The technology discipline entails implementing, using, and managing systems and is not limited to the hard science and math techniques leveraged to create detailed solutions and specifications (Frase et al., 2017). Technologists may not have the same level of scientific and mathematical understanding as engineers, despite being expected to troubleshoot and solve problems within practical applications (Frase et al., 2017). For example, a structural engineer may use math and science to design a bridge to cross a specific river (Frase et al., 2017). In contrast, a technologist may use distinct technologies coupled with industry knowledge to build and test the durability of the bridge, collaborating with the structural engineer (Frase et al., 2017). A technology expert may also have advanced knowledge of how a specific technology platform works and is implemented to use or sell it, without having engineered the platform (Frase et al., 2017). These two types of knowledge are both necessary and complementary within the technology industry (Frase et al., 2017). Technological literacy includes a blend of soft skills and technical understanding, providing the ideal context to explore twenty-first-century

education for professionals working within digital product teams (ITEEA, 2020; Information & Technology Educators of Minnesota [ITEM], 2016).

Agile digital product teams are a relatively new phenomenon with unique workforce needs, emerging as information products take forms unimagined before the arrival of Web 2.0 (Fisher, 2017; Minnesota State, 2021). Technical know-how alone is not a guarantor of long-term success within technology roles since the future needs of employers in a rapidly changing technology landscape can't be known (Lewis, 2020). The most prudent approach to preparing for success in a growing and continuously shifting field is to ensure a solid foundation of general, transferable skills that complement and enhance technical skills (Lewis, 2020).

Soft skills encompass the most crucial constituents of technological literacy (ITEEA, 2020; ITEM, 2016; Snape, 2017). Technologically literate individuals solve problems in a global context with interpersonal, social, and cultural awareness (ITEEA, 2020; ITEM, 2016; Snape, 2017). Technological literacy and soft skills are highly transferable (ITEEA, 2020; ITEM, 2016; Snape, 2017). Dispositions such as resilience, reliability, a growth mindset, and a persistent work ethic are desired within professional organizations and communities alike (Snape, 2017). Technology career professionals that can communicate effectively, organize information, collaborate, take a structured approach to problem-solving, and think creatively have non-technical skills that transcend knowledge of a given technological system (Snape, 2017).

Constructionist-informed technology education develops both leaders and individual contributors within an evolving professional landscape, delivering a full learning lifecycle that begins in primary school and continues throughout a full career (Morris, 2018; Sanders et al., 2018). Exploring opportunities to cultivate and continuously develop individuals through creative engineering projects and making activities may optimize combinations of technical and

soft skills (Morris, 2018; Sanders et al., 2018). The reality of the changing business environment and the resulting shift in professional expectations presents an opportunity to gain a clearer understanding of how both on and offsite continuing education can support modern digital product teams (Kane, 2019; Lynch, 2019; Ravisankar, 2020). One goal of research related to training and technology education within professional environments is to gain insight into the types of skills that are integral elements of remote, product-focused technology departments. A secondary aim is to identify vocational education and training gaps related to soft skills integration.

Purpose Statement

The purpose of this study is to explore perceptions of 21st century soft skill gaps among career technology professionals within digital software product teams working in a remote environment, a topic in education that deserves examination within a continuously shifting vocational landscape.

Statement of the Problem

The soft skills gap is widely recognized by educational institutions and employers alike, emphasizing the importance of pointedly teaching technologists interpersonal communication skills, cultural competency, emotional intelligence, collaboration, how to manage expectations, and adaptability (Moye, 2019; Parker, 2011; Snape, 2017; Yohana & Wijiharta, 2021). Professionals need to move beyond simply understanding soft skill competencies to gain a worldview that optimizes the application of non-technical aptitudes, based on the situation (Snape, 2017). Traditional approaches to education content, assessment methods, and in-class techniques do not provide the immersive, experiential learning events that enable self-discovery

and spontaneous moments of insight that impress transferable knowledge in learners (Snape, 2017).

Expertise gained from technology programs doesn't age well as narrow, highly specialized skill sets quickly become outmoded as technology advances (Urzillo, 2018). Employers in Minnesota are increasingly seeking adaptable professionals with transferable skills (Minnesota State, 2021). The need for technological literacy is demonstrated by Minnesota State (2021) data related to job skills needed for technical and engineering-related roles. The top terms mentioned in the data included communication, collaboration, interpersonal, problem-solving, and soft skills (Minnesota State, 2021). Technology is changing as well. Complex, digital, web-based digital products are transitioning from Web 2.0 to Web 3.0 (Cook et al., 2020; Fisher, 2017). The shift represents a technological transition from rich web applications to deeply engaging experiences that bridge the gap between the physical and the virtual dimensions with Internet of Things (IoT) devices and progressive web apps (Cook et al., 2020; Fisher, 2017). Considering the newest wave of technological change and comparing data from 2016 to 2018, employers are also increasingly acknowledging the need for professionals that are pliable and clearly convey ideas and updates in a business setting (Cook et al., 2020; Yohana & Wijiharta, 2021).

Background of the Problem

Organizations and teams composed of well-educated technology professionals are expected to efficiently deliver digital products and operate with ambiguity, uncertainty, and a fixation on delighting the end-user with excellent experiences (Murray & Musk, 2020; Scipioni, 2020; Świtek & Drelichowski, 2018). Management structures staffed with rigidly educated professionals focused on financials and board presentations are not optimized for putting the

product experience first (Murray & Musk, 2020; Scipioni, 2020; Świtek & Drelichowski, 2018). Similarly, technologists who are products of traditional engineering programs often miss soft skills and an entrepreneurial mindset that puts innovation and end-user value first when designing a software platform (Murray & Musk, 2020; Scipioni, 2020; Świtek & Drelichowski, 2018). High-performing product-focused technology teams include diverse skills, blending entrepreneurial management, and a "lean startup" mentality (Świtek & Drelichowski, 2018, p. 20). The unique skills to thrive in the variety of roles within a product-focused technology team come neither from a business program nor from an engineering program but from varying combinations of both (NAE, 2004, 2005 as cited by Frase et al., 2017). The softening boundary between the fields of business and technology is a call to action for higher education to produce employable technologists (Frase et al., 2017).

Higher education and for-profit organizations are answering the call (Bariso, 2020; Johnson, 2020; Price & Dunagan, 2019; Snape, 2017). For-profit and community colleges offer career programs, promising to place students into in-demand fields (Butrymowicz & Kolodner, 2020; O'Banion, 2018). More recently, private companies set about offering boot camp-style technology training courses, which quickly enhance the skills of students for technology jobs (Bariso, 2020). Abbreviated programs are designed to focus on the technical understanding needed to contribute to the economy as a skilled worker (Bariso, 2020; Butrymowicz & Kolodner, 2020; O'Banion, 2018).

Theoretical Framework

There are three theories supporting this study. Constructivist approaches to education focus on teachers as enablers for student exploration and knowledge assembly in place of one-way knowledge transfer and rote memorization (Ekpenyong & Edokpolor, 2016; Mărunțelu,

2020; Piaget, 1957; Vygotsky, 1978). The business application of constructivist approaches may prove beneficial when utilized with adult professional learners that have already completed some form of higher education.

Pedagogical Constructivism

Pedagogical constructivism promotes learning as an ongoing, active process (Ekpenyong & Edokpolor, 2016; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978). Based on previously accrued personal experience, the learner's prevailing understanding is continuously enriched and amended by newly introduced ideas and concepts in specific environs and conditions (Ekpenyong & Edokpolor, 2016; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978). The theory of pedagogical constructivism builds on Piaget's stages of development by acknowledging that humans design and amend their understanding of themselves and the world through experience, interaction, and reflection (Juvova et al., 2015; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978).

Transformative Learning

Transformative learning is constructivist because students make their own meaning in the process of combining experience and exploration (Harel & Papert, 1991; Hyde, 2021; Mezirow, 1990; Piaget, 1957; Vygotsky, 1978). Further, transformational learning includes elements of constructionism since meaning that has been made within learners can be compared between individuals using dialectics, shared experiences, and mutual contemplation (Harel & Papert, 1991; Hyde, 2021; Mezirow, 1990; Piaget, 1957; Vygotsky, 1978). Experiencing and processing sense perceptions, including social exchanges, provide new information for individuals to use to enhance comprehension and evolve intellectually (Hyde, 2021; Mezirow, 1990). Applying the theory of transformative learning to adult learners is not uncommon, providing a framework

suitable for examining technology education and soft skills within remote digital product teams (Hyde, 2021; Mezirow, 1990).

Social and Cultural Capital

Transformative learning enabled by pedagogical constructivism supports the development of social and cultural capital (Hora et al., 2018; Hyde, 2021; McTighe & Silver, 2020; Mezirow, 1990). Each learner has hereditary social capital that is influenced by environment, class, background, and other factors decided by birth and upbringing (Bourdieu, 1973; Bourdieu, 2021). Social capital provides personal and professional advantages (Bourdieu, 1973; Bourdieu, 2021). Cultural capital builds on social capital by adding the context of the culture one is part of, as well as understanding other cultures one interacts with (Bourdieu, 1973; Bourdieu, 2021). Social and cultural capital are inherited and cultivated outside and inside of the classroom, providing education the opportunity to influence the development thereof (Bourdieu, 1973; Bourdieu, 2021).

Research Questions

The study aims to understand better how varying education and training regimes shape members of cross-functional digital product development teams. The following questions guide the study:

1. How do members of remote digital product teams describe the transferable soft skills needed to achieve proficiency in technology work?
2. What recommendations do members of remote digital product teams have for integrating soft skills training in technology career professional development?
3. How do remote digital product team members describe the acquisition of soft skills proficiency on career development?

Definition of Terms

Digital literacy includes competencies related to using communication and information technology for personal and professional purposes (Maryland Department of Labor Adult Learning, 2021; Neves & Henriques, 2020; Rosen, 2020). Competencies include searching, assessing, curating, and using information effectively (Maryland Department of Labor Adult Learning, 2021; Neves & Henriques, 2020; Rosen, 2020).

Engineering education comprises entry into and continuing learning about applying science, mathematics, critical thinking, teamwork, and creativity to use and develop technologies and structural systems that provide for the common good and respond to social needs (Frase et al., 2017; Moye, 2019; Polyakova, 2020).

Information and Technology Educators of Minnesota (ITEM) is a professional organization for technology education professionals within Minnesota (ITEM, 2019).

Information & Technology Literacy Standards (ITLS) are technology education standards for the state of Minnesota developed by ITEM, based on national standards created by the International Society for Technology in Education (ITEM, 2019).

International Society for Technology in Education (ISTE) is a global, professional organization for educators that use technology in the classroom and teach technological literacy to students (ITEEA, 2020). The ISTE publishes books and guidelines related to technology in education (ISTE, 2017).

International Technology and Engineering Educators Association (ITEEA) is a global, professional organization for technology and engineering educators (ITEEA, 2020). The ITEEA develops technology education standards and creates curricula for educators (ITEEA, 2020).

Internet of Things (IoT) devices are appliances, for example, coffeemakers or ovens, that are connected to the Web 3.0 technologies and can often be managed remotely (Cook et al., 2020; Fisher, 2017).

Science, Technology, Engineering, Arts, and Math (STEAM) programs are similar to STEM programs, explicitly adding arts to the subjects of science, technology, engineering, and math education for a richer transdisciplinary experience (Cianca, 2020; Davis et al., 2019; MacDonald et al., 2019).

Science, Technology, Engineering, and Math (STEM) education initiatives are transdisciplinary programs designed to promote students' abilities to use systematic inquiry, logic, creative problem-solving, and critical thinking while teaching students how to formulate and ask questions and define perplexing issues (Cianca, 2020; Davis et al., 2019).

Soft Skills are interpersonal capabilities and components of a mindset that enable collaboration, facilitation, productive communication, perseverance, and discernment within professionals in the workforce (Hora et al., 2018; Parker, 2011; Snape, 2017).

Software-as-a-Service (SaaS) platforms are cloud-hosted software packages that run in a web browser and often do not require installation onto a computer (Ergu & Peng, 2013).

Standards for Technological and Engineering Literacy (STEL) represent a framework for national technology education standards developed by the ITEEA (2020). The framework includes the lenses of contexts, practices, and standards to create guidelines for technology and engineering education programs (ITEEA, 2020).

Technological literacy is fluency, proficiency, and comfort with using, contributing to design, and leveraging technology effectively, both professionally and personally (ITEEA, 2020; Jablansky et al., 2019; Moye, 2019). Technologically literate people consider the implications of

technology within social contexts and select, operate, and maintain the ideal tools for various purposes (ITEEA, 2020; Jablansky et al., 2019; Moye, 2019).

Technology education can be defined as instruction and curriculum focused on teaching students how to collaboratively design and develop solutions and become fluent using tools to extend natural capabilities (Frase et al., 2017; Jablansky et al., 2019; Moye, 2019).

Technology systems are designed collections of two or more constituents that interact with each other and external elements or environments to solve a problem, create an opportunity, or provide utility to people, society, and organizations (Frase et al., 2017; ITEEA, 2020).

Vocational education is training or instruction aimed at developing technicians or frontline supervisors with specialized occupational skills, often within trades or technical fields. (Young & Hordern, 2020).

Web 2.0 generally refers to the era of World Wide Web applications with reach multimedia, electronic commerce, social media components, and user-generated content (Fisher, 2017).

Significance of the Study

Researching the role of transferable, core technology competencies within a world that is changing quickly with minimal indication of future needs will benefit educators producing emerging technologists (McTighe & Silver, 2020). The importance of exploring general professional and social abilities for technology career professionals is not limited to the loss of time and resources for new hires and managers (Wekelo, 2018). Trained technicians exhibiting soft skill deficits in technology-mediated work environments may also impact the educational institutions supplying the professional workforce in the United States. The trend towards derivative variations of traditional vocational programs underwritten by Big Tech organizations

furthers the significance of examining soft skills integration for technology professionals, especially those with diverging education backgrounds operating within remote digital product teams (Bariso, 2020). Google's technology certification courses focus solely on the technical skills necessary for employment within the organization (Bariso, 2020). Completing the curriculum gains recognition by the company's hiring managers equivalent to having a four-year degree (Bariso, 2020). Trends toward non-traditional, expedited training programs and boot camps should motivate an exploration of the value realized by the student and if there is the acquisition of transferable skills (Bariso, 2020). Considering remote digital product team members' backgrounds, education, and training histories may reveal differences in professionals' experiences and access to opportunities.

Specifically, education related to jobs in technology and communication deserves consideration because of the projections in steady job growth and workforce outcomes, which predict a 12% growth from 2018 to 2028 (Bureau of Labor and Statistics, 2017). The projected growth of technology careers and increasing focus on technical training certificates by companies like Google may result in more technology professionals in the market with educational backgrounds novel to many organizations (Bariso, 2020). Studying individuals with varying exposures to soft skills education and training provides insight into the implications of shifting technology career education regimens as liberal arts schools fade nationally (Baldwin, 2013; Fagin, 1999; Hanson, 2013; Haberberger, 2017).

Scholars across disciplines are surveying twenty-first-century skills to understand better the emerging needs of a more technologically connected society (Ekpenyong & Edokpolor, 2016; Johnson, 2020; Yohana & Wijiharta, 2021). Advancing technologies are altering technology teams to focus on iterative, agile products and programs, shedding the traditional

project-centered approach (Murray & Musk, 2020; Schwaber & Sutherland, 2017; Scipioni, 2020; Świtek & Drelichowski, 2018). The quickly changing nature of technology, processes, and the increasingly remote character of digital product teams reveals gaps in the current research, which is focused primarily on traditional higher education programs or managing technology workers on-premises (Brynjolfsson et al., 2020).

Common practices and summative assessments are no longer sufficient for evaluating student learning and producing technologically literate students, especially within technology and innovation studies (Sakai-Miller, 2016). Exploratory, hands-on, research activities, and problem-solving exercises are gaining importance within technology education, creating an opportunity to follow up to learn more about workplace outcomes for students exposed to modern practices (Gura, 2016). Exploring the skills gap within the context of ongoing training and professional development within remote digital product teams in a corporate setting enriches the body of knowledge, serving to inform the growing number of technology educators and organizations hiring and sustaining remote workers within digital product teams (Brynjolfsson et al., 2020). Soft skills are unquestionably becoming increasingly valuable within technology classrooms and professional project teams (Minnesota State, 2021; Sahin & Celikkan, 2020; Singh Dubey & Tiwari, 2020). Gathering detailed reflections about non-technical competencies from career technology professionals will offer new perspectives about soft skills integration for educators, instructors, researchers, and trainers.

Overview of the Study

The disruptive characteristics of technology make a case for greater focus on transferable skills and technological literacy (Davis et al., 2019; ITEEA, 2020; MacDonald et al., 2019; Moye, 2019; Moye & Reed, 2020). Musk (2020), a well-known technology executive and

employer of high-tech workers, mentions the stifling of innovation by business' heavy focus on graduates with narrow skill sets, such as business administration or finance. The diminishing need to differentiate between occupational and scholarly skills is demonstrated by STEL, ITLS, and employer needs (Minnesota State, 2021; ITEEA, 2020; ITEM, 2019; Young & Hordern, 2020). Worthy of investigation, the combination of higher-order thinking capabilities and soft skills cross over traditional higher education divisions (ITEEA, 2020; ITEM, 2019; Young & Hordern, 2020).

This study aims to understand the soft skills gap and integration opportunities within remote digital product teams. A secondary goal of the study is to provide educators and trainers insight into continuing education opportunities. Digital transformation is occurring across the modern economy and within the field of education, with companies and institutions of higher education maturing and adapting at varying levels (Kane et al., 2019; Lynch et al., 2019). Changes to post-secondary educational programs, technology curricula, and talent management are resulting from the changing ways that organizations conduct business (Kane et al., 2019; Lynch et al., 2019). Technology educators working with seniors in high school, teachers in post-secondary institutions, and business stakeholders will need more information about current practices and outcomes to accommodate a progressively variable landscape (Kane et al., 2019; Lynch et al., 2019). The study's goal is to provide additional insight related to the skills needed to thrive within digital product teams.

The concentration on remote workers within technology teams is timely, accounting for a paradigm shift in the field (Kane et al., 2019). Traditional co-located project work is giving way to geographically distributed digital product development (Kane et al., 2019). Products are managed by global teams as ongoing, dynamic entities and not as fixed initiatives with precise

requirements and static start and end dates (Kane et al., 2019). Agile and lean startup approaches to digital product development replace fixed timelines, certain requirements, and procedural, sequential phases with iterative cycles of testing and discovery, uncertainty, ambiguity, flexible roles, and minimally defined tasks (Kane et al., 2019; Schwaber & Sutherland, 2017; Świtek & Drelichowski, 2018). Digital product teams have a need for transferable soft skills, such as critical thinking, creative problem-solving, using design thinking, active listening and empathy to gather input from end-users, and concise communication (Clarke, 2020; Kane et al., 2019; Świtek & Drelichowski, 2018). In addition to the continuously shifting needs of technology employers, content changes quickly in technology education, with students often making things of value while studying and consuming information (Sakai-Miller, 2016). Rapidly evolving technological changes also impact the accuracy of content, creating a need for the primacy of large, transferable ideas (McTighe & Silver, 2020).

Studying the perceptions of technology professionals will offer perspectives of the soft skill integration needed within a continuously fluctuating career field. The research design is qualitative and phenomenological, consisting of key informant interviews and a focus group within a remote digital product team to gain an understanding of the unique experiences and challenges of individuals with varying academic backgrounds and continuing training regimes. Job description and professional profile documents will be collected and analyzed to expose how soft skills are currently integrated into job role requirements and promulgated within career technologists' curricula vitae. The focus of the study is the perceptions of vital non-technical skills as described by technology career professionals.

Summary

Chapter I framed the integration of technology education, technological literacy, and soft skills within remote digital product teams. Chapter I also outlined issues facing higher education and digital product teams that arise with the rapidly changing nature of technology (Ravisankar, 2020; Sanders et al., 2018; Scipioni, 2020; Snape, 2017). Chapter I further stated the significance and purpose of the study and listed research questions related to the problem. Chapter II will review literature focused on technology education and the soft skills gap, using the lenses of pedagogical constructivism and transformative learning (Hyde, 2021; Mărunțelu, 2020). Chapter III will propose the methodology used in this qualitative phenomenological study, explaining data collection and analysis techniques. Chapter IV will provide the results of this study. Chapter V will conclude this study with discourse related to the findings and opportunities for further study.

Review of the Literature

Chapter II presents a literature review relevant to 21st century soft skills within technology career professionals and the current state of technology education. This chapter begins by analyzing articles related to 21st century skills and probes the idea of the soft skills gap to gain the context necessary for further examination. Technology professionals rely on post-secondary education to gain the credentials required to enter the professional workforce, so the history of technical and vocational education is interrogated within the literature review. The background of vocational education is queried within this chapter, incorporating the lenses of non-technical skills and professional preparation. The objective is to catechize the partitioning of professional education pathways caused by technical college career technology education existing in parallel with traditional universities' colleges of technology and engineering (Labaree, 2012). Lastly, technology education is addressed in Chapter II to discuss its role in the United States and opportunities to expand into post-secondary education. Throughout the literature review, consideration is given to the rise of STEM education and the support of the technology and engineering pillars provided by the broadening of industrial arts education into technology education (Moye, 2019; Moye et al., 2020; Moye & Duggar, 2016).

Search Strategy

Literature collection and review was carried out in a systematic way. A clear, unbroken lineage from root philosophies to technological literacy and 21st century soft skills was not found solely in academic journals, resulting in nonuniform discovery. Numerous searches were executed to gather information related to two primary themes: 21st century soft skills and technology education. Academic databases, web search engines, and university library search aggregation tools were leveraged to find literature related to keywords and phrases using

permutations of the two main themes. Academic journals contained several articles researching 21st century soft skills and professional preparation. Historical resources associated with the development of vocation and technical education were abundant.

Similarly, copious amounts of literature related to the soft skills gap was accessible. Technology education articles found were fewer in number and less frequent. Many involving the United States education system focused on primary and secondary education with a notable deficit of material associated with post-secondary learning. As a result, many of the articles and resources were not found in academic databases and the resources that were discovered did not concentrate on post-secondary education. Much of the technology education literature found was gathered from professional teaching organizations that set standards and develop curricula for elementary, middle, and secondary schools. Other technology education literature that discussed post-secondary education originated from regions outside of the United States. The search strategy resulted in composite narrative that illustrates the current state of non-technical skills integration in 21st century technical education and technology career professional training.

21st Century Soft Skills as Social & Cultural Capital

Colleges and employers alike acknowledge instances of post-secondary program graduates failing to thrive within the workforce due to underdeveloped soft skills (Parker, 2011; Wekelo, 2018). Educational institutions are tasked with facilitating the success of 21st century technology career professionals (Hora et al., 2018; Parker, 2011; Snape, 2017). Technology career professionals with strong academic backgrounds and technical skills have the credentials necessary to enter the workforce and the soft skills confidence to successfully navigate the interview process (Stewart et al., 2020). Many technology professionals are convinced that they have solid soft skills, despite employers reporting the contrary (Stewart et al., 2020). The soft

skills gap has often been discussed in reference to new college graduates (Parker, 2011; Snape, 2017; Stewart et al., 2020; Wekelo, 2018). The soft skills gap is observed broadly within industry and is not isolated to recent college graduates (Adhvaryu et al., 2018).

The Soft Skills Gap

The idea that 21st century soft skills are necessary for professional and personal success has been touted by researchers (Lewis, 2020; Neves & Henriques, 2020; Parker, 2011; Snape, 2017; Stewart et al., 2020). Some view aptitudes such as emotional intelligence, interpersonal abilities, managing expectations, and cultural competence as protection against workforce automation (Ernst et al., 2019 as cited in Lewis, 2020). Presented at times as a static, generic set of soft skills, Hora et al. (2018) and Sahin & Celikkan (2020) note the complexity of teaching non-technical competencies.

Environmental and institutional factors further complicate the acquisition of soft skills (Hora et al., 2018; Sahin & Celikkan, 2020). Some researchers do not discern between soft skills and technological competencies, instead advancing a blended model that embeds digital and technological literacies within the canon of lifelong learning (Neves & Henriques, 2020). The requirements of engaged citizenship overlap with professional needs, both dimensions demanding technological literacy and social understanding (Neves & Henriques, 2020).

Regardless of the purpose for acquiring 21st century competencies or how they are grouped and described, the pervasiveness of the digital world requires professionals and citizens of all backgrounds to navigate the technology-society continuum in ways formerly unknown (ITEEA, 2020; McTighe & Silver, 2020; Snape, 2017). Technological literacy and digital literacy are easily confused, but they are different concepts with different scopes (ITEEA, 2020; Maryland Department of Labor Adult Learning, 2021; Neves & Henriques, 2020; Rosen, 2020).

Digital literacy focuses primarily on information gathering and use, the concept originating from library science (Maryland Department of Labor Adult Learning, 2021; Neves & Henriques, 2020; Rosen, 2020). Technological literacy is concerned with the selection, use, and application of technology systems and design processes, as well as the history, ethics, and social skills required to implement and manage technology competently (ISTE, 2017; ITEEA, 2020; Information Technology Educators of Minnesota [ITEM], 2019). Like digital literacy, technological literacy has both civic and professional applications (ISTE, 2017; ITEEA, 2020; ITEM, 2019; Moye, 2019; Neves & Henriques, 2020).

Soft Skills as Character Traits

Setting aside digital literacy and focusing specifically on technological literacy within professionals, there is a known disconnect between prospective and active employees' perceptions of soft skills mastery and actual competencies (Stewart et al., 2020). Aside from competencies, soft skills verge on being defined as character traits (Griffin et al., 2012 as cited in Snape, 2017). Behavioral attributes that are strongly correlated with on-the-job success, such as persistence, curiosity, initiative, reliability, and emotional intelligence are viewed as desirable soft skills by employers (Adhvaryu et al., 2018; Snape, 2017). Skills that border closely on personality attributes are demanding to teach and assess using commonly accepted methods (Bolstad et al., 2012 as cited in Snape, 2017; Griffin et al., 2012 as cited in Snape, 2017).

Regardless of whether soft skills are personality traits or teachable skills, competency gaps between skills taught in colleges and skills sought by employers have been examined (Sahin & Celikkan, 2020). Employers' survey responses, regarding desired skills, from Minnesota State's outreach (2021) and Sahin & Celikkan's (2020) study were weighted heavily in favor of soft skills and general business acumen. Employers seeking technical knowledge desire project

management, teamwork, understanding of software fundamentals, and methodology versus learning highly specialized technology platforms (Sahin & Celikkan, 2020). Singh & Tiwari (2020) also noted disparities between employer soft skill needs and workforce availability. Findings reveal that as complexity in technology increases, non-technical skills become more important (Singh & Tiwari, 2020).

Reframing the Soft Skills Gap as Building Cultural Capital

Hora et al. (2018, p. 31) have described the soft skills gap as the "soft skills paradigm," denoting the increasing pressure on post-secondary institutions to deliver returns on investment, using professional preparation as a key performance indicator, and the soft skills needed to meet performance goals. This paradigm reveals gaps in higher education that leave students without the soft skills necessary to succeed (Hora et al., 2018). Hora et al. (2018) argue that the idea of a soft skills gap is better converted from a deficit model to one of building cultural capital (Bourdieu, 1986 as cited in Hora et al., 2018). The unspoken curriculum and structures comprising technology career education contribute to a narrow set of lenses being taught to students that perpetuate issues with professional success (Hora et al., 2018). Simply providing one culture's ideal version of soft skills to a diverse array of students perpetuates scenarios where corporate culture is not inclusive (Hora et al., 2018).

Hora et al. (2018, p. 32) contend that the "cultural capital paradigm" takes context and application into account, acknowledging the gatekeeping enabled by viewing soft skills with a deficit perspective. The dominant culture defines soft skills to maintain control of power and preserve status (Hora et al., 2018). Such skills are not general and have specific contexts and subjective value, as defined by the dominant culture (Hora et al., 2018). Soft skills should not be pieces of the dominant group's culture that those in outside groups require to fit in with

workplaces defined by the social elite. Leaders in education and the private sector should not only focus on adding more soft skills training to technology education programs at the secondary and post-secondary levels but should also build cultural competence within the classroom and management (Hora et al., 2018).

Using Bourdieu's (2021) framework related to types of capital, soft skills are better referred to as professional social and cultural aptitudes that build both social and cultural capital within individuals (Hora et al., 2018). Professional social and cultural aptitudes are gained inside and outside of the classroom and take years of socialization to acquire (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018). These skills also adapt based on cultural context and cannot be simply written off as basic social competencies (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018). For example, a prolonged narrative about a topic in one geographic location may not conform to regional norms, demonstrating poor communication skills in this situation (Hora et al., 2018). In contrast, lengthy, descriptive discussions about an issue may be expected in other regions, demonstrating the contextual character of professional communication skills (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018). Educators that teach professional communication skills cannot approach the topic simplistically, relying on content alone, or students will miss the subjective essence of workplace exchanges (Hora et al., 2018). Remote working and the global economy require professional social and cultural aptitudes that account for context (Brynjolfsson et al., 2020; Hora et al., 2018; Lewis, 2020).

Yohana & Wijiharta (2021) conducted a literature review to examine secondary sources to identify the basic set of soft skills needed for professional and personal success. The study also explored effective coaching strategies for soft skills development (Yohana & Wijiharta, 2021). A unique contribution from the study relates to its global context and demonstration of the

need for cultural competence in an increasingly interconnected world (Yohana & Wijiharta, 2021). The article discusses the crossover between soft skills and character traits, noting that internalization can strengthen dispositions related to social and professional success (Yohana & Wijiharta, 2021). The researchers advise focusing first on essential soft skills related to communication, collaboration, and facilitation (Yohana & Wijiharta, 2021). As students advance, moving on to critical thinking, accountability, interpersonal skills, and problem-solving (Yohana & Wijiharta, 2021). Further, engaging deeply with content and continuous curricular, extra-curricular, and non-curricular learning cultivates soft skill competency (Yohana & Wijiharta, 2021).

Content ages quickly, and the collective compendium of knowledge is growing exponentially (McTighe & Silver, 2020). Sahin & Celikkan (2020) reiterate the rapid change of technology resulting in the instant obsolescence of curricula developed for IT college programs. Lewis (2020) describes efforts by organizations to update employee skills as technology changes, pointing to less reliance on carrying specific technical knowledge and a need for adaptability and resilience. The ability of adults to tap into prior learning and create meaning/enhanced understanding from new experiences on an ongoing basis, described by Mezirow (1990), mimics the knowledge desired by organizations, as outlined Lewis (2020). Meaning-making, labeled as “deep learning” by McTighe & Silver (2020, p. 2), builds on Mezirow’s (1990) framework. Deep learning focuses on developing transferable capabilities and instilling a continuous learning mindset, which is conducive to future workforce needs (Lewis, 2020; McTighe & Silver, 2020). Educating with deep learning in mind is complex in nature, enabled by experiential learning and supported by pedagogy more than content (McTighe & Silver, 2020; Mezirow, 1990).

Deep learning builds a cross-section of intellectual faculties that crossover with social capital within learners, including curiosity, ethics, cultural awareness, communication, and courage (McTighe & Silver, 2020). Social and cultural capital complement and overlap with the transferable skills needed to navigate a swiftly changing technology landscape (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018; Lewis, 2020; McTighe & Silver, 2020). Ideally, professional social and cultural aptitudes are seeded in youth and continuously develop within a lifelong process (Hora et al., 2018; Lewis, 2020; Neves & Henriques, 2020). Since these skills become increasingly relevant when seeking improved status within professional environments, post-secondary education and on-the-job training become default settings (Hora et al., 2018).

Vocational education's primary aim is to deliver skilled workers to the workforce, without adding the complete list of general education requirements common to university programs (Urzillo, 2018). Issues of quality and perception continue within vocational education alongside class distinctions that have persisted between academic and vocational pathways in education (Young & Hordern, 2020). Young & Hordern (2020) debated the merits and disadvantages of integrating vocational and academic education, noting there is still not a clear understanding of each in comparison with the other. Educational tracking towards specialized vocational training or academic education is increasingly problematic within a knowledge economy that has blurred the boundaries between practical and general skills (Young & Hordern, 2020). Vocational education will have to evolve to be more academic to serve the needs of the 21st century (Young & Hordern, 2020).

Vocation-focused institutions have a long history, evolving to adapt to the economic realities of a given era (Calhoun et al., 2017; Green, 1995; Urzillo, 2018). Approaches to adult education may vary based on program and institution, complicated further by the rapidly

changing landscape of business and technology, especially considering the transition from Web 2.0 to Web 3.0 (Cook et al., 2020; Fisher, 2017; Green, 1995). Exploring the history of vocational education reveals its parallel development path with traditional higher education and contextualizes its unique relationship with the university (Calhoun et al., 2017; Green, 1995; Labaree, 2012; Urzillo, 2018).

Soft Skills in Technology Career Education: Historical Influences

Vocational education has long been intertwined with industry and technology as modern, mechanized factories began requiring technicians and forepersons (Calhoun et al., 2017; Green, 1995; Labaree, 2012; Urzillo, 2018). Industry is also inextricably linked with technology (Calhoun et al., 2017; Green, 1995; Labaree, 2012; Urzillo, 2018). Contemporary STEM education includes technology as a pillar or as the capstone sitting atop math, science, and engineering (Snyder, 2018). Digital technology products are technical systems created by blending elements of the trades with generalized analytical skills, such as end-user empathy, business knowledge, engineering/design thinking, and social understanding (Clarke, 2020; Frase et al., 2017; Guinan et al., 2019; ITEEA, 2020; Polyakova, 2020).

The Modern History of Vocational Education in the West

The history of education concentrated on technical occupations and the skills needed to fulfill specialized industrial roles began in Europe and England (Green, 1995; O'Banion, 2019). During the height of the Industrial Revolution of the 19th Century, apprenticeships, vocational schools, and technical education fulfilled the need for forepersons and low-level floor supervisors in plants and manufacturing facilities (Green, 1995). The evolution of apprenticeship systems into vocational programs created new opportunities for the upper strata of the working class (Green, 1995). Institutions that were not part of universities offered to teach individuals

skills necessary to supervise line workers and perform highly specialized roles (Green, 1995). Historically, vocational programs have served as a career gateway for lower middle class high school graduates, providing credentials outside the traditional university setting (Calhoun et al., 2017).

Classism and Post-Secondary Paths

Traditional university scholarship and career learning began to be classified as separate paths: one for acquiring a trade and one for gaining prestige and profession (Green, 1995; Labaree, 2012). Elementary education, depending on social class, privileged some and disadvantaged others (Green, 1995). Working class elementary school students were often ill-prepared for the university and instead routed to vocational school to learn the trades (Green, 1995). Class distinctions and biases related to university education and vocational education persist, contributing to professional outcomes and perpetuating issues related to cultural capital (Green, 1995; Hora et al., 2018; McQueen, 2020). Vocational programs have not been emphasized as heavily in the United States until recently (Dougherty & Harbaugh Macdonald, 2020).

Education to Serve the Needs of Industry

At the close of the 19th-century, the United States faced challenges fueled by the emergence of the corporate industrial economy (Labaree, 2012). Worker dislocation within an increasingly complex and hierarchical labor force, a sudden increase in immigration, expeditious urbanization, and strengthening corporate power precipitated changes to primary, secondary, and post-secondary education (Labaree, 2012). A dominant industrial economy, strong corporate influence, and increasingly noticeable boom and bust cycles began to push down wages and impact workers (Labaree, 2012). An emerging economics-driven education paradigm shifted

focus to efficiency and highly educated professional managers using skilled forepersons to supervise expendable, unskilled labor (Labaree, 2012).

The industrial economic system created specialization and more considerable administrative overhead with strictly enforced hierarchies supported by an education system that tracked students toward a trade or the university (Labaree, 2012; McQueen, 2020). Grubb & Lazerson (2004, as cited in Harbour & Wolgemuth, 2015) concur with Labaree (2012), describing the shift of education's purpose towards economic and social mobility as vocationalization. Political and rhetorical focus on education for employment targeted primary, secondary, and post-secondary institutions (Harbour & Wolgemuth, 2015; Labaree, 2012). Vocational education in the United States manifested as trade schools, technical colleges, and high school career training programs, fueled by economic demands and the curricular tracking system introduced within the comprehensive high school movement (Dougherty & Harbaugh Macdonald, 2020; Labaree, 2012).

Curricular Tracking's Influence on Vocational Education

Curricular tracking in high school created a compromise between vocationalists and liberal progressives (Labaree, 2012). Vocationalists sought standalone trade-centered high schools focused solely on occupational skills (Labaree, 2012). Liberal progressives were concerned that separate vocational schools served the causes of the ruling elite by reinforcing the stratified nature of the social order, reducing opportunities for social integration and advancement (Labaree, 2012). Creating tracks within a comprehensive high school enabled equal access to high school academics while supporting career preparation with opportunities for practical coursework (Labaree, 2012). Middle-class students primed for the academic track were funneled into universities, maintaining an edge on an increasingly educated and competitive

citizenry (Labaree, 2012). Working class students were often prepared for vocational paths, reinforcing class divisions (Labaree, 2012). With a contemporary lens, the division and stigma still remain between liberal arts and sciences universities and applied, technical and vocational institutions (Labaree, 2012).

Despite vocational education unlocking economic opportunities for traditionally underserved communities, highly specialized technical programs create a technology underclass subjected to the transitory needs of hiring managers and organizations (Grubb & Lazerson, 2004, as cited in Harbour & Wolgemuth, 2015). Overly-specific occupational skills age quickly, negatively affecting individuals with fewer transferable skills (Harbour & Wolgemuth, 2015).

The Evolving Role of Community Colleges

Over time, community colleges have been tasked with numerous disparate missions while being subjected to the age-old debate between college for job training versus college for life training (O'Banion, 2019). Community colleges have become a focal point for workforce education as social mobility enabled by upgraded skills has become the default purpose for higher education (O'Banion, 2019). Employers and students alike have benefited from the vocational skills focus of community colleges, solidifying these institutions' transformation from junior colleges to workforce training and transfer education centers (O'Banion, 2019). The introduction in some states of applied baccalaureates, certificate programs, modern apprenticeships, and STEM/STEAM programs are innovations that have helped close the skills gap and created new opportunities for community colleges to meet workforce needs and blend occupational training with some liberal arts study (O'Banion, 2019). Community colleges will increasingly become important within the higher education landscape due to their accessibility and ability to respond quickly to changes in workforce needs (O'Banion, 2019).

Comparing Baccalaureate and Non-Baccalaureate Technology Programs

Community and local technical colleges have increasingly become the primary venues for vocational education in the United States, including occupational training for jobs in the technology sector (Anoka Technical College, 2021; Frase et al., 2017; Harbour & Wolgemuth, 2015; Minnesota State Community and Technical College, 2011). Engineering and technology courses of study follow the historical bifurcated paths presented by (a) the secondary and post-secondary vocational education continuum culminating within community colleges and (b) university STEM programs (Dougherty & Harbaugh Macdonald, 2020; Frase et al., 2017; Harbour & Wolgemuth, 2015). Modern computer science university programs include a general education curriculum component that includes communication and sociology coursework (University of Minnesota, 2021). Non-baccalaureate programs and technical colleges deviate from university engineering programs by promising to quickly transmit the high-tech skills needed to break into the technology field, making little mention of soft skills (Bariso, 2020; Price & Dunagan, 2019).

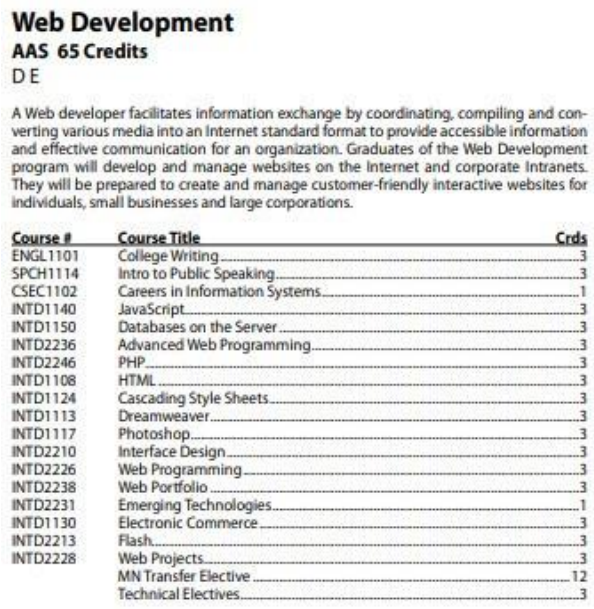
A similar program within a technical institution requires no post-secondary general education coursework outside of remedial classes required if placement test scores are not sufficient (Anoka Technical College, 2021). It is possible that graduates from technical and university programs studying similar content will work together with variations in soft skills reinforcement, based on individual post-secondary pathways (Anoka Technical College, 2021; Dougherty & Harbaugh Macdonald, 2020; Frase et al., 2017; McQueen, 2020; University of Minnesota, 2021). The mixture of baccalaureate and non-baccalaureate educated career technology professionals in the technology sector underlines the need for a general set of

common social and cultural aptitudes (Anoka Technical College, 2021; Dougherty & Harbaugh Macdonald, 2020; Frase et al., 2017; McQueen, 2020; University of Minnesota, 2021).

Examples have been found featuring non-baccalaureate programs that have been intentionally constructed with communication coursework, such as the now defunct Web Development Associate of Applied Science degree offered at Minnesota State Community and Technical College (2011). To graduate, students needed to take both a college writing and public speaking course (Minnesota State Community and Technical College, 2011). Despite the program being closed, it provides a clear example of soft skills integration within vocational education (Minnesota State Community and Technical College, 2011). Arguments could be made that speaking and writing courses in a technical program are redundant, repeating high school coursework.

Figure 1.

Example of 2011-2012 Web Development AAS Required Courses



Web Development

AAS 65 Credits

D E

A Web developer facilitates information exchange by coordinating, compiling and converting various media into an Internet standard format to provide accessible information and effective communication for an organization. Graduates of the Web Development program will develop and manage websites on the Internet and corporate Intranets. They will be prepared to create and manage customer-friendly interactive websites for individuals, small businesses and large corporations.

Course #	Course Title	Crds
ENGL1101	College Writing	3
SPCH1114	Intro to Public Speaking	3
CSEC1102	Careers in Information Systems	1
INTD1140	JavaScript	3
INTD1150	Databases on the Server	3
INTD2236	Advanced Web Programming	3
INTD2246	PHP	3
INTD1108	HTML	3
INTD1124	Cascading Style Sheets	3
INTD1113	Dreamweaver	3
INTD1117	Photoshop	3
INTD2210	Interface Design	3
INTD2226	Web Programming	3
INTD2238	Web Portfolio	3
INTD2231	Emerging Technologies	1
INTD1130	Electronic Commerce	3
INTD2213	Flash	3
INTD2228	Web Projects	3
	MN Transfer Elective	12
	Technical Electives	3

Note. (Minnesota State Community and Technical College, 2011)

Career and Technical Education

High school career and technical education (CTE) programs have accelerated to meet 21st century workforce needs, urged by worker shortages in fields requiring STEM skills (Dougherty & Harbaugh Macdonald, 2020). While high school STEM career prep programs reach a broader student demographic, Dougherty & Harbaugh Macdonald (2020) found that the programs also reinforce the status quo by maintaining a homogeneous supply of STEM college students. One idea to make the transition from CTE programs to college STEM programs more equitable includes encouraging first-generation and disadvantaged college students to attend a community or technical college to first study and earn a two-year associate of science degree before transitioning to a university program (Brown et al., 2017). This approach allows students time for any necessary remedial coursework, gain exposure to STEM fields, and to prepare for the rigor of a university engineering program (Brown et al., 2017). Another benefit of starting at a community college is that the setting provides a supportive environment that includes ample student assistance within a familiar setting (Brown et al., 2017). Routing students from a community college to a university STEM program provides general education coursework that covers soft skills and implicates cross-institution coordination, student services specific to the transition program, and monitoring and interventions related to student progress (Brown et al., 2017).

Durable, 21st century skills require a more unified technology education pipeline than the current community college versus university binary (Brown et al., 2017; Couch & Towne, 2018; Harbour & Wolgemuth, 2015). The experimental approach routing students through community college and into university STEM programs is one success story (Brown et al., 2017). The high demand for technical skills and shortage of technology workers does not align well with the idea

of forcing all students through full university STEM programs, which opens opportunities for technical college or boot-camp style vocational programs (Bariso, 2020; Price & Dunagan, 2019). Digital technology has become so intertwined with everyday life that technological literacy and technical education of all forms should crossover heavily into the realm of soft skills, attitudes, and context-switching (Couch & Towne, 2018).

The idea of practical education blended with personal and social development is not novel (Couch & Towne, 2018; Dewey, 1938; Harbour & Wolgemuth, 2015; Labaree, 2012). The concepts of the soft skills gap and 21st century education hearken to the historical balancing act between useful job skills and basic moral education (Dewey, 1938; Labaree, 2012). Skilled worker shortages and the trendiness of STEM education have shifted the conversation to ensuring students receive enough science and math education despite employers expressing knowledge gaps related to soft skills (Bariso, 2020; Price & Dunagan, 2019; Minnesota State, 2021; Poague, 2020; U.S. Department of Education, 2021; Wekelo, 2018). Technology education provides a platform accounting for a range of transferable skills related to engineering and technology as unique, individual subjects, expanding beyond hard science and math (ITEEA, 2020).

Technology Education

Technology is tightly woven into the fabric of civilization and touches multiple aspects of people's everyday lives (ITEEA, 2020). Ironically, only a modest share of the population has a strong grasp of technological systems and ethical implications related to technology (ITEEA, 2020). One objective of technology education is to give learners the ability to discern between the built and natural world (ITEEA, 2020). Another goal is to impart an understanding of the linkages between technological systems, the environment, and people (ITEEA, 2020). Further,

technology educators seek to evolve learners beyond functioning as consumers of technology products and into technologically literate individuals that quickly adapt as technologies change (ITEEA, 2020).

Standards Organizations for Technology Education

Technology education curricula are developed to address workforce and societal needs (ITEEA, 2020). Curricula and standards set by the ITEEA target primary and secondary education audiences (ITEEA, 2020). Similarly, standards developed by ITEM in Minnesota do not apply to students in post-secondary institutions (ITEM, 2019). Regardless, technology education standards provide guidance for the types of knowledge technologically literate individuals should possess (ITEEA, 2020; ITEM, 2019).

The Origins of Technology Education

Beginning with industrialization in the early 20th century, the call to action for technology education became louder after World War II (Snyder, 2018). The surplus manufacturing capacity and rapid technological advancement led to a sense of urgency to teach industrial arts subjects related to energy, transportation systems, manufacturing technology, construction principles, communication, and management (Snyder, 2018). Within the latter half of the 20th century, industrial arts education slowly evolved to include additional emphasis on technology (Snyder, 2018). By the late 1980s, the International Technology Education Association (ITEA) emerged, touting technological literacy as a goal of technology education (Snyder, 2018). Advocacy by the ITEA contributed to the inclusion of technology within STEM, though the absence of technology and engineering facilities, experience, or other roadblocks caused reduced focus in the classroom (Snyder, 2018). The ITEA's (today known as the ITEEA or International Technology and Engineering Education Association) continued advocacy and

other factors have underlined the importance of an integrated STEM curriculum with representation from technology and engineering (Snyder, 2018).

A Key Contributor to Technology Education: William E. Duggar, Jr.

The history of technology education as a means of achieving technological literacy would be incomplete without the mention of William E. Duggar, Jr., a key contributor to the development of national standards for technological literacy (Moye & Duggar, 2016). Understanding Duggar's involvement at the ITEEA creating technology and engineering literacy standards is pertinent for investigating technology education in the United States (Moye & Duggar, 2016). Educators teaching technology education or addressing STEM-related topics are guided by standards informed by the national standards developed by professional technology education teaching organizations such as the ITEEA (ITEEA, 2018; ITEEA, 2020; Moye & Duggar, 2016; Piaget, 1957).

Duggar began his career as an industrial arts teacher in the late 1950s (Moye & Duggar, 2016). A few years later, while pursuing a Ph.D., Duggar worked on the Industrial Arts Curriculum Project (IACP) as a research associate (Moye & Duggar, 2016). After receiving his Ph.D., Duggar began working within higher education, preparing graduate students for industrial arts education and the newly emerging specialization of technology education (Moye & Duggar, 2016). Duggar eventually landed at Virginia Tech, an institution renowned for its technology education teacher preparation programs (Moye & Duggar, 2016). Duggar was the President of the American Industrial Arts Association (AIAA) during its shift towards a heavier focus on technology (Moye & Duggar, 2016).

Shifting Focus from Industrial Arts Education to Technological Literacy

One result of the shift was the AIAA's reemergence as the International Technology Education Association (ITEA) in 1985 (Moye & Duggar, 2016). The new, broadened scope of the organization enabled a larger coalition and increased advocacy for learning about technology (Moye & Duggar, 2016). One component of advocacy involves developing guidelines for technology education (Moye & Duggar, 2016).

The promotion of the necessity of technological literacy for all, through the research and development of national standards, is a major contribution of Duggar (Moye & Duggar, 2016). Roughly 20 years ago, Duggar played a decisive role in the creation of the Standards for Technological Literacy (STL), designed for primary and secondary students (Moye & Duggar, 2016; ITEEA, 2020). Duggar's involvement started while working at Virginia Tech in the 1980s as a part of the project team that developed and delivered the Standards for Industrial Arts Programs, a precursor to STL (Moye & Duggar, 2016). A subsequent initiative funded by the Technical Foundation of America updated the Standards for Industrial Arts Programs to target technology more broadly, resulting in the *Standards for Technology Education Programs* dossier (Moye & Duggar, 2016). Released in 1985, it was the first pass at national technology education standards released by the newly rebranded ITEA (Moye & Duggar, 2016).

While not alone in his work and advocacy, Duggar relentlessly reiterated the importance of technological understanding for all people through the Technology for All Americans Project (Moye & Duggar, 2016). In the early 1990s, a committee including Duggar procured funding from the National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA) to develop a doctrine that would serve as the cornerstone laying the groundwork for a philosophy related to technology education (Moye & Duggar, 2016).

Technology education was in a nascent state at the time (Moye & Duggar, 2016). Duggar's work on the *Rationale and Structure for the Study of Technology* and *Standards for Technological Literacy: Content for the Study of Technology* documents provided a sound argument and set of guidelines for a curriculum aimed at enabling technological literacy (Moye & Duggar, 2016).

Adding Engineering Literacy to Technology Education

Continuing in the spirit of Duggar and his contemporaries, the ITEA has again evolved and rebranded as the International Technology and Engineering Educators Association, releasing the updated set of standards known as the Standards for Technology and Engineering Literacy (STEL) in 2020 (ITEEA, 2020; Moye & Duggar, 2016). The ITEEA also continues to release updated model curricula for use by technology and engineering teachers, providing content that facilitates collaboration, project-based learning, intercultural communication knowledge, ethical implications of technology, and other transferable skills helpful outside of the engineering lab (ITEEA, 2018).

Compiling 21st Century Soft Skills within the Lens of Technological Literacy

The evolution of industrial arts education into technology education has added additional soft skills to the mix, benefiting students, future citizens, and future professionals (ISTE, 1027; ITEEA, 2018; ITEEA, 2020; Moye & Duggar, 2016). The intentionality of this evolution reiterates the role of soft skills within technology and engineering education (ISTE, 2017; ITEEA, 2018; ITEEA, 2020; Moye & Duggar, 2016). Technology education standards crossover heavily with 21st century soft skills (ITEEA, 2020; ITEM, 2019; Moye, 2019; Snape, 2017). ITEEA's (2020) STEL, Minnesota's ITLS, and Snape's (2017) frameworks can be combined into a single comprehensive list, removing overlap and creating a comprehensive view of technology education standards at the national and state levels (ITEM, 2019). The following list

provides an overview of competencies required to achieve technological literacy (ITEEA, 2020; ITEM, 2019).

- Historical Understanding – Technology and the built world are core components of humanity and history. It is a social responsibility to be fluent with technological concepts (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Ethics & Cultural Competency – Technologically literate digital citizens understand the legal, ethical, environmental, and community impacts of technology (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Design Thinking – Technological literacy includes creatively approaching inquiry and solution ideation, using a methodical design process to develop and implement technology products (Clarke, 2020; ITEEA, 2020; ITEM, 2019; Snape, 20176).
- Communication – Technology development and use require the ability to clearly communicate complex concepts simply, adjusting based on the audience and context (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Collaboration – Collaboration involves combining disparate collections of information and generating new knowledge that can be used to solve problems (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Global Consideration & Stewardship – Technology has had a global impact throughout history that has accelerated considerably within the last 150 years, connecting the entire globe and improving humans' abilities to solve problems (ITEEA, 2020; ITEM, 2019; Snape, 2017). Technology needs to be maintained and operated. The impacts of technology on the planet and society need to be managed (ITEEA, 2020; ITEM, 2019; Snape, 2017).

- Information Organization & Curation – Technology includes gathering requirements and collecting and making sense of information by systematically arranging and analyzing data and artifacts (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Problem-solving – Technology is inextricably linked to problem-solving, as technological solutions are often devised to overcome problems (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Curiosity & Discovery – Technology's ongoing evolution requires continuous learning, fueled by curiosity, to stay current with trends and issues (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Decision-Making – Technology development requires the ability to make and defend decisions. Technological systems require operation and decisions related to controlling and managing processes (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Systems Thinking – Technologies interface with people, society, and nature and are comprised of multiple, interconnected constituent parts, modules, and subsystems (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Products & Processes – Technologies are not only products; they use resources and processes within the context of broader natural and human-built systems to be developed (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Safety & Privacy – Using technological products and systems has safety and privacy implications for individuals and society (ITEEA, 2020; ITEM, 2019; Snape, 2017).
- Reflection – Technological literacy includes reflection, critical thinking, and questioning (ITEEA, 2020; ITEM, 2019; Snape, 2017).

- Optimism/Empathy – An optimistic view of technological products, processes, and systems includes a focus on the end-user and the broader environment (ITEEA, 2007; ITEEA, 2020; ITEM, 2019; Snape, 2017).

The strong representation of soft skills within the list underlines the common understanding that technical skills alone are not sufficient for technology career students (ITEEA, 2007; ITEEA, 2020; ITEM, 2019; Moye, 2019; Snape, 2017).

Technological Literacy & Andragogy

Neves & Henriques (2020) explored technological literacy within adult learners, suggesting a three-sided set of benefits gained from lifelong learning coupled with cultivating digital proficiency. Beyond professional gains, continuous learning, including technology education, enables individual growth and enhances public life (Neves & Henriques, 2020). It is the duty of higher education to evolve to meet the needs of learners of all ages, including the continuing technology education of adult learners for personal and professional purposes (Neves & Henriques, 2020). The possibilities unlocked with advances in remote education make possible a holistic technology education curriculum that does not partition digital literacy from other forms of literacy (Neves & Henriques, 2020).

Modern pedagogy has limitations and challenges, especially considering standardized assessment mechanisms and uniform model curricula (Mărunțelu, 2020). One study conducted a review of literature focused on the root of learning and the role of the educator, examining the works of Lev Semenovič Vygotski and Jean Piaget as solid contributors to constructivism (Mărunțelu, 2020). The research concludes by noting that constructivist approaches to education are useful to enhance teaching and learning, despite not being a singular solution for the shortcomings of pedagogy in the modern world (Mărunțelu, 2020).

Education is emerging in nature, adapting on an ongoing basis (Moye et al., 2020). The prevalence of high-stakes, standardized testing is not popular with the public, opening an opportunity for technology and engineering education to address gaps between public sentiment and pedagogy in the contemporary classroom (Moye et al., 2020). Prior literature describes technology education's roots and connections with preparing industrial arts teachers and subsequent evolution towards focusing more broadly on technology and engineering (Moye et al., 2020). The study involved three rounds using the Modified-Delhi approach to gather data, organizing responses by theme and then by the following categories: current trend, future trend, current issue, and future issue (Moye et al., 2020). Findings showed top issues and trends related to teacher shortages, a need to advocate for more project-based work, and a lack of support and funding for programs (Moye et al., 2020). The technology education teacher shortage is exacerbated by the closure of many secondary technology education programs, while new federal funding for 21st century and career education has been earmarked (Moye et al., 2020). Promoting the holistic nature of modern technology education and its benefit to general workplace skills while addressing teacher shortages could open new opportunities for technology education (Moye et al., 2020).

The medium of primary and secondary education does not profoundly impact building professional, non-technical competencies despite education's key role in developing soft skills within students (Singh Dubey & Tiwari, 2020). Engineering pedagogy needs to be modified as the professional context changes, despite the slow-changing nature of many engineering education programs and departments (Polyakova, 2020). Engineering education is not keeping up with industry; education 4.0 needs to catch up with industry 4.0 (Polyakova, 2020). The purpose, content, audience, props, technological approaches, and settings related to engineering

pedagogy need to meet the needs of students that grew up in a remote, high-tech, digital world and prepare them to be influential professionals and technologically literate citizens (Polyakova, 2020). Polyakova (2020) acknowledges the incertitude of the engineering education system and asserts that clarifying the fundamental questions (why, what, whom, how, where) can help improve pedagogy and practices.

Workshops, Project-Based Learning, and Constructing Meaning

Sanders et al. (2019) created a guide focused on using making as means to teach with a constructionist approach to learning that involves project-based techniques to deliver products while providing experiences that enable the creation of new knowledge within students. The framework addresses the tension inherent when teachers balance standards-based approaches to learning with constructivism (Sanders et al., 2019). The guide focuses on facilitating makers' workshops following the model of writing workshops that drive the making of knowledge within a process-focused methodology while addressing reading and writing literacy standards (Sanders et al., 2019). The approach used in the framework is adaptive, iterative, and feedback-driven, demonstrating the similarities between writing, engineering, and design processes (Sanders et al., 2019). Aside from providing a guide for instructors, the document compares makers' workshops to writing workshops and reveals their similarities and reinforcement of science, technology, engineering, and math (STEM) principles, especially as related to development processes (Sanders et al., 2019). Both types of workshops also favor formative assessments and peer feedback with continuous improvement (Sanders et al., 2019). The paper reveals the need for responsive pedagogy in an environment where teachers act as facilitators on the learning journey alongside students, guiding and co-creating (Sanders et al., 2019). Such shifts introduce new challenges for teachers and standards-based assessment schemes (Sanders et al., 2019).

Mokhtarzadeh & Faghei (2019) explored collaboration between organizations to gain insight into how technological learning occurs in collaborative scenarios. The modern economy is knowledge-driven, with specializations distributing knowledge across a number of organizations (Mokhtarzadeh & Faghei, 2019). The unequal distribution of knowledge and talent makes it difficult for single organizations to generate all of the expertise needed to be competitive in the market (Mokhtarzadeh & Faghei, 2019). In the pursuit of research and development and considering the finite pool of intellectual capital, organizations increasingly create partnerships to access general and technological knowledge (Mokhtarzadeh & Faghei, 2019). Previous literature on technological learning in collaborative scenarios proposes six different models (Mokhtarzadeh & Faghei, 2019). The study shows that two basic structures exist in collaborative technological learning. Single-loop learning involves using the results of actions to change future tactics and actions (Mokhtarzadeh & Faghei, 2019). Double-loop learning adds to single-loop learning by adding an additional layer of questioning assumptions and considering changes to values in addition to adjusting future actions (Mokhtarzadeh & Faghei, 2019). Mokhtarzadeh & Faghei's (2019) study found that double-loop technological learning in each model starts with the generation of new knowledge or the adaptation of existing knowledge to be used in novel ways. Learning occurs in organizations as problems are solved within cross-firm research and development initiatives, demonstrating the promise of learning outside of educational institutions (Mokhtarzadeh & Faghei, 2019).

Morris' (2018) exploration probes adult learners' adaptability and self-governance within the context of a rapidly changing world. The research compares two learning models, the reinforcing model of modes of learning and the adapting model of modes of learning. The reinforcing model of modes of learning focuses on lecture and demonstration, deemphasizing

questioning, and the exploration of deeper context (Morris, 2018). The adapting model of modes of learning includes lecture and demonstration while also including interrogation and additional background for learners (Morris, 2018). The research revealed the benefits of using an adapting model of modes of learning with a constructivist lens (Morris, 2018). Adult learners become more versatile within changing circumstances when they play a key role governing their continuing education (Morris, 2018). Further, the adapting model of modes of learning promotes critical thinking and reduces tendencies toward the idea that knowledge is static in nature (Morris, 2018).

Current education practices exist in an environment where technology and understanding are upended with increasing frequency (Snape, 2017). The need for breadth and depth within the study of technology is supported by society's need for digitally-savvy citizens and industry's need of technically and socially capable professionals (Snape, 2017). Snape (2017) further contends that teaching knowledge and soft skills can occur concurrently while engaging students and equipping them with a growth mindset. Accomplishing a transformation in education to integrate knowledge and soft skills more effectively will require changes in curricula, assessment, and pedagogy (Snape, 2017). Technology education is uniquely positioned to synthesize cross-disciplinary learning while facilitating creative problem-solving, critical thinking, resilience, and soft skills attitudes (Snape, 2017).

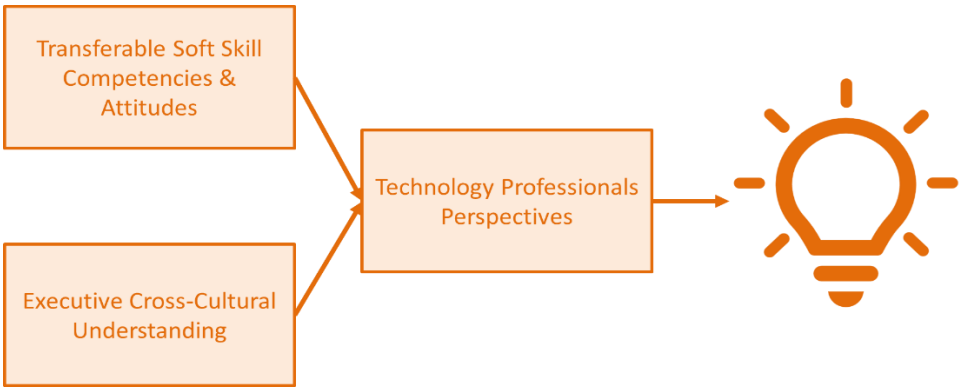
The Role of the Literature in This Study

Two overarching concepts from the review of literature will be used to frame data collection and analysis. The synthesis of transferable 21st century soft skills, technological literacy, and social capital will provide a lens focused on the career technology professional/learner, based on constructivism (Bourdieu, 2021; Hora et al., 2018; ITEEA, 2020;

ITEM, 2019; Piaget, 1957; Snape, 2017). The blending of social and cultural capital and constructionism will inform both conversations with participants with management experience and the collection and analysis of job postings (Bourdieu, 2021; Harel & Papert, 1991; Hora et al., 2018).

Figure 2.

Concepts from literature will inform the study



Summary

Chapter II reviewed the literature on technology education and the 21st century soft skills gap, also examining the history of vocational education. Chapter III will outline the methodology used in this phenomenological research study, beginning with a review of the research questions. The next chapter will explain sampling, data collection procedures, analysis techniques, limitations, delimitations, biases, ethical considerations, and applicability. Chapter IV will supply the results generated by this research initiative. Chapter V will complete this study with a discussion related to the findings and point to opportunities for further study.

Methodology

Chapter III is an overview of the methodology for this phenomenological study exploring soft skills integration for educating technology career professionals. The chapter begins by outlining the research questions and describing the design of the study. Chapter III provides study design rationale, instrumentation, sample selection, setting, and potential biases. Delimitations are discussed within descriptions of the sample selection, setting, and data collection methods. Additionally, the chapter describes data collection and analysis methods, applicability, limitations, researcher biases, assumptions, and ethical considerations, concluding with a summary of Chapter III.

Research Questions

The purpose of the study is to understand the integration of soft skills into modern technology education for career professionals, using the following research questions:

1. How do members of remote digital product teams describe the transferable soft skills needed to achieve proficiency in technology work?
2. What recommendations do members of remote digital product teams have for integrating soft skills training in technology career professional development?
3. How do remote digital product team members describe the acquisition of soft skills proficiency on career development?

Research Design

The research method consists of a qualitative study exploring the perceptions of soft skills integration within technology career professionals' educational and workplace experiences. Qualitative research methods are increasingly common within social sciences and education (Merriam & Tisdell, 2016). Qualitative, phenomenological research designs interpret language,

non-verbal interactions, and words within a natural setting to gain insight into a problem or phenomenon (Creswell & Creswell, 2018). The philosophies of symbolic interactionism, constructivism, and phenomenology advise qualitative research practices (Merriam & Tisdell, 2016). Qualitative, phenomenological research explores human experiences, involving cognitive psychology through the comingled cerebral operations required for phenomena to be sensed, analyzed, integrated, and shared with the researcher (Gall et al., 2017).

Phenomenology closely aligns with constructivist orientations, interpretivism, and naturalism (Erlander et al., 1993; Gall et al., 2017; Lincoln & Guba, 1985; Merriam & Tisdell, 2016; Moustakas, 1994). Pioneered by Moustakas (1994) and based on work by Husserl (1931 as cited in Moustakas, 1994), transcendental phenomenological frameworks are used to study human perceptions of lived experiences without surfacing commonly accepted understandings or proclivities of the phenomenon being explored (Gall et al., 2017; Moustakas, 1994). Phenomenology is one of many means of learning, placing the human perspective at the center of research, focusing on how people build reality (Gall et al., 2017; Moustakas, 1994; Patel, 2016). Phenomenological studies are human-centered, fitting well within a qualitative research design involving career professionals despite possibly limiting non-anthropocentric perspectives (Moustakas, 1994; Patel, 2016).

Qualitative studies are the opposite of objective, quantitative studies (Gall et al., 2017; Moustakas, 1994). Qualitative research contributes to domain knowledge by making meaning of subjective experiences and revealing subtleties captured in people’s perceptions (Gall et al., 2017; Moustakas, 1994). Multiple participants' descriptions of a specific occurrence or perception reveal a shared phenomenon that transcends each individual (Creswell & Creswell, 2018; Gall et al., 2017; Moustakas, 1994). Studying phenomena adds to the collective knowledge

base by describing subjectively experienced elements of reality as precisely as is feasible (Groenewald, 2004; Moustakas, 1994). The research design will be a qualitative phenomenological, naturalistic inquiry targeting the soft skill integration experiences of career technology professionals within a single site, including technology career-focused members of a digital technology team within a mid-size business' virtual corporate office environment (Erlandson et al., 1993).

The Rationale of the Research Design

Education researchers are concerned with the nature of consciousness, worldview frameworks, and cognitive processes because sets of learners are not homogeneous (Gall et al., 2017). Gaining insight into the variety of perspectives, backgrounds, and perceptions of learners enriches the body of knowledge related to soft skills integration for students preparing for 21st century technology careers (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016). Research rooted in confidence inherent in proximity to sense perceptions reduces the uncertainty associated with the existence of objective reality while providing actionable findings relevant to discerning consumers of the results (Groenewald, 2004). The researcher is the instrument in phenomenological research, collecting, documenting, and analyzing experiential data while acknowledging and examining the impact of the phenomena on the individual conducting the research (Gall et al., 2017). A novel contribution to understanding soft skills integration is ideally organized as a phenomenological study (Gall et al., 2017). The structure of the study ensures the researcher has proximity to the phenomenon in a subjective manner, with an intentionally selected sample (Gall et al., 2017). Approaching the study of a phenomenon as a naturalistic inquiry acknowledges context and the researcher's role within an interconnected reality comprised of numerous interconnected "sub-realities" interplaying to construct a

patchwork of shared experiences (Erlandson et al., 1993). The unique setting, population, the problem being examined, and research questions posed with a phenomenological, naturalistic approach will provide findings that add to the body of knowledge by enriching the understanding of similar contexts (Erlandson et al., 1993).

Sample Selection

The selection of participants for this inquiry utilized purposeful sampling, guided by a set of criteria targeting individuals with experiences inclined to provide descriptions of the phenomenon of soft skills integration within technology career professional development (Creswell & Creswell, 2018). Purposeful sampling involves the intentional selection of a sample that provides an optimal data set, bountiful for achieving depth in understanding the problem explored by the study (Merriam & Tisdell, 2016). Purposeful sampling facilitates the collection of the most relevant data and allows targeted analysis specific to the topic of the study and specializations of the participants (Patton, 2015, as cited in Merriam & Tisdell, 2016). Accessible sampling is often used to target convenient populations with desirable attributes, without the large resource overhead needed to gather participants from across the entire global technology workforce (Gall et al., 2017; Merriam & Tisdell, 2016).

Purposeful, accessible sampling was employed to find participants that are technology career professionals with mixed education backgrounds. Specific criteria for participants included academic and professional attributes (Merriam & Tisdell, 2016). Technology career professionals that have previously or are currently working in the technology field with no formal education, boot camp education, professional certification, vocational/technical education, unrelated undergraduate or graduate degree education, or undergraduate or graduate computer science degree education were selected for participation in the study. Eligible

participants must have had at last four years of experience working in technology-focused functional roles that involve web development, software quality assurance, information technology business analysis, digital content management, systems analysis, solution architecture, or web design responsibilities. An organizational announcement was syndicated within team-wide communication forums and sent via email to individuals meeting the selection criteria. The study solicitation letter provided details about the study purpose, design, expectations for participants, and outlined criteria for participation (see Appendix A). The letter provided the researcher's contact information and listed a response deadline.

Data Collection

The data collection procedures for the study included commonly accepted qualitative methods (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016). The purpose of data collection is not always evident to participants, creating an imbalance that benefits the researcher and sponsoring institution while potentially suppressing full, equitable participation (Patel, 2016; Merriam & Tisdell, 2016). The study framework is supported by specific data collection and analysis methods positioned for disclosure and exploration. Qualitative research methods seek a deeper understanding of phenomena, collecting data within native settings (Putman & Rock, 2017). Multiple researcher-generated data collection methods implemented within natural settings provide a richer understanding of a research topic (Merriam & Tisdell, 2016; Paulus & Lester, 2021). Diverse data collection methods uphold triangulation by supporting phenomena found within naturally occurring data sources, such as publicly-accessible online documents found on the world wide web (Merriam & Tisdell, 2016; Paulus & Lester, 2021).

Interviews

Qualitative and applied research often use interviews as a primary method of collecting data (Merriam & Tisdell, 2016). If not the primary method, interviews are often used in addition to other methods due to the usefulness of interviews for revealing participants' feelings, perceptions, and reactions that are not easily perceived by other means (Patton, 2015, as cited in Merriam & Tisdell, 2016). Interviews add context to other data collection methods (Merriam & Tisdell, 2016). Interview formats vary within qualitative research (Gall et al., 2017). Semi-structured interviews approach participants with questions that have a less prescribed form than highly structured interview questions (Gall et al., 2017; Merriam & Tisdell, 2016). This approach enables natural conversation, deviating from simple, succinct answers and rigidly predetermined questions (Gall et al., 2017; Merriam & Tisdell, 2016). Interviews conducted in virtual settings are increasingly accepted in academia as COVID-19 has forced the saturation of online tools within research (Paulus & Lester, 2021).

Semi-structured, virtual interviews were conducted with each participant opting into individual interviews. The primary topics included reflection on each participant's post-secondary education experience, motivations for joining the technology field, perceptions of non-technical skills, means of acquiring soft skills, and impressions of growth prospects related to soft skill development (see Appendix A).

Key Informant Interviews. The research included interviews with purposefully selected individuals. Targeted interviews with purposefully selected individuals provide insights not available within a generic population of technology career professionals (Gall et al., 2017). Boyd (2001, as cited in Groenewald, 2004) has proposed that as few as two participants are adequate for completing a phenomenological study. Kumar (2018) describes sample sizes in qualitative

research as not being predetermined. Data is collected from the target population until a saturation point is met (Kumar, 2018). Creswell & Creswell (2018) advise a minimum of three participants for a qualitative, phenomenological study. A targeted minimum of four participants were sought for participation in one-on-one interviews. Key informants were grouped to provide succinct, canny information within individual interviews (Gall et al., 2017). The study sought two groups of key informants for informal, conversational interviews (Gall et al., 2017). The first subset included technology career professionals with individual contributor roles and four to seven years of field experience. The second subset included technology career professionals with hiring authority and with more than seven years of field experience.

Participant Construction Survey Focus Group Interview. The study included an online focus group interview formatted as a participant construction survey workshop (Brinkmann et al., 2018; Gall et al., 2017). Group interviews reveal details not caught within individual interviews (Putman & Rock, 2017). The optimal interview format varies based on the problem being explored and the type of data sought (Brinkmann et al., 2018). Survey interviews are often employed in conjunction with other data collection methods to provide additional, complementary information that enriches the data set (Gall et al., 2017). Participant construction survey interviews allow participants to share the frameworks that shape perceptions of the corporeal and socio-professional realms (Gall et al., 2017). Survey interviews conducted as participant constructions involve interviewees providing phrases related to a topic to develop a model (Gall et al., 2017). A focus group formatted as a participant construction survey interview was conducted to catalog, group, and grade tiers of soft skills perceived as beneficial for technology career professionals.

Document Review

Insightful, naturally occurring public data related to the 21st century soft skills gap permeates the world wide web in the form of digital documents (Paulus & Lester, 2021). Document review was a data collection method used for the research study. Document collection is an innocuous means of gathering rich sources of minimally adulterated information for qualitative research purposes (Merriam & Tisdell, 2016). The abundance of documentation, especially within professional settings, provides a wealth of valuable information with minimal effort required for collection (Merriam & Tisdell, 2016). The corroborative nature of documentation also provides a means of supporting and adding context to data collected from interviews and observation, enriching the exploration of the research questions posed by the study (Merriam & Tisdell, 2016). Document collection was employed for the study.

Employer Soft Skills Solicitation: Job Descriptions. Public postings of job descriptions and lists of skill requirements for career technology positions derive from various sources, including from the corporate setting of the study, Minnesota State, and LinkedIn job boards. Document reviews of job postings, desired skills, and descriptions focused on technology career roles targeted at professionals with an intermediate level of experience, defined as at least four years of professional experience. Further criteria for document selection included job titles that were similar to the functional roles of study participants within organizations that employ professionals in the Greater Twin Cities metropolitan area of Minnesota directly or as remote workers. The postings were for various technology roles reporting within information technology or digital product departments. At least nine unique documents were gathered. The document review focused on soft skill requirements listed within the documents.

Employee Soft Skills Showcased: Professional Profiles. Additionally, public LinkedIn professional profiles related to technology careers were analyzed. Professional profiles examined included those of currently employed career technology professionals with a minimum of four years of experience. Additional criteria for document selection included the most recent role for the profile having similarity to the functional roles of participants of this research and the location of the professional listed as the Greater Twin Cities metropolitan area of Minnesota. Another criterion was that the profile needed to have an "about" section with at least 100 words to provide insight into how technology professionals promote their skills within public professional profiles. A minimum of seven unique documents were gathered. Documents were reviewed to look for soft skills listed within profiles, career trajectories, and educational attainment.

Document analysis provided insight into soft skills integration by examining employer soft skill needs and the soft skills presented within the profiles of technology career professionals to gain an understanding of employer and employee perceptions of soft skills integration within technology career education. The documents were collected and analyzed over the same two-month period as the observation exercises occurred.

Data Analysis

Qualitative data is inductive, with themes emerging as information is simultaneously collected and analyzed (Merriam & Tisdell, 2016). The constant comparative approach to data analysis consists of grouping data, assigning themes, and comparing specific groups, refining groups into categories as data is collected and analyzed (Merriam & Tisdell, 2016). Using the contact comparative method to analyze data is common and broadly accepted within qualitative research (Merriam & Tisdell, 2016).

Experiences of the participants are interpreted as patterns emerge within the data, providing detail critical to addressing the research questions contained within the study (Merriam & Tisdell, 2016). Constant comparative methods are based in Grounded Theory, revealing insightful, underlying subtext beyond what is being consciously conveyed by the participants (Merriam & Tisdell, 2016). Phenomenology within the data analysis explores subtle experiences as entities distinct from the participants themselves, further enriching categorization and emergent themes (Merriam & Tisdell, 2016). Phenomenological research commonly uses reflection within data analysis, examining the words and subtext communicated by the participants alongside patterns that emerge from the data collected to form new understanding (Gall et al., 2017).

Transcribing software, such as Fireflies.ai, has increased the fidelity and quality of automatically generated transcripts, even capturing pauses occurring within interviews (Paulus & Lester, 2021). Automated transcripts often capture a higher volume of text than manual transcription, albeit with some transcription errors included (Paulus & Lester, 2021). Reviewing and amending automatically generated transcripts with field notes improves data collection within virtual interview settings (Paulus & Lester, 2021). The study used automated transcription in conjunction with manually transcribed notes. The data collected within the study consisted of field notes, manually and automatically transcribed interviews, digital documents, and printed documents. All collected data were housed in a cloud-based document storage and editing application, organized into folders by date, participant, and collection method. The digital documents were annotated with notes and initially coded. Refinement occurred as new information was collected and aggregated.

Atlas.ti, an online qualitative data analysis software tool, was used to manage and refine codes into categories, allowing for centralized management of codes, code groups, and eliminating duplicate codes (Paulus & Lester, 2021; Scientific Software Development, 2021). Atlas.ti also facilitated excerpt management, aggregating all passages relating to a code together (Paulus & Lester, 2021; Scientific Software Development, 2021). Category refinement, data analysis, and resulting assertions were supported by excerpts from the data, as well as theme frequency recorded during analysis, organized primarily within Atlas.ti (Paulus & Lester, 2021; Scientific Software Development, 2021).

Qualitative research's strengths include narrative elements that present findings in a way that relates to readers (Wolcott, 2008; Gall et al., 2017). The analysis included narrative excerpts with commentary to describe perceptions and experiences of individual technology career professionals. Further, the analysis examined patterns that emerged from the aggregated data sources and identified common soft skill gaps and opportunities for improved integration within technology education for career professionals.

Trustworthiness and Applicability

Storing and organizing field notes and transcriptions, immersion in the data during collection and analysis, triangulation, and maintaining a log of notes describing the reflections and pattern identification found during coding, and process documentation strengthened the trustworthiness of the thematic analysis (Guba, 1981; Lincoln & Guba, 1985; Nowell et al., 2017). Comprehensive descriptions that document a phenomenon that is recognized by reviewers and derived from thematic analysis, reflection, and ongoing comparison as data was collected are considered trustworthy (Guba, 1981; Lincoln & Guba, 1985; Nowell et al., 2017). Maintaining and providing access to a repository containing a log of processes, thoughts, notes, and iterations

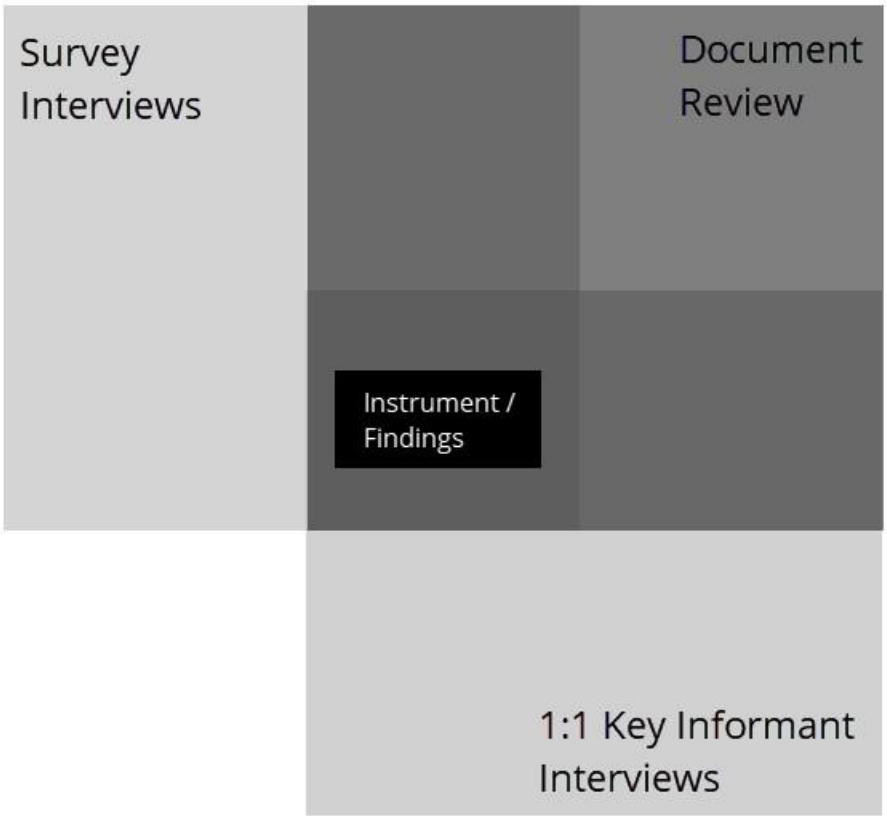
of coding exercises showed rigor, further aiding trustworthiness (Guba, 1981; Lincoln & Guba, 1985; Nowell et al., 2017). The study has been designed with a documentation trail for audits and reviews. Microsoft OneDrive contains all raw data collected. Raw data will be maintained for a period of five years. Atlas.ti houses coded data, with notes and annotations. Coded and annotated data will be retained for five years (Scientific Software Development, 2021). Data storage is secured with multifactor authentication, protecting any confidential information.

Triangulation

Triangulation is valuable for increasing the applicability of the study's findings, as data collected from documents, interviews, and observation are compared to find common support for conclusions originating from the data analysis (Wolcott, 2008; Merriam & Tisdell, 2016). Using multiple sources of data for triangulation is an acceptable practice within research, validating insight gathered from analyzing data sets collected during the study (Denzin, 1978, as cited in Merriam & Tisdell, 2016). Reviewing findings in relation to existing literature further increases applicability outside of the scope of the study (Gall et al., 2017). Finally, "reader/user generalizability ... [indicates] that it the responsibility of each reader or user of ... [the] research to determine the applicability of the findings in their own situations" (Wilson, 1979, as cited in Gall et al., 2017).

Figure 3.

Triangulation approach



Triangulation using multiple data sources (reviewed documents, 1:1 interview transcripts, and focus group transcripts and output) was employed during data analysis to verify the insight gathered from the data collected. Participant transcripts from individual and group interviews contained topical discussions from the perspectives of individuals operating within certain functional roles. Similarly, the soft skills tiers created in the focus group were based on participant perceptions from technology career professionals with particular operational duties. Specific types of documents were intentionally selected for review. Candidate and job profiles

analogous to participant functional roles were gathered for analysis. A shared framework was used for coding across data sources to facilitate triangulation, with variances noted and rationale recorded.

Limitations

The study had specific, acknowledged limitations. Reflective analysis requires an account and summary of the research to be constructed as a mixture of analysis, interpretation, and discussion (Gall et al., 2017). Reflection and narration in qualitative research limit findings as the report of the analysis filters through the prose of the researcher (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016). Participant availability and willingness to participate impacted the sample by not providing participants with varying demographic characteristics and academic backgrounds (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016; Paulus & Lester, 2021). Group interviews cause apprehension, limitations manifesting as stifled participation and muted or disproportionate interaction by a specific subset of participants (Putman & Rock, 2017). Interviews also introduce limitations resulting from the confinement of time and resources common within professional settings, causing circumscribed data collection (Putman & Rock, 2017). Virtual interviews could obscure nonverbal interactions and automated transcriptions may affect data collection, even if reviewed and amended with manually transcribed field notes (Paulus & Lester, 2021). Solicitation for the individual interviews and focus group resulted in the underrepresentation of executive technology professionals in the focus group. The executive-level participants that took part in the study opted for individual interviews and not the focus group, potentially affecting the content and grading of the soft skill tiers developed during the study. Further, the setting of the study did not include a high level of

gender and ethnic diversity within the target population. Despite efforts to recruit the most diverse sample possible from the population, most of the participants were male and Caucasian.

Reiterating delimitations, the proposed study took place in a specific setting with a limited set of participants, documents, and time, confining the research to a particular virtual office setting and industry (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016). The study focused on technology career professionals with at least four years of professional experience that work within a virtual environment. The setting was a single site office environment within a small business organization. Participants were career technology professionals within the technology division of a single organization. Recruitment excluded professionals directly supervised by the researcher, reducing the population eligible for participation. Individual interviews involved seven participants. The Focus group included six participants, following common practices within qualitative research (Brinkmann et al., 2018). Research topics related primarily to soft skills integration and non-technical skills, delimiting the focus of discussions, collection, analysis, and activities.

Researcher Bias and Assumptions

Qualitative studies are subjective by design (Putman & Rock, 2017). Researchers must be aware of and seek to mitigate biases arising from individual outlooks and worldviews (Creswell & Creswell, 2018; Gall et al., 2017; Merriam & Tisdell, 2016; Putman & Rock, 2017). Further, data can be viewed as property within a Western lens, situating the researcher in a position of bias by default (Patel, 2016). Formalized biases may influence the analysis of the data if the researcher does not consider partisan perspectives emerging from methods designed by institutions traditionally represented by the dominant group (Patel, 2016; Putman & Rock, 2017). Relationships and power differentials may also impact data collection and analysis, despite the

effort to avoid participation from technology career professionals directly reporting to the researcher (Patel, 2016).

With over 13 years of professional experience within digital product teams consisting of technology career professionals, the researcher entered the study with a few key assumptions. First, the researcher has an academic background that includes both technical/vocational and liberal arts education. Considering the disposition of the researcher, assumptions about the importance of communication and other non-technical skills may be present within the research design and analysis.

Second, the researcher is an experienced digital technology team manager, regularly coaching direct reports and providing guidance regarding communication, critical thinking approaches to problem-solving, and related issues. Conversations with colleagues about communication, collaboration, and building soft skills competencies in career technology professionals and within teams motivated the researcher to pursue the study's research topic.

Efforts were employed to set aside researcher biases towards "soft skills," relying on the data to reveal the nuances of the professionals' experiences, regardless of educational background. One tactic for reducing bias involved approaching interviews in a semi-structured way, presenting topics and allowing participants to describe their perceptions related to a given subject. The researcher took care to avoid conveying a particular idea before the participant mentioned it. Probing questions were asked and discussion was facilitated to allow participants to elaborate on ideas with limited interruption from the researcher. A resulting limitation was that some participants discussed a smaller set of phenomena than others. In the focus group, participants focused primarily on useful soft skills, how to group them, and how to rank them. Due to the planned duration of the focus group, the researcher was unable to incorporate how the

tiered soft skills could be acquired. A trade-off between reducing bias and ensuring each topic for each interview was addressed in detail was made in favor of lessening the impact of the predispositions of the researcher. Motivation to work to eliminate bias existed in the genuine desire to gain an honest understanding of how various educational backgrounds affect technology career professional soft skills integration. The researcher was driven by a desire for improving post-secondary technology education, training programs, and support for the integration of soft skills for technology career professionals. Such improvement would not be possible if bias was not considered and conscientiously addressed throughout the study.

Ethical Considerations

The study design accounts for ethical considerations. Research involving human subjects seeks to minimize the impact on the sample being studied (Patel, 2016). Contemporary analysis of qualitative research centered on human subjects criticizes the limited disclosure of the nature of the inquiry to the subject (Patel, 2016). Further criticism decries the lack of a full acknowledgment of the level of intrusion and power imbalance inherent between researcher and subject (Patel, 2016).

The study was conducted with an ongoing concern for intrusiveness, transparency, acknowledgment of power imbalances, and with culturally-sensitive collection and analysis (Patel, 2016). The researcher was positioned primarily as a participant observer and acted in some scenarios as a collaborative partner (Merriam & Tisdell, 2016). The researcher engaged in a semi-structured conversation within individual interviews, participating in a two-way exchange, asking probing questions, providing context, and adapting the content while observing and writing field notes. In group interviews, the researcher collaborated with interviewees, operating primarily as a facilitator, to construct a taxonomy related to soft skills integration while

recording and transcribing the workshop. The decision to approach the research as a participant observer and collaborator stemmed from the desire for transparency and to make available the benefits of the research to the participants as soon as possible (Patel, 2016).

Summary

Chapter III provided an overview of the research design and methodology applied to study soft skills integration for 21st century technology career professionals. The chapter reviewed the research questions and details the development of the study, the rationale for the research design, sampling methods, the data collection and analysis approach, and the reliability of the study. The qualitative, phenomenological study used interviews and document analysis to examine soft skills integration within a purposefully sampled set of technology career professionals within a corporate office setting (Merriam & Tisdell, 2016). Constant comparison data and triangulation applied to data sources/collection methods enabled the data analysis (Merriam & Tisdell, 2016). Chapter III addressed limitations, delimitations, researcher biases, assumptions, and ethical considerations related to the study design. The study was limited by elements of its design and scope, primarily a single site within an office with technology career professionals in the state of Minnesota. The researcher disclosed professional proximity to participants and approached the study as a participant observer and collaborator (Merriam & Tisdell, 2016). Chapter IV will introduce the analyzed data. Chapter V will include a discussion of the discoveries revealed during data analysis and summarize opportunities to expand on the research.

Findings

Chapter IV reexamines the purpose of the study and reviews the research questions generated by the problem statement. The goal of the research is to understand how technology career professionals experience the phenomenon of 21st century soft skills at work, professional development, and continuing education scenarios. This chapter also outlines the research design and provides context about the study participants before offering descriptions of soft skills integration collected within one-on-one interviews, a participant construct focus group, and document analysis. Chapter IV concludes with a summary, laying the groundwork for Chapter V.

Review of the Problem Statement

The non-technical components of the skill sets required to thrive in technology careers are known by educators and employers (Minnesota State, 2021; Moye, 2019; Parker, 2011; Snape, 2017; Wekelo, 2018; Yohana & Wijiharta, 2021). The swiftly shifting technology landscape requires the acquisition of a mixture of technical and non-technical skills, along with an entrepreneurial mentality (Murray & Musk, 2020; Scipioni, 2020; Świtek & Drelichowski, 2018). A growing need for skilled technologists has led to the development of vocational certificate and boot camp programs designed to promptly provide a purely technical education, with little focus on non-technical aptitudes (Bariso, 2020; Butrymowicz & Kolodner, 2020; O'Banion, 2018). Career technology professionals' perspectives related to non-technical skills have been examined within the context of aligning candidates' skills with employers' needs (Sahin & Celikkan, 2020). Not yet traversed is the integration of 21st century soft skills experienced by digital product team members navigating an increasingly virtual and variable career environment (Moye, 2019; Parker, 2011; Snape, 2017; Wekelo, 2018; Yohana &

Wijiharta, 2021). The research explores how career technology professionals employed in a remote working environment perceive 21st century soft skill integration.

Review of the Research Design

The research study was designed to explore perceptions of 21st century soft skill gaps among career technology professionals within digital teams working in a remote environment. The research consisted of a qualitative study investigating the perceptions of the integration of non-technical/soft skills within technology career professionals' educational and workplace experiences. Phenomenological research uses the researcher as the instrument, collecting data and interpreting language, non-verbal interactions, and words within a natural setting to gain an understanding of a phenomenon (Creswell & Creswell, 2018). This phenomenological study was set at Midwest Tech Company, a suburban software technology company located outside of Minneapolis, Minnesota. After soliciting for participation, a total of 12 individuals eligible for involvement expressed interest in participating in the focus group, a one-on-one interview, or both. Eleven of the 12 individuals interested in taking part in the study participated in either the focus group, a one-on-one interview, or both.

After interviews were conducted, professional profile documents were collected from LinkedIn and job descriptions were collected from both LinkedIn and Midwest Tech Company. Job descriptions and professional profiles related to the job functions of participants were sought for comparative analysis and triangulation purposes. Text content from all data sources was uploaded to Atlas.ti, organized by data source: 1:1 interview transcriptions, focus group transcriptions, focus group taxonomy, job description documents, and professional profile documents (Scientific Software Development, 2021). Data was prepared for analysis and scrubbed to remove any content that could potentially identify a participant or the study site.

Symbolic interactionism and constructivism framed the examination of human experiences as the researcher sought to sense, analyze, and describe phenomena related to 21st century soft skills integration (Gall et al., 2017; Merriam & Tisdell, 2016).

Research Questions

The purpose of the study is to understand the integration of soft skills into modern technology education for career professionals, using the following research questions:

1. How do members of remote digital product teams describe the transferable soft skills needed to achieve proficiency in technology work?
2. What recommendations do members of remote digital product teams have for integrating soft skills training in technology career professional development?
3. How do remote digital product team members describe the acquisition of soft skills proficiency on career development?

Data Collection

Participant Selection

Participants included adult technology career professionals with more than four years of experience in the technology field. An effort was made to solicit subjects with a range of different academic backgrounds. Sample sizes can be estimated initially and do not need to be constrained to a size determined prior to data collection (Kumar, 2018). Within qualitative studies, data is often collected from the target population until a saturation point is met (Kumar, 2018). A minimum sample size was set for the study, based on the minimum of three participants recommended by Creswell & Creswell (2018) for a phenomenological study. A floor of four participants were sought for participation in each type of interview.

For one-on-one interviews, key informants were grouped to provide succinct, canny information within the individual interviews (Gall et al., 2017). Two groups of key informants were formed (Gall et al., 2017). The first subset included technology career professionals with individual contributor roles and four to 15 years of field experience. The second subset included technology career professionals with more than seven years of field experience with hiring authority or executive status.

Interview Framework, Circumstances, and Environment

One-on-One, Key Informant Virtual Interviews. Individual interviews hosted within virtual conferencing software were conducted in a conversational, semi-structured format. The first items discussed with participants involved education background and exposure to higher education.

- How was higher education discussed at home and at school during high school years?
- What types of fields were introduced by peers, parents, and educators?

Subsequently, the conversation shifted to a discussion about work experience and perceptions of non-technical skills in professional environments and contexts.

- How do you describe soft skills?
- Soft skills in daily work activities
- Opportunities for soft skills within training, professional development, and continuing education
- The acquisition and role of soft skills as you have grown in your career

- How would you seek out further developing soft skills? What are your thoughts on if they are attitudes or teachable?

Focus Group Participant Construct Interview. A collaborative focus group interview was conducted with a total of six participants, two of which were participants within prior one-on-one interviews. The researcher facilitated the focus group as a participant construct interview, where participants are tasked with collaborating to produce a taxonomy related to a topic (Gall et al., 2017). The focus group specific to this study used ScatterSpoke, a web-based software that allows anonymous group collaboration and voting in a real-time, virtual environment (https://www.scatterspoke.com, 2021). Two columns were created on a collaboration board where cards with text could be placed in a list. One column was labeled "soft skills" and the other column was labeled "critical soft skills." Participants were asked to create cards that contained short descriptions of non-technical skills and place them in one of the two columns. Participants could not discern which specific cards others conceived. Once participants stopped creating new cards, the facilitator asked if everyone listed each of the soft skills used or deemed critical for technology careers.

Once the participants expressed that this portion of the task was complete, the researcher facilitated the grouping of the cards into themes by encouraging discourse and using the group's input. Granular, short descriptions were preserved and nested under themes determined by the group. Finally, each participant was given 10 votes that could be used to add weights to soft skill themes. Vote counts were not visible on the cards containing the theme groups, during voting, to ensure participants would not be influenced by seeing tallies. Participants voted. Once all votes were used by each participant, votes were revealed and the results were discussed.

Document Review. Documents were collected from primarily from two sources: LinkedIn and Midwest Tech Company. Job descriptions for roles similar to those of interview participants were collected from both Midwest Tech Company and LinkedIn (LinkedIn.com, 2021). Professional profiles for individuals with roles similar to those of interview participants were collected from LinkedIn. The primary criterion was that the role related to the document was similar to the functional roles of participants. Secondary criteria for job descriptions were that they were not created by the researcher, in the case of job descriptions from Midwest Tech Company, and that the positions would be located in the Greater Twin Cities metropolitan area or offered remote employment for professionals within the region. Preference was given to positions listed in the Greater Twin Cities metropolitan area, with remote positions only considered if a similar role was unavailable locally. Secondary criteria for professional profiles included a requirement of at least 100 words in the "about" section of LinkedIn to ensure rich descriptions were present when conducting analysis (LinkedIn.com, 2021). Preference was also given to professional profiles for professionals located within the Greater Twin Cities metropolitan area.

Document collection on LinkedIn used the search feature on the website (LinkedIn.com, 2021). Keywords were taken from interview participants' functional roles to conduct site searches for job listings and professional profiles. The first results returned were given precedence. The researcher did not read the entire job description nor full professional profile when selecting to reduce the chances that specific information would be sought and included. Instead, the researcher only checked for primary and secondary criteria and selected and retrieved the first returned document that met the criteria for each site search conducted. Nine job

description documents and seven professional profiles were retrieved from LinkedIn (LinkedIn.com, 2021).

Document selection for job descriptions from Midwest Tech Company was based on the availability of documents and responsiveness and willingness from participants to provide documents. Two job descriptions documents were collected from Midwest Tech Company.

Description of Sample and Participants

The sample consisted of a mixture of career technology professionals with varying educational backgrounds, different functional roles, and levels of professional experience ranging from four years to over 20 years. The sample included both participants that work primarily in individual contributor roles and participants that lead teams and manage people.

Table 1

Participant Descriptions

Participant	Gender or Sex	Education Level	Most Recent Area of Study	Role Seniority	Years in Field
Ash Ceres	M	Master's Degree	Business Related	Senior Individual Contributor	9
Astrid Eris	F	Bachelor's Degree	Liberal Arts Related	Mid-level Management	14
Harlow Mercury	M	Bachelor's Degree	Non-IT Engineering Related	Executive	26
Jamie Jupiter	M	Associate's Degree	Information Technology Related	Intermediate Individual Contributor	4
Jess Mars	M	Bachelor's Degree	Liberal Arts Related	Senior Individual Contributor	5
Jordan Makemake	M	Bachelor's Degree	Information Technology Related	Senior Individual Contributor	5
Kris Pluto	F	Some College and/or Certification Completed	Information Technology Related	Mid-level Management	8
Sam Saturn	M	Associate's Degree	Information Technology Related	Executive	21
Skylar Earth	M	Master's Degree	Business Related	Executive	21
Taylor Neptune	M	Bachelor's Degree	Information Technology Related	Mid-level Management	29
Whitney Venus	M	Some College and/or Certification Completed	Information Technology Related	Intermediate Individual Contributor	4

Note. Professional attributes of participants.

The average years of professional experience in the technology field for the participants was 13.27 years. The digital technology teams at Midwest Tech Company have a male employee majority. Despite efforts to reach out to prospective participants from varying genders, the study participants were mostly male (81.82%), with females making up an 18.18% share.

Data Analysis

Data Preparation

Data were collected from interviews via automated and manual transcriptions and by gathering documents for analysis and review. Data was extracted from source systems, anonymized, transferred to Microsoft Word documents, and stored within OneDrive cloud storage. All Microsoft Word documents containing the data collected were uploaded into Atlas.ti for coding and analysis to discover emerging themes and patterns (Scientific Software Development, 2021). Documents were converted into Atlas.ti raw text files and sanitized to remove any personally identifiable data related to participants and the study site (Scientific Software Development, 2021). The text files were labeled and grouped based on collection sources: one-on-one interviews, focus group, job descriptions, and professional profiles.

Text data imported into Atlas.Ti was read, reviewed, and coded using constant comparative methods (Merriam & Tisdell, 2016; Scientific Software Development, 2021). Phrases related to the research questions were highlighted and grouped under summary phrases (Creswell & Creswell, 2018; Merriam & Tisdell, 2016). Data was iteratively reviewed, and codes were consolidated and refined into top-level themes with supporting subtopics (Creswell & Creswell, 2018; Guba, 1981; Merriam & Tisdell, 2016). Themes were prioritized based on being mentioned by more than half (50%) of the documents or participants included in a data source and relevance to the research questions.

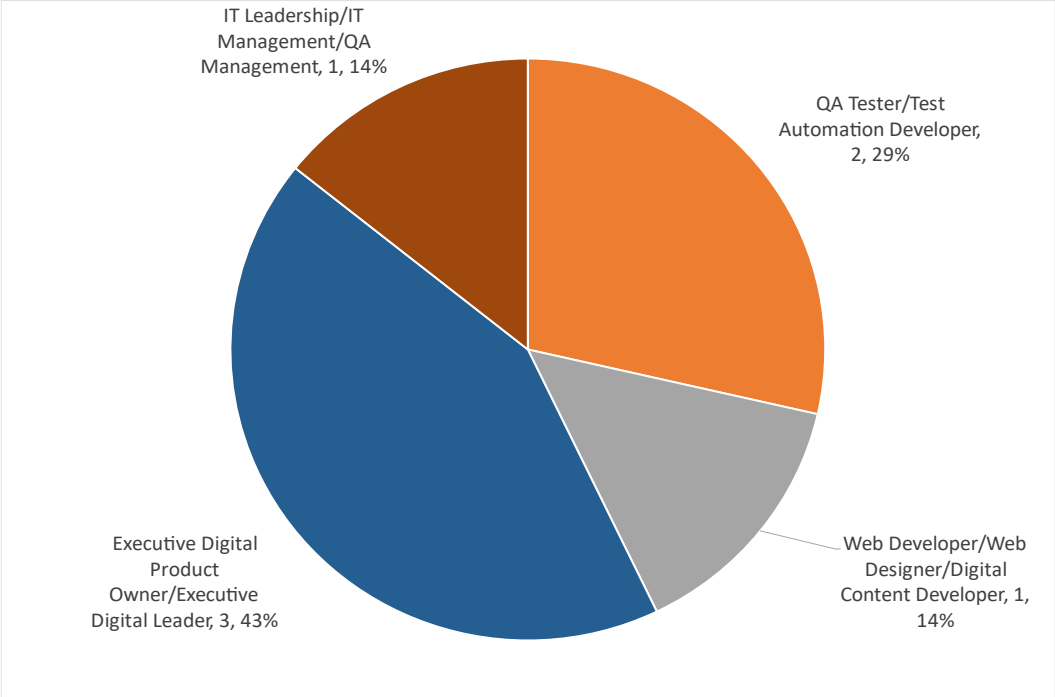
Findings

One-on-One, Key Informant Virtual Interviews. As shown in Figure 4, individual interviews included seven participants representing five job functions, ranging from executive leadership roles to technical, individual contributor roles. Over half (57%) of the individual

interview participants were executives or managers with employees directly reporting to them. Individual contributors with no direct reports made up less than half (43%) of the participants.

Figure 4.

One-on-One Interview Participant Job Functions



Note. The functional roles of one-on-one interview participants.

Most (43%) of the individual interview participants held bachelor's degrees at the time of the study. A smaller share (29%) held associate's degrees and one participant (14%) held a master's degree and another (14%) had some college or held a professional certification at the time of the research study.

Table 2

Themes emerging from 1:1 interviews

Theme	Description	Proportion of Participants Mentioning Theme
1	Effective Communication is a Key Proficiency in Technology Work	100%
2	Learning How to Learn: Curiosity, Resilience, Malleability, and Taking Ownership	85.71%
3	Soft Skills Are Acquired in Professional Contexts	85.71%
4	Soft Skills Are Important Factors in Hiring and Career Advancement	57.14%

Note. Several themes emerged from key informant interviews.

Theme 1: Effective Communication is an Important Proficiency in Technology Work.

Each participant (100%) described communication as an essential non-technical skill, regardless of job function, education background, seniority, or years of experience. One participant, Astrid Eris, functioning as a QA Tester/Test Automation Developer, stated, “All the way through it's the soft skills that got me to be on a tech team. So, it's the asking the why, the communication…” Astrid also mentioned communication’s role in collaboration within technology teams. “Communication has been a big part of it. Our team works as a team, in that sense, for that reason. [Our team] would not be able to function if we all went in, did our own thing, just…gave a brief update, on a daily basis.”

Jamie Jupiter, serving within the Web Developer/Web Designer/Digital Content Developer function, spoke to the importance of effective and discerning use of email communication when asked about non-technical skills used regularly as a technical employee. Jamie explained, “So, I think…a lot of it is just emailing back and forth with people, texting them, kind of communication.” When discussing how communication at work in a technology

team differs from other settings, Jamie said, “there's a difference between like talking to your friend and talking to your boss.” Jamie then explained, “I used to have an Xbox 360 and, like in the game chat on there, you heard the nastiest things ever…” and then described how conversation within video game chats is more forgiving and requires less precision than communication in a professional technology team.

When miscommunications happen at work, Jamie elaborated:

> If it’s like a one-time thing and then you follow up and apologize, saying you didn't mean this and that, I think it gets fixed pretty easily, if that makes sense…because yeah, with…sending the email and, like I was saying, if it's a one-time thing, but it's not to, like, the CEO or something, one time…send a follow-up email right away, I think you should be good. If it's time after time, I kind of believe…that's where people get fired.

Regarding non-technical skills needed in technology, Whitney Venus commented on the importance of effective communication skills:

> The ability to simplify and basically, and I hate to use this term, but it was a term that was used a lot of places, speak to the lowest common denominator, being able to use language that somebody who has never seen anything [technical] in their life can, understand…

Participants functioning as managers and executives further reiterated effective communication. Taylor Neptune explained the negative impact that a lack of effective communication has on information technology (IT) teams:

> I'd set aside the business skills. The business skills are vitally important, but soft skills are that ability to communicate with others, understand what their issues are, get to the bottom of it, maybe even translate that into where you're trying to go…we need to be able

> to talk the business. IT fails on translating what the business really wants to accomplish with technology.

Sam Saturn, an executive technology leader, noted, “You need all of these things, as far as communication and understanding, buy-in, and how to get buy-in across multiple departments and lead by bringing a kind of excitement, all of that to the table.”

Another executive-level technology leader, Harlow Mercury, discussed the elements of effective communication that include adjusting how you communicate with different audiences:

> My soft skills with [one leader] are completely different than my soft skills with [another leader]. I think a lot of it has to do with the established relationship that you have with your audience, know your audience…that immediately tells you that you have to change how you're going to speak to this person or what you're going to speak about.

Skylar Earth summarized effective communication simply, saying:

> Soft skills become really important if you're the tech guy and you're weighing in on new wire frames. You need to approach that conversation [with the designer] with some good soft skills…If you just come in, like, this is terrible, or why don't we do it my way? That's going to go over really poorly with the creative person. It takes the art away from the artist. I think that's really where soft skills are super important. A lot of it's art and you can criticize art. Not everybody has the same taste in art. But, at the end of the day, you have to be able to [communicate in a way that can] influence the outcome.

Theme 2: Learning How to Learn: Curiosity, Resilience, Malleability, and Taking Ownership. Most participants (85.71%) mentioned topics related to resilience, curiosity, adaptability, and flexibility as necessary non-technical skills.

Sam Saturn describes this theme:

> A lot of frustration and anger happens that doesn't need to happen…you can really identify if somebody's able to grow into being more malleable. It's how they handle a situation and the feedback that they receive, because if they can carry anger through your conversation and still be angry about whatever the event was, then they seem less malleable. But, if they can hear the other side and maybe empathy is applied…I…see less frustration.

Sam further elaborated that malleability can be acquired:

> It seems like it can be learned. I've definitely seen it firsthand where it can be taught. It's pretty easy to identify that now. It's just how much time should go into it, that's honestly the biggest driver for me. It's looking at investing my time into people and whether or not they're good, they're malleable, in the sense of soft skills, is one of the first things I look for.

Astrid Eris commented about the decision to pursue a Bachelor of Arts degree and how malleability factored into the decision and has provided benefits in professional life:

> Everyone that I spoke with said, go with a BA and not a BS. The reason being is that you're going to learn more of those life skills and you're going to be more malleable to learn whatever the, that particular company, because you're going to have more of those soft skills that you can use, more so than if you were to go more of the scientific route. I was one of the very few people that ended up with a BA and not a BS. I'm going to college and I did because of that. And it's actually really helped.

Skylar Earth framed adaptability in a few parts of the interview by using an example related to user experience (UX) design. First, Skylar said:

> Well, I should say some people. It's the same reason why I like to hire people that have, they may go deep in a skillset, but they have interest in other things. I like developers that have interest in UX design or opinions on UX design. I like, user experience, people that have opinions on product and vice versa.

Skylar returned to adaptability, adding:

> Again, it's not everybody, but definitely the key team leads, if you will…people…need to be able to wear many hats or put on different hats.

Skylar also described using adaptability to learn through observation:

> …probably the greatest lessons were just observing and dealing with other leaders and saying, I like what this one's doing. I don't like what this one's doing and if I were to do it, I'd like to adopt this approach.

Skylar also touched on the importance of taking ownership for learning and development:

> I'm a big fan of [the idea that] you own your own career. You have to own your own career. You have to own your own development companies. Companies aren't going to develop you. Education is not going to develop you. If you just blindly go in and say, I'm going to go learn the soft skills in college, right, it's like, what's the application? I tend to, I don't really read for entertainment purposes. Anything that I read is typically to learn something business related or technology related…so, something that will help me. Whether it's books or it's articles, I'll go seek out information. I think you need to own that path. I've never been a fan of corporate training. They're always so broad and surface-level and in my opinion, not effective.

Taylor Neptune explained adapting to learn to like the technology field:

> I was sitting here thinking I wanted to be a truck driver when I was in junior high. But, to be honest, the reason I got into this career field was because they were hiring…I was the first one to go to college [in my family] and I was looking for the career field that would land me a job afterwards. I discovered it and…I don't know that I thought work was about enjoyment. I learned to like it after I got into it.

Taylor later took an organization perspective and explained that "Employers need to be cognizant of, maybe, fast-changing needs," also noting:

> I think college is about teaching you how to learn…Where college helped me was it taught me how to learn, how to take that time and figure things out. Maybe the [general education courses] taught me how to ask good questions and how to be bold enough to go ask for help when I needed it.

Harlow Mercury tied together creative problem-solving and adaptability:

> I don't know if it's a soft skill, it's definitely a skill, but it's problem-solving and creative thinking for your problem-solving. It's the ability to think out of the box…ability to adapt.

Jamie Jupiter made comments related to the topic of adaptability and being willing to learn:

> I think you're teachable unless you're not willing to try to actually learn. You know, when [a coworker] was helping me with learning JavaScript in first year, I mean, I could've said no, [that] I didn't want to and that would [have] set me back a lot farther. So, I was willing to expand on my coding and it's helping out.

Jamie also commented later that "At Midwest Tech Company, there'd be times that I made the [web]site, made whatever work."

Theme 3: Soft Skills Are Acquired in Professional Contexts. Nearly all participants (85.71%) spoke to the acquisition of soft skills occurring within professional settings. After describing the value of college in terms of teaching people to "learn how to learn," Taylor Neptune discussed the role of on-the-job experiences:

> I don't know if I would have gone for a tech degree, but I think a tech degree can get the job done. I think we need to be cognizant as a society now and, maybe as a it workforce, that…people's experiences are important. As long as we have the programs early on in our career field to help us learn how to learn. I'm talking out of both sides of my mouth. I think my four-year degree was very valuable to me in terms of getting to me where I am now, but I absolutely think you can do it through a tech degree. I think that industry needs to get better about cultivating and coaching young workers through those first years of their work life. I think the way people get them [soft skills] today is going to be very different than I got them. I got those skills in the work life in two ways. First of all, I graduated from college and I went to a big six consulting firm and they throw you in a hundred different situations, get you work in 60 hours a week. And you're forced to figure things out.

Taylor Neptune discussed mentorship for learning soft skills:

> In my years at [a former employer], they were very growth-minded. They were very much focused on developing soft skills. I'll never forget. My one director at the time…he's a CIO someplace now, he used to say: be curious. That was his mantra. Be curious, question, learn about the business, understand why they do the things they do. All of those things really helped in my development. Another thing they had at [a former employer]…they had reverse mentorship programs. Are you familiar with the reverse

> mentorship? It is a program where high-level executives are assigned a mentor who is a 25 year old millennial to teach them what the younger generation expects and how to work with them and refer to them. The 50-year-old CFO or whatever is now being mentored by a 25-year-old. It helps them and us. If we're assigned someone younger, they'll help us modify our behaviors so that we're more adaptable to the young folk.

Harlow Mercury also stressed the role of professional work settings for learning and developing soft skills, adding mentorship as a component:

> I think they can be developed. I think some of it has to do with maturity and, if you hook up with somebody, if you hook up with the right mentor, they can guide that maturity. [Then] some of these skills can be learned and developed. From the age of six to the age of 14, we lived in an apartment complex and in this apartment complex…it was just a melting pot of cultures. [That] taught me how to…be around different people. I didn't grow up where you didn't experience different cultures [and different types of people]. For me, that is what I was raised in, but I think the other part of it is just, I had a mentor at my second job out of college at [a fabrication company] who really drove customer service. Then…after that job…it was my consulting job. As a consultant, you have to have those soft skills. There's a lot of learning with the soft skills and it's just watching the leaders of the organization and picking up on their skills and watching people that weren't good at it and saying to myself, man, I don't want to be like that person. It's learning, it's learning through watching or learning from somebody that's pushing it on you.

Harlow also explained other environmental factors present within professional settings that facilitate soft skills development:

> First job out of college…[being] surrounded by people that are extremely successful and business owners. I was dealing with business owners. Then, the other thing too is it doesn't always have to be from people above you. I learn stuff from [my direct reports] all the time. So, it's not always top down.

Skylar Earth talked about the symbiotic relationship between formal education and working in a professional environment:

> I think that the most, beneficial, formal education I had was my MBA. The only reason I say that is because I was working at the same time and I could apply what I was learning, real time. I compare my MBA where I went back to school…[while I was] working a full-time job as a manager level employee…to somebody that just graduated undergrad and went straight to get their MBA. You're learning about something, but you don't have any context because you don't have any experience going into that conversation. It's almost like you need to have experienced it, [then] learn about a better way or a different way and then apply it. If you just learn it theoretically, you don't necessarily understand it as much or why it's important. A lot of the leadership lessons learned…from my MBA were more poignant with me because I had experienced the opposites or situations where I [thought] gosh, it would've been great if I would have known this. I would have done this differently.

When asked about learning soft skill competencies, Sam Saturn talked about project-based learning that mimics professional technology environments:

> I definitely think it should be done in school and, I mean, it could be done in school by shipping a [digital] product for the school in a collaborative fashion. It'd be a difficult

> project where everybody has a role. Treat it like a real-world scenario. Look at creating environments where students can fail and have to do it gracefully.

Jamie Jupiter described "learning on the fly" at work to strengthen soft skills related to when best to send an email message versus an instant message.

Whitney Venus talked about technology and engineering courses in high school that presented projects in a way similar to professional contexts:

> When I was done with the first couple of classes and an intro to graphic design [class] in high school, there was a web design class and the project was to build the high school's a website. We did that, all from top to bottom. We programmed it in-house and everything. It was the same thing with the videography class. They actually had a TV show that aired in the school. A lot of that stuff was extremely hands-on and, actively working on like actual projects…they required us to learn how to communicate and how to basically tell each other what we're doing and showing off. It ended up being something I've used in almost every aspect of my technical career, which is the group things. Cause everybody's got their hands on those things and it doesn't make sense unless everybody has their hands in those things. So, no, I would definitely say it had an impact. Somebody would be working on it. We'd all take our tasks for the day. We'd sit down and start working on it. We'd all crowd around each other's computers and show each other what new thing we found. It ended up being more of an experience where were learning from each other learning just by doing instead of a structured, like somebody telling us what to do, thing.

Theme 4: Soft Skills are Important Factors in Hiring and Career Advancement. A majority of participants (57.14%) discussed soft skills as important prerequisites for hiring and promotion opportunities and decisions.

Skylar Earth talked about how having the ability to be a self-directed learner opened doors for technical roles:

> So, I applied to a company that a couple of my buddies were working for that was a startup. And they were developers. I applied for a web developer role. Basically, I just self-taught everything I learned about web development and they knew I knew nothing and they hired me anyways, just based on my aptitude to learn and apply what I was learning.

Skylar also connected soft skills to advancing one's career in a corporate setting, saying "I wouldn't say it's something that every single person needs to really focus on, but if you want to advance in your career…in a corporate structure [it is necessary to]."

Sam Saturn mentioned that soft skills are a core part of hiring decisions:

> If you get to know someone, it's one to two interviews. Typically, you just don't really get to see through somebody that quickly. At least I don't have that ability. So, it's looking for signals, somebody that's going to bring these soft skills to the table that aren't on the resume. That can matter more than the resume in a lot of positions. It's really important for people to acknowledge how important soft skills are…

Whitney Venus compares the value of soft skills versus hard skills for garnering promotions and opportunities:

> People with people skills always get, are going to get the promotion before somebody with [technical] skill. That's why networking sites like LinkedIn and everything are so popular as it's about who you know and how you know them and how you interact with the people [that] they know, more so than it is what you're capable of. And, people who don't talk make others uncomfortable.

Taylor Neptune described how having technical skills complemented by soft skills helped upward trajectory into leadership roles and are valuable for information technology (IT) professionals:

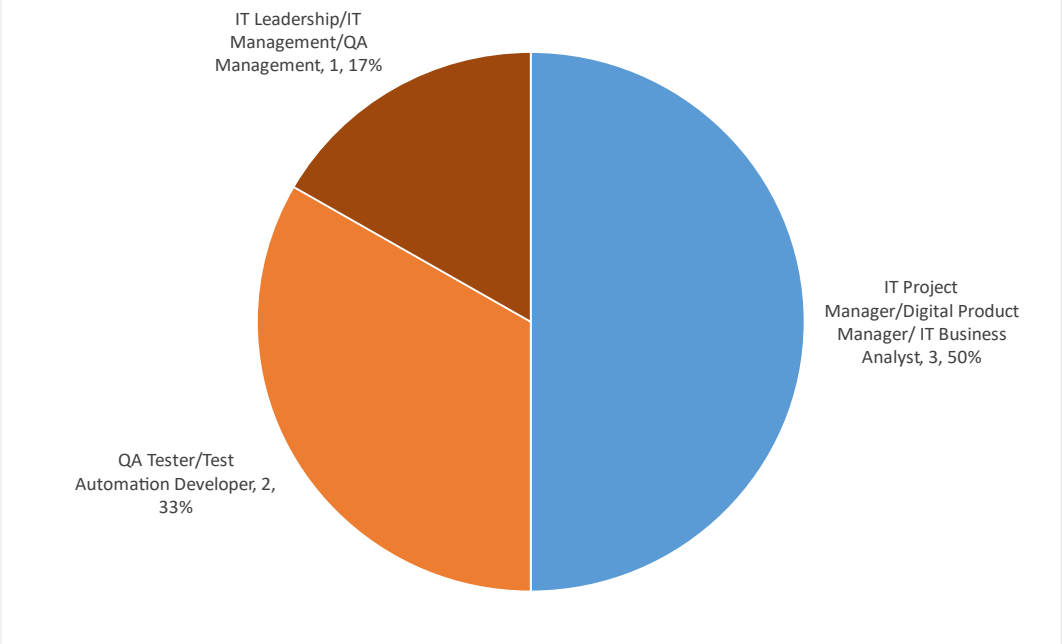
> I went into [business analysis and project management] routes before I got into leadership. That really helped me make the connection between the technology and the business. Going up through that and having those technology skills, but then being taught the softer skills and [business analysis and project management] work before ultimately getting into leadership positions, I think really helped me develop. By the way, full disclosure: I have a bias towards liberal arts or maybe against liberal arts, because I think the liberal arts programs and colleges do themselves a disservice by encouraging more people to get into psychology degrees when we've got far too many psychology majors working at McDonald's right now. At the same time, I think every IT worker should have to take a psychology class because I think it helps them develop their soft skills.

Summary of One-on-One Key Informant Interviews. The four emerging themes outlined are densely packed and contain multiple subthemes. Each participant mentioned effective communication. Some, such as Taylor Neptune and Harlow Mercury connected effective communication with cultural competency and functioning effectively within teams. Similarly, Jamie Jupiter, Astrid Eris, Taylor Neptune, Harlow Mercury, and Skylar Earth described the emerging theme of malleability in relation to a willingness to learn and integrate feedback to change approaches to solving problems and operating within a technology team and organization. Finally, a majority of participants shared the sentiment that professional experiences provided experiential learning opportunities for soft skills reinforcement and acquisition and that soft skills factor into hiring and career advancement.

Focus Group Participant Construct Interview. Figure 5 shows the job function breakdown for the focus group. Unlike the one-on-one key informant interviews, the focus group consisted primarily of individual contributors and did not have any executive leaders as participants. Anonymous votes were cast for each top-level soft skill group created during the interview. A total of 10 votes were allocated to each of the six participants. Participants were not restricted in how they could distribute their votes.

Figure 5.

Focus Group Interview Participant Job Functions



Note. The functional roles of focus group interview participants.

Table 3

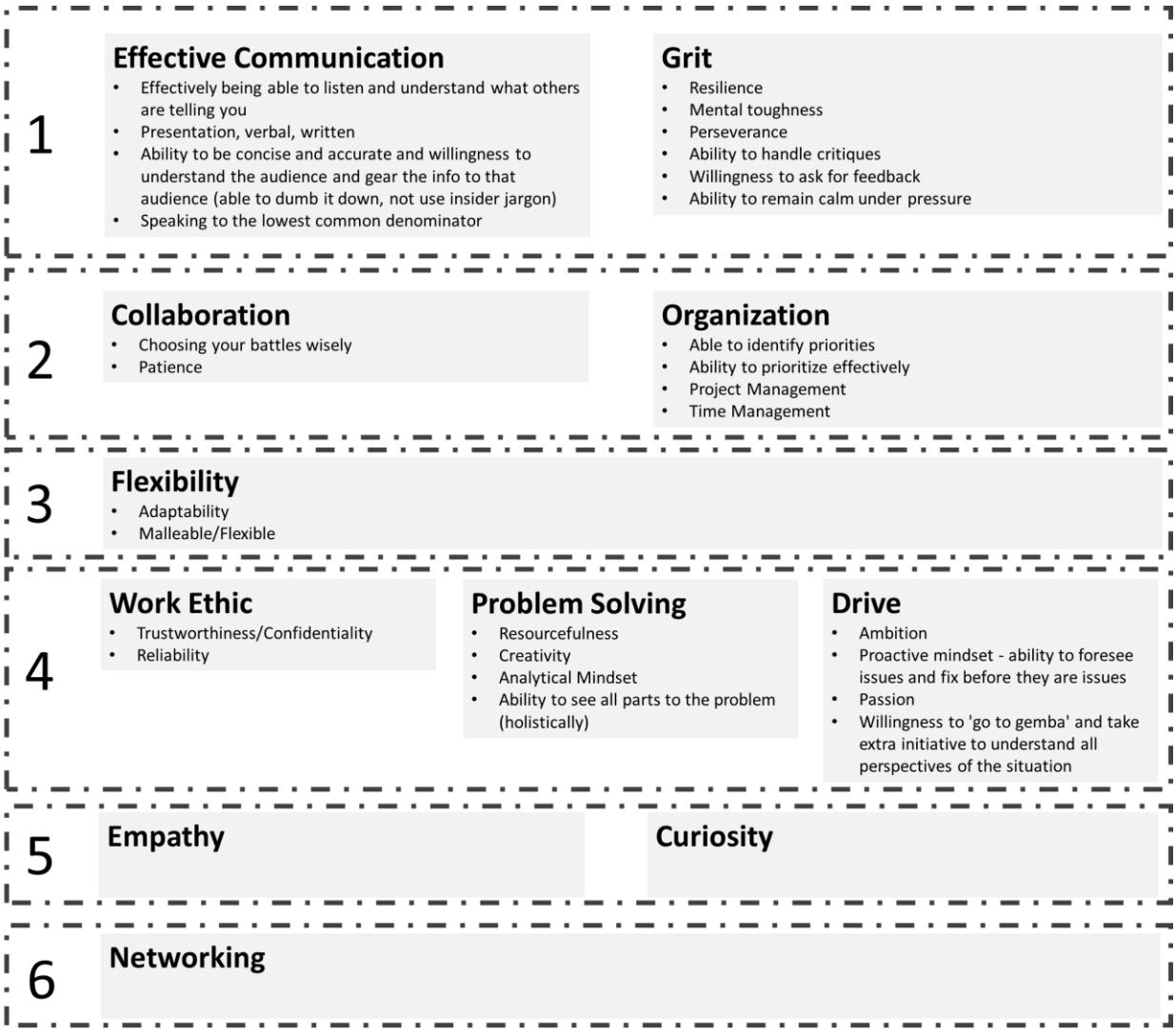
Ranked top-level soft skills emerging from focus group interview

Rank	Top-Level Soft Skill	Vote Count	Percent of Votes
1 (tie)	Effective Communication	9	15%
1 (tie)	Grit	9	15%
2 (tie)	Collaboration	8	14%
2 (tie)	Organization	8	14%
3	Flexibility	6	10%
4 (tie)	Work Ethic	5	8%
4 (tie)	Problem-solving	5	8%
4 (tie)	Drive	5	8%
5 (tie)	Empathy	2	3%
5 (tie)	Curiosity	2	3%
6	Networking	1	2%

The participants defined and provided guidance for grouping soft skill themes into top-level skills. The researcher facilitated the focus group, giving instructions and combining cards based on the group's direction. As the focus group progressed, conversation and activities centered on the most beneficial non-technical skills for technology professionals. Consequently, discourse about the acquisition of each soft skill was not addressed substantively in the focus group nor the resulting taxonomy. The outcome of the participant construct focus group interview was a chart of ranked soft skills, based on vote counts and grouped by top-level theme, shown in Figure 6.

Figure 6.

21st Century Soft Skills Hierarchy



Note. The ranking and grouping of non-technical skills resulted in a hierarchy of soft skills.

The hierarchy of non-technical competencies necessary for career professionals shows skill groups with related themes nested under each top-level skill. There are six tiers of soft skills that emerged from the participant construct focus group.

Tier 1: Effective Communication and Grit. Based on the focus group, effective communication includes listening, adjusting concepts to match audience understanding, and being able to both write and present. Half of the focus group attendees (50%) mentioned communication in discussions during the participant construction of the hierarchy. The group agreed that "grit" is ideal for describing non-technical skills involving resilience, mental toughness, perseverance, seeking out and using criticism, and remaining calm under pressure. All of the focus group participants (100%) mentioned grit, resilience, and persistence.

Whitney Venus said of grit:

> I would agree with grit mainly because if you can't take criticism, you're never going to improve as a person. You need to be able to sit down and have somebody tell you're wrong and be like, what? Maybe I am. Let's find a way to make this better. If you can't take that, you're never going to improve. That's just a dead stop for you, period.

Jess Mars added, "If you're working in anything…tech-related [or] tech-adjacent…you're going to be wrong…stuff is going to change and…you're just gonna be wrong." Ash Ceres built on the exchange by noting, "Yeah. Accounting doesn't change the way [that] tech changes." Astrid Eris followed with, "Right? Well, even with grit, you need to be able to, if you find an issue, you need to be able to solve that issue too. You need to have the grit to get through it. Even though it might have you go down rabbit holes, you have to persevere and get through it to fix it. So makes perfect sense."

After the votes were revealed and the tie between effective communication and grit was made apparent, there was some discussion about the relationship between the two soft skills for technology career professionals. Astrid Eris said, "Honestly, I think if you can have grit, but if you don't have communication, it's gonna fall apart." Jordan Makemake replied, "Yeah. You

can't apply grit unless you communicate effectively the application of the actions involved." Ash Ceres summarized in the form of a question, asking "So, are they almost symbiotic then? Is it [that] you need grit and then you need communication, which is the grit distribution system?" The group agreed with the results of the votes for the top tier of non-technical skills needed to thrive in 21st century technology teams.

Tier 2: Collaboration and Organization. Half of the participants (50%) mentioned the ability to organize, while another half (50%) discussed time management as a relevant soft skill. Components of collaboration include choosing when to debate and to exercise patience. Organization includes triaging and prioritizing, and the ability to manage time and projects. Jordan Makemake discussed the facets of collaboration, "At a top-level you're talking about some things like getting together cross-functional groups and facilitating, communicating, and organizing them while also…choosing your battles as conflict resolution, but you're collaborating with a team to get to that resolution." Jordan also spoke about the ability to organize, saying, "I think organization is commonly a top-level soft skill." Astrid Eris suggested that time management was a component of organization, "Might better under organization, because it can apply to time, but then it can also apply to projects."

Tier 3: Flexibility. According to card sort, flexibility is composed of adaptability and malleability. Less than half of the focus group attendees (33.33%) discussed flexibility explicitly. Discussion about flexibility in the focus group often tied back to grit. Jordan Makemake said, "We're getting hit with…too many requirements and…now our roadmap has changed. Our goal has changed. We need to stop and have that grit to like, not only stop the group, lead them forward in what the new path is."

Tier 4: Drive, Work Ethic, and Problem-solving. Problem-solving was mentioned by about one-third of the participants (33.33%). Drive and work ethic were mentioned outright by only 16.67% of the focus group attendees. The work ethic top-level soft skill was organized to include trustworthiness, confidentiality, and reliability. During the discussion, Astrid Eris suggested in the form of a question, "Would trustworthiness and reliability be more encompassed under like worth work ethic?" Problem-solving, as grouped by participants, includes resourcefulness, creativity, being analytical, and the ability to break issues down into multiple constituent parts. Focus group participants, grouped ambition, having a proactive mindset, passion, and willingness to take additional initiative to look from multiple perspectives when looking at a situation.

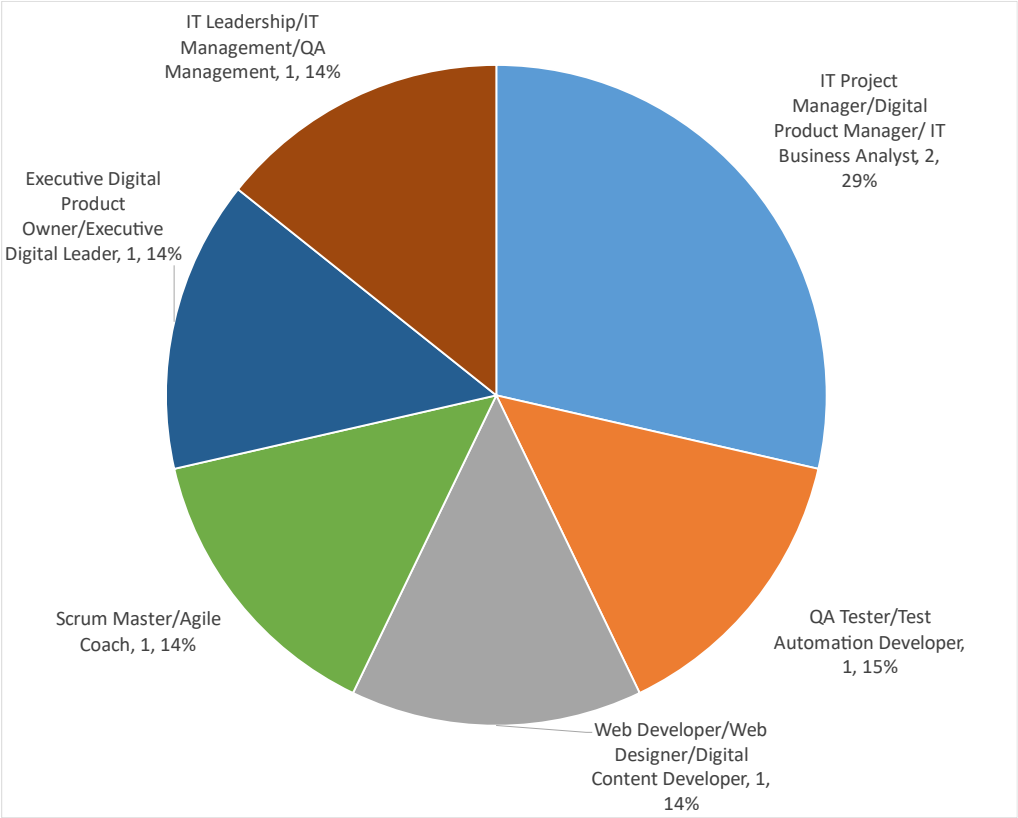
Tier 5: Empathy and Curiosity. There was only mention of empathy and curiosity by one attendee (16.67%). Whitney Venus said, "Empathy and curiosity [should be] alone [and not grouped with under other top-level skills]." The group agreed. Each of these top-level skills received two votes, placing them as siblings in the fifth tier.

Tier 6: Networking. Similar to empathy and curiosity, there was only one mention of networking by one attendee (16.67%). Whitney Venus said, "How about networking? It could be under collaboration or it could be on its own because networking kind of is its own thing, but you gotta be able to collaborate. It's a hand in hand kind of thing." Jess Mars said, "…networking, I could see how that could be different [than collaboration]." The group decided to keep networking as a standalone card with no supporting subthemes. The card only received one vote, putting it in the lowest tier of the hierarchy.

Job Description Document Review. Figure 7 displays the job function proportion for the job descriptions collected for document review.

Figure 7.

Job Description Documents Job Functions



Note. The functional roles of job descriptions collected for document review.

Table 4

Themes emerging from job description document review

Theme	Description	Proportion of Documents Mentioning Theme
1	Collaborate, Motivate, and Manage Relationships	100%
2	Creative Problem-solving and Analytical Mindset	64%
3	Cultural Competency, Can Work with Global Teams	55%
4	Effective Communication	100%

Theme 1: Collaborate, Motivate, and Manage Relationships. Each job description (100%) mentioned job requirements or duties related to collaboration, teamwork, and motivating colleagues. The job description for an Agile Scrum Master role stated, "Collaborate with developers and functional users to analyze scope and trade-offs."

Job Description: Chief Technology Officer

- Collaborating with IT and business partners to deliver and maintain excellent technology solutions with excellence in user experience
- Transforming team to a DevOps model / culture
- Ability to establish effective working relationships with executives and key business partners to drive a change agenda
- Outstanding collaboration abilities

Job Description: IT Director

- This role acts as a business influencer
- Be viewed as a thought leader in marketing technology by your peers
- Strong collaboration with your IT peers in a matrixed environment to drive global synergies
- Highly adept at building mutually beneficial relationships that result in value, benefit, and growth
- Team player attitude is mandatory

Job Description: IT Manager

- Engage with project leads and other stakeholders to ensure alignment of team prioritization with strategic objectives of the organization
- Manage vendors, maintenance contracts and renewals
- Advocate the use of DevOps tooling such as Github/Jenkins in place of manual processes for server deployments

Job Description: IT Project Manager

- Human relations skills to establish rapport, and to motivate coworkers and customers.
- Ability to work with diverse teams, manage conflict, develop team accountability, effectively deal with change, facilitate meetings, listen to stakeholders, and project members, build consensus, negotiate and persuade.

Job Description: QA Performance Tester

- Partner with developers and business owners to triage and create defects. Work as part of an agile product team, to deliver quality automation aligned with each sprint to support DevOps
- Experience coaching and mentoring others on test automation tools and coding best practices
- Collaborate with an automation team focusing on maximizing the ROI on automation

Job Description: Release Engineer

- Partner with technology team members to ensure the release of applications and features

- Work with development and QA team to understand impacts of branches and code merges
- Work cross-functionally with colleagues across departments

Job Description: Technology Business Analyst

- Business Analysts have strong problem-solving skills and interact regularly with various professionals to generate value for the business.
- Lead the effort to engage with business and technology partners to clarify application functions, processes and data flow to align business and technology capabilities or constraints
- Integrate the solution into the business workstreams, which may include the provision of enablement materials and training agenda to facilitate adoption and integration of the product and processes into the business cycle
- Ability to engage and collaborate in diverse settings of people, perspectives and experiences

Job Description: VP of Product

- You will lead and motivate a team of product managers and product designers to convert that strategy into product execution.
- Collaborative approach and focus on finding the best ideas, wherever they may be
- A strong history of collaboration and alignment with cross-functional teams, including Engineering, Sales, Marketing, Operations, Finance, and People Operations

Job Description: Web Content Developer

- The Web Content Developer collaborates with creative, internal corporate marcomm and Corporate Communications teams to create original, engaging, high quality content in support of the corporate global brand for external audiences on the company web site
- Partners to build and executes against roadmap of updates for designated corporate content on [the company's website] in collaboration with stakeholders and Digital team
- Interfaces effectively with web vendors as needed for efficient and optimized output
- Example of Team Membership - Editorial and content planning teams; Brand event or other cross functional teams for corporate initiatives
- Collaborates with other writers, content creators and content owners, both internally and externally to deliver unified and effective results

Job Description: Web Developer

- Has a customer service mindset working with both stakeholders and peers
- Values differences and collaboration
- Collaborate with other technical areas (Database Administration, System Administration, Change Control, etc.) to ensure application performance and availability expectations are met

Theme 2: Creative Problem-solving and Analytical Mindset. A majority of the job descriptions (64%) listed skills related to creative problem-solving and thinking critically with an analytical mindset.

Job Description: Chief Technology Officer

- Strong influencing, problem-solving and negotiation skills

Job Description: IT Director

- Self-motivated problem solver
- Able to perform trade off analysis on various technical approaches Ability to rapidly understand business models

Job Description: QA Performance Tester

- Looking for an experienced Performance Engineer with excellent analytical and problem-solving skills, thought leadership, and demonstrated ability to find creative solutions to complex problems

Job Description: Release Engineer

- Solve problems with curiosity and creativity; embrace challenges and change
- Excellent technical and creative problem-solving abilities

Job Description: Technology Business Analyst

- Solve complex business problems
- Business Analysts will apply analytical knowledge areas and in-depth analysis of the business to uncover its true problems, understand its objectives, define the relevant

requirements, business rules and identify design elements to support the application functions

- Business Analysts have strong problem-solving skills and interact regularly with various professionals to generate value for the business
- Strong analytical capabilities to decompose sophisticated business models, specify critical functions and identify inter-dependencies for design considerations
- Ability to listen and to think independently, and be a curious and creative person
- A self-starter, independent-thinker, curious and creative person with ambition and passion

Job Description: VP of Product

- You take a data-driven approach to provide product recommendations
- Combination of ambition and creativity to solve hard problems

Job Description: Web Content Developer

- Delivers relevant and effective content based on analytics and best practices, ensuring alignment with corporate strategy, messaging, tone and voice
- Understands and adjusts for content performance based on analytics

Job Description: Web Developer

- Views code as a craft, used to solve difficult problems
- Enjoys addressing a wide range of projects using a variety of technologies

Theme 3: Cultural Competency, Can Work with Global Teams. More than half of the job descriptions (55%) included cultural competency skills.

Job Description: Chief Technology Officer

- Experience leading global technology teams

Job Description: IT Director

- Develop a diverse and inclusive talent pipeline to meet the growing demands of marketing operations

Job Description: IT Manager

- Comfort with cross-functional teamwork, including global partners

Job Description: Technology Business Analyst

- Ability to engage and collaborate in diverse settings of people, perspectives, and experiences

Theme 4: Effective Communication. Each participant mentioned communication as an important non-technical skill, regardless of job function.

Job Description: Agile Scrum Master

- Proactively communicate and collaborate with internal and external customers
- Make sure everyone on the team understands the project's goals and scope
- Facilitate the preparation and dissemination of project communications

Job Description: Chief Technology Officer

- High level of emotional intelligence

Job Description: IT Director

- Develop a diverse and inclusive talent pipeline to meet the growing demands of marketing operations
- Exemplary people and communications skills coupled with the savvy and maturity needed to garner the respect of senior management and clients
- Develop and deliver concise and meaningful presentations for internal and external audiences

Job Description: IT Manager

- Excellent interpersonal communications skills
- Support team members' individual development plans to build new skillsets required to thrive in a DevOps, Infrastructure as Code framework

Job Description: IT Project Manager

- Excellent communication skills, a good listener, with the ability to communicate clearly in writing and orally, present complex information to diverse audiences in a comprehensive style and translate technical and system information for non-technical stakeholders
- Ability to work with diverse teams, manage conflict, develop team accountability, effectively deal with change, facilitate meetings, listen to stakeholders, and project members, build consensus, negotiate and persuade

Job Description: QA Performance Tester

- Can clearly summarize test findings and provide recommendations for remediation, including code-level recommendations and solutions within a delivery team
- Focused on being an engaged listener and can effectively select the 'right' words for messages being delivered through clear & concise communication
- Building the ability to think like a client, consider firm strategic priorities, business decisions and organizational processes
- Demonstrated skills in written, verbal, and presentation communications

Job Description: Release Engineer

- Management of all agreed release activities and the release calendar, keeping project managers informed regarding the release cadence
- Provide regular release-focused status updates to Customer Technology stakeholders

Job Description: Technology Business Analyst

- Excellent communication skills and confident to identify, negotiate and mitigate difficult circumstances (ex. demanding stakeholders, changing requirements scope)

Job Description: VP of Product

- Understand our customers and the market to create a product strategy that enables benefits administration to be as simple as clicking a button
- Develop, align, and communicate the product roadmap each quarter
- Strong verbal and written communication skills

Job Description: Web Content Developer

- Interfaces effectively with web vendors as needed for efficient and optimized output.

Job Description: Web Developer

- Has a customer service mindset working with both stakeholders and peers

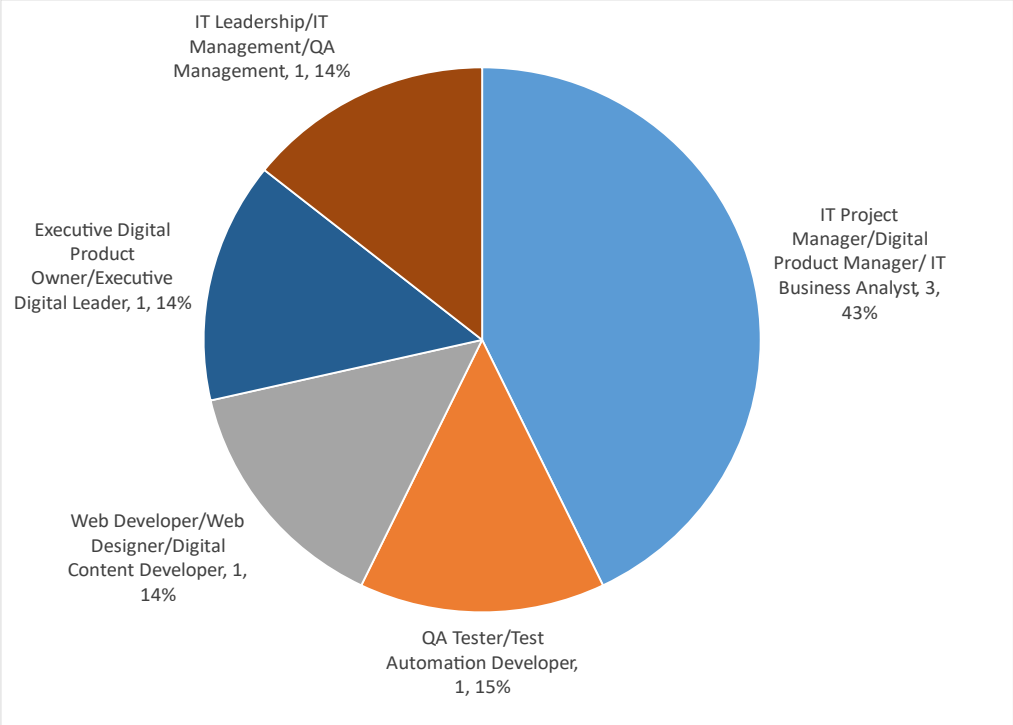
Job Description: Technology Business Analyst

- Ability to listen and to think independently, and be a curious and creative person

Professional Profile Document Review. The professional profiles collected for document analysis covered a range of job functions similar to those of the participants and job description documents, as demonstrated in Figure 8.

Figure 8.

Professional Profile Documents Job Functions

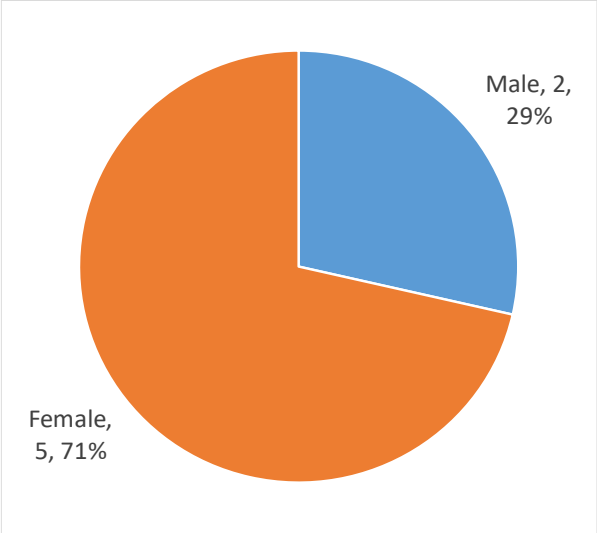


Note. The functional roles of professional profiles collected for document review.

Figure 9 reveals the gender breakdown of the professional profiles collected for document analysis.

Figure 9.

Gender of Professional Profiles Collected for Document Analysis



Note. The gender breakdown of professional profiles collected for document review.

Patterns emerged during document analysis and a number of frequently mentioned themes were identified.

Table 5

Themes emerging from job profile document review

Theme	Description	Proportion of Documents Mentioning Theme
1	Collaborate, Motivate, and Manage Relationships	71%
2	Creative Problem-solving and Analytical Mindset	71%
3	Effective Communication	86%
4	Prioritization and Time Management	43%

Theme 1: Collaborate, Motivate, and Manage Relationships. Most professional profiles (71%) touted professional abilities and past successes related to collaboration and managing relationships.

Professional Profile: Digital Project Manager

- Collaboration & partnership; managing stakeholders across a highly matrixed organization
- Collaborated with consumer insights and trend teams throughout [the organization] to share insights and build a common language to foster a unified understanding of the [retail location's] guest in order to drive consumer-focused business decisions across the organization

Professional Profile: IT Business Analyst

- Highly regarded for the ability to build strong, collaborative relationships between IT and business stakeholders
- My primary focus was working collaboratively with other cross-functional teams to design solutions that met the needs of multiple business lines

Theme 2: Creative Problem-solving and Analytical Mindset. A majority of professional profiles (71%) mention skills involving problem-solving and analytical thinking.

Professional Profile: Chief Digital officer

- Creative problem solver

Professional Profile: Digital Project Manager

- Synthesizing large amounts of data to drive strategic decision-making, influence product roadmaps and uncover opportunities for growth

Professional Profile: Digital Project Manager

- Analyzed and synthesized a vast amount of data, research and observations to translate consumer insights and marketplace trends into opportunities for [the organization]

Professional Profile: IT Business Analyst

- Innovative and dynamic IT Professional with hands-on experience delivering critical analysis and leadership to advance technology initiatives
- Critical thinker with a reputation for the design and implementation of creative solutions focused on intuitive user experience and communication

Professional Profile: QA Analyst

- Strong background problem-solving, customer service, planning and implementation in a production oriented [*sic*] environment
- Apply proven analytical and problem-solving skills to help validate IT processes through software testing

Professional Profile: Web Developer

- Excellent problem-solver and driven to surpass goals with a life-long dedication to learning

Theme 3: Effective Communication. Almost every professional (86%) listed effective communication as a skill in their professional profile.

Professional Profile: Chief Digital Officer

- Communication skills to help partners and clients in the areas of technology evaluation, architecture design, benefit case delivery, motivating high-performing teams, and driving to achieve results

Professional Profile: Digital Project Manager

- Effective communication

Professional Profile: QA Analyst

- Document and communicate API test strategy to QA and development teams
- Identify defects, issues and risks for communication to the project team and management
- Communicate and interact with appropriate areas on problems, changes and enhancements that may impact data, workflow and /or functionality

Professional Profile: Senior IT Director

- Articulate communicator and liaison with proven capacity for fostering productive IT and business community partnerships, and inspiring group consensus, productivity, and accomplishment

Professional Profile: Web Developer

- Experience in the service and accounting industry utilizing strong communication, analytical, and collaboration skills

- Continually coordinate with interdepartmental staff to ensure critical supply demands are met, effective communication key in making sure departments needs are fulfilled so as to provide quick and efficient customer service

Theme 4: Prioritization and Time Management. Almost half of the professional profiles (43%) analyzed included mentions of time management skills.

Professional Profile: Digital Project Manager

- Strong focus on user-centered design, roadmap development and prioritization

Professional Profile: QA Analyst

- Possess strong ability to coordinate multiple tasks to meet deadlines and to maximize available resources

Professional Profile: Senior IT Director

- Recognized for delivering on-schedule, on-budget project results

Summary

Chapter IV provided a recap of the problem statement, the purpose of the study, and research questions. The chapter also gave a refresher of the research design, data collection, and analysis approaches. The data was presented within this chapter along with participant information and details about the sampling strategy. Chapter V will examine the data in more detail and provide discussion, conclusions, and recommendations for opportunities for further study.

Discussions, Conclusions, and Recommendations

This research study explored perceptions of 21st century soft skill gaps among career technology professionals within digital teams working in a remote environment. Using a qualitative approach, structured as a phenomenological study, the researcher sought insight into how career technology professionals view non-technical proficiencies and soft skills disparities. Chapter I introduced the research problem within the contexts of technology education, technological literacy, and 21st century soft skills. The background of the problem was framed within remote digital product team settings. Chapter I continued by stating the significance and purpose of the study and presenting research questions related to the problem. Chapter II reviewed literature focused on the soft skills gap, the history of vocational instruction, and technology education. Chapter III outlined the methodology used in this qualitative phenomenological study, explaining data collection and analysis techniques. Chapter IV reviewed the problem statement, the purpose of the study, research questions, research design, data collection, data analysis approaches, and presented research findings. Chapter V presents a discussion of the findings through distinct theoretical lenses with specific conclusions related to each research question and proposes recommendations for opportunities for further study.

Discussion Overview

The research design for this qualitative study was structured as a phenomenological investigation (Creswell & Creswell, 2018; Merriam & Tisdell, 2016). Participants were purposefully selected using specific criteria (Gall et al., 2017). Key informants possessed over four years of experience working as career technology professionals. Interviewees also had a range of educational backgrounds and degree levels, spanning from trade certifications to graduate degrees. Further, the professional technology roles of the participants varied. Individual

interviews were semi-structured. Discussion topics related to the research questions were asked in an open-ended way that did not assume nor overtly define an expected reply. For example, inquiries related to soft skills within technology were approached as non-technical skills in conversation, despite the semi-structured interview outline (see Appendix A) expressly referring to soft skills. Focus group prompts and instructions for the participant construct activity were approached similarly. The subject of non-technical skills was presented early in the conversation. When participants mentioned soft skills specifically, the researcher followed suit. The researcher facilitated the focus group and prompted the group, when needed, to maintain engagement and secure the completion of the taxonomy. When group discussion stalled or there was disagreement, the researcher asked probing questions to stimulate conversation. The researcher did not endorse any specific taxonomy designs, leaving the content and structure of the taxonomy to the group.

Individual interviews provided robust, detailed descriptions of experiences related to soft skills integration. The focus group resulted in a taxonomy comprised of tiers of soft skills grouped by top-level concepts. Like the key informant interviews, document analysis of job descriptions and professional profiles provided insight into soft skill integration within technology careers from the perspectives of hiring authorities and professionals. One of the research design goals was to gather soft skills integration perceptions in the words of technology career professionals. A secondary goal was to collect soft skills perspectives from professionals that operate as individual contributors and those that manage and hire people. The range of participants and documents combined with the three primary data collection methods enabled triangulation across data sources and collection approaches as common themes emerged (Wolcott, 2008; Merriam & Tisdell, 2016).

The prevailing themes that spanned data sources and collection methods consisted of (a) effective communication is a key proficiency in technology work; (b) a willingness to learn is a crucial disposition for technology career professionals; and (c) soft skills are important factors in hiring and career advancement. Each theme contains multiple components that will be discussed in greater detail as the theoretical implications are explored using the theories that guided this research. All individual interview participants (100%) mentioned effective communication. Effective communication surfaced in 100% of the job description documents and 86% of the professional profile documents collected for the study. Effective communication received nine votes and tied with grit as having the highest vote count in the focus group participant construct activity. Perceptions analogous to a willingness to learn were captured across data sources and collection methods, with 85.71% of one-on-one interview participants discussing the theme. Concepts described included adaptability, resilience, creative problem-solving, reflecting on feedback, taking ownership, and curiosity. Most professional profile documents collected (71%) and a majority of job description documents collected mentioned keywords related to this theme (64%). Concepts related to the theme of willingness to learn as a crucial disposition for technology career professionals resided in three distinct categories following the focus group workshop activity. The willingness to learn theme consisted of top-level skills akin to an analytical mindset, persistence, and adaptability, garnering 33% of the votes cast. Grit (persistence) represented 15% of the votes, splitting the theme and placing it as a tier one soft skill. Flexibility (adaptability) received 10% of the votes cast, establishing it as a tier three soft skill. Problem-solving (analytical mindset) landed as a tier four soft skill, receiving 8% of the votes. The results represent soft skills integration as described by digital product team members operating within a remote working environment in a Midwestern technology company.

Interpretation of the findings through the theoretical framework outlined for the study uncovered new insight.

Implications

Theoretical Implications

Pedagogical Constructivism. Pedagogical constructivism maintains that knowledge is acquired actively within formal and informal settings through experiential learning (Ekpenyong & Edokpolor, 2016; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978). New situations create learning events and opportunities to perceive, process, reflect, and adjust current understanding using newly collected information (Ekpenyong & Edokpolor, 2016; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978). Learning is dynamic and continuous (Ekpenyong & Edokpolor, 2016; Mărunțelu, 2020; Piaget, 1957; Vygotsky, 1978). Data collected from participant perceptions, the taxonomy constructed by the focus group, and job description documents frequently mentioned the importance of learning how to learn and having a willingness to reflect and adapt understanding based on new information. Participants described real-world school project work and experiences within professional settings as modalities that provided the richest learning opportunities.

Transformative Learning. Transformative learning expands on pedagogical constructivism, adding social elements to the learning process (Harel & Papert, 1991; Hyde, 2021; Mezirow, 1990; Piaget, 1957; Vygotsky, 1978). Experiences that include deliberation augment the construction of knowledge, inviting perspectives from colleagues into the process of contemplating and modifying comprehension (Hyde, 2021; Mezirow, 1990). Three of the key informant interview participants described mentorships that played crucial roles in facilitating

the acquisition of soft skills. Similarly, job description documents for executive roles listed components related to coaching and mentoring team members.

Social and Cultural Capital. Social and cultural capital is accrued over time, building on a foundation established by socioeconomic and environmental factors and membership within a dominant or non-dominant social group (Bourdieu, 1973; Bourdieu, 2021). Social and cultural capital are gained in formal and informal settings (Bourdieu, 1973; Bourdieu, 2021). Social and cultural capital predispose certain individuals to the acquisition of soft skills (Hora et al., 2018). Participants described post-college internship and mentorship experiences as valuable opportunities to gain soft skill competencies. Such experiences demonstrate the inheritance of social capital in professional settings, facilitated by the traditional higher education to specialized career pipeline (Hora et al., 2018). Data collected from participants and documents reinforce the "soft skills paradigm" as the prevailing model while establishing minimal evidence of the ascendance of the "cultural capital paradigm" within the study site and sample (Hora et al., 2018, p. 33). Soft skills were not described in a culturally relevant context and were generalized as necessary for being hired and advancing within a professional technology career (Hora et al., 2018). Participants and job description documents described cultural competency as a soft skill necessary in a global technology work environment where teams are distributed across the globe.

Research Conclusions

Data analysis resulted in the development of conclusions related to each of the research questions established for the study.

Conclusion: Effective Communication, Grit, and Willingness to Learn are Crucial in Technology Work

Individual interviews, focus group discussions, and documents mentioned communication at the highest frequency, placing emphasis on communication as a prerequisite for functioning successfully in collaborative technology teams. Looking at the frequency of topics mentioned without considering distinct data sources, effective communication as a key proficiency in technology work was described 80 times. Phrases including collaboration, motivating others, and managing relationships were mentioned 66 times. Fourteen of the quotations included both themes (effective communication and collaboration), showing the overlap between communication and collaboration. A technology education model curriculum developed for high school students provides group work involving creating and exhibiting presentations, substantiating the significance of effective communication and collaboration skills for aspiring technology professionals (ITEEA, 2012). Group presentation activities reach beyond preparing students for careers and reinforce transformative learning as students engage in discussions about their experiences to formulate final presentations and adjust their worldviews as a result (ITEEA, 2012; Mezirow, 1990).

Aside from effective communication, themes related to persistence and a "growth mindset" emerged from the data collected in the study (Dweck, 2009, p. 4). Individual interviews, focus group results, job descriptions, and professional profile documents heavily favored grit or resilience and a willingness to learn and seek knowledge as critical soft skills within digital product teams, especially within the early stages of professional development. Such findings corroborate Morris' (2019) contention that motivation for self-directed learning is essential for thriving in contexts that require malleability, such as technology career professions.

One IT Project Manager job description document captured the idea, along with communication and collaboration, in a single bullet point: “Ability to work with diverse teams, manage conflict, develop team accountability, effectively deal with change, facilitate meetings, listen to stakeholders and project members, build consensus, negotiate and persuade.” During the focus group, Whitney Venus concurred with the primacy of grit and coupled it with a willingness to accept feedback to learn, beginning an exchange that later incorporated the importance of grit and flexibility within a technology landscape that shifts frequently.

Conclusion: Mentorship and Experiences within Professional Settings Cultivate Soft Skills

Within individual interviews, four of the seven participants explained that a mentor or mentors made a lasting impact on professional soft skills integration. Six of the seven individual interview participants talked about soft skill acquisition occurring while observing others and participating in project work in an internship or while functioning in a professional role. Only one participant mentioned explicit workplace training programs as a source of soft skills integration. Four participants of individual interviews described school settings as a place to gain general, transferable skills, positioning those skills as being theoretical initially, until they are applied in a professional setting. Ibrahim et al. (2017) propose the idea of opening up a share of an employee’s schedule for exploratory activities that build non-technical competencies, further elaborating “that the time-spaced learning method enables employees to acquire soft skills more effectively” (p. 2). Soft skills are bestowed via social capital or picked up at many points throughout social and professional development (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018). Based on input from individual interview participants in this study, soft skills taught explicitly in a classroom setting fully matured when applied in real-world professional scenarios.

Conclusion: Soft Skill Competencies are Substantial Factors for Being Hired and Career Advancement within Technology Teams

Individual interview participants built on the idea shared by prior studies, that "many authors prioritize non-technical skills over technical skills, this importance of non-technical skills increases with increased complexity of projects" (Agrawal & Thite, 2006; Hazzan & Har-Shai, 2013 as cited by Singh Dubey & Tiwari, 2020, p. 376). Skylar Earth indicated, "If you don't have the soft skills, you're not going to get very far." Whitney Venus echoed a similar sentiment, declaring, "People with people skills are more likely to get the best internal opportunities." Regarding getting hired, Sam Saturn mentioned, "So, it's looking for signals, somebody that's going to bring these soft skills to the table that aren't on the resume. That can matter more than the resume in a lot of positions." Sam's sentiment contradicts the notion presented by Ibrahim et al. (2017) that technical skills are primary drivers that place candidates in roles. For most technology workers, maintaining employment, advancing professionally, and growing career prospects rely heavily on securing 21st century soft skills (Lewis, 2020; Singh Dubey & Tiwari, 2020). This research study found that most of the participants, career technology professionals that function in a remote, virtual environment, perceive soft skills as preconditions for obtaining leadership roles within digital product teams.

Practical Implications and Recommendations for Future Research

Snape (2017) declared the necessity of reimagining programs of study, moving beyond the procurement of knowledge and skills to include the cultivation of social and cultural capital (Bourdieu, 1973; Bourdieu, 2021; Hora et al., 2018). Social and cultural capital denote qualities accumulated and possessed over time through a combination of inheritance and opportunity (Bourdieu, 1973; Bourdieu, 2021). Data from participants and documents collected and analyzed

stress the importance of attributes such as effective communication, collaboration, relationship management, cultural competency, and learning how to seek information. Participants described the significant roles of professional experience and mentorship for the acquisition of the soft skill competencies that result in desirable career outcomes within the technology field.

For professional education programs and on-the-job training, making room for trial-and-error opportunities and supporting the gradual emergence of mentor-mentee relationships creates an environment that facilitates the natural acquisition of 21st century soft skills (Ibrahim et al., 2017). Post-secondary programs may consider expanding real-world project-based learning and flexible internships to expose students to the experiences that enable the development of non-technical competencies.

Future research focused on experiential learning opportunities for students of technology boot camps, certificate programs, and technical colleges may increase understanding about education and training institutions' capacities for improving soft skills cultivation. Model technology education curricula developed by the ITEEA (2012) for high school students include activities that foster soft skill development. Uncovering model curricula for post-secondary technology career programs and examining the benefit of their application in adult education might provide new insights into enhancing college-level technology education curricula. Studies exploring soft skills integration for individuals new to the workforce compared to those retraining to shift into a new career would reveal insight into the transferability of soft skills across fields. Such a comparison could inform the design of courses of study and soft skills integration for technology boot camps, certificate programs, and technical colleges.

Finally, opportunities exist to explore mentorship models to determine more efficient facilitation of soft skills acquisition with culturally relevant practices (Hora et al., 2018). In this

study, all participants that mentioned the benefits of mentorship for building soft skills described relationships as occurring naturally. There are research opportunities for understanding how technology career professionals and students form mentorship bonds with colleagues. Another limitation already addressed in the study was the homogeneity of the sample due to the study setting and available criteria-meeting population. Exploring social and cultural capital and culturally appropriate practices is likely to require future research that involves a more diverse set of participants (Hora et al., 2018).

Summary

This qualitative research study used a phenomenological approach to gather the perceptions of soft skills integration from technology career professionals. The purpose was to provide insight for post-secondary and on-the-job training programs. The findings underscored the prevalence of soft skill integration within technical roles and the crucial role of non-technical competencies in hiring and career advancement. The exploration also revealed the primary modalities facilitating the acquisition of soft skills: experiential and real-world project-based learning and organically occurring mentorship. Suggestions for practice and future research included further exploration of the integration of project-based learning in classroom and work settings, exposing students to non-technical competencies, and examining internship models for students in certificate and technical degree programs. Recommendations were made related to shifting workplace training to include increased tolerance for trial and error and making room for the development of two-way mentorships. This study presented the perceptions of technology career professionals, revealing lived experiences that underscore the importance of post-secondary and on-the-job education programs integrating soft skill components to prepare 21st century technology professionals.

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Appendix A: Interview Solicitation Letter and Discussion Topics

Educating 21st Century Technology Career Professionals: Perspectives on Soft Skills Integration

What is this research study about?
You are invited to participate in a research study designed to explore perceptions of 21st Century soft skill gaps among career technology professionals within digital teams working in a remote environment. Participants include adult technology career professionals with more than four years of experience in the technology field and mixed education backgrounds.

We hope to learn how 21st Century soft skills integration is perceived by technology career professionals and captured within technology career roles and responsibilities. The topic deserves examination due to the rapidly evolving technology landscape that needs to be supported by post-secondary learning programs and on-the-job training.

What activities will this study involve?
If you decide to participate, you will be asked to participate in a single session one-on-one interview and/or a single session participant construct focus group, using Zoom. Automated and manual transcripts will be recorded. Fireflies.ai will be used for automated transcriptions. Automated transcriptions will be deleted from Fireflies.ai after being exported to Microsoft Word and combined with manual transcriptions. All data collected will be anonymous, with any potentially identifiable data being deleted immediately when automated and manual transcriptions are combined and stored in Microsoft OneDrive.

Each participant can choose to participate in a single one-on-one interview, a single participant construct focus group, or one of each.

One-on-one interviews will be semi-structured and conversational, addressing the following topics:

- Education background
  - How was higher education discussed at home and at school during high school years?
  - What types of fields were introduced by peers, parents, and educators?
- Work experience
- How do you describe soft skills?
- Soft skills in daily work activities
- Opportunities for soft skills within training, professional development, and continuing education
- The acquisition and role of soft skills as you have grown in your career
- How would you seek out further developing soft skills?

Participant construct interviews will be semi-structured and conversational, resulting in a taxonomy of soft skills themes:

- Identify a core group of soft skills used regularly by group members
- Group soft skills by theme
- Organize themes from most important to least important to create a taxonomy
- Identify how soft skills by theme could be acquired and annotate the taxonomy

One-on-one interviews will be scheduled for one hour each. The participant construct focus group will be scheduled for 1 ½ hours.

How much time will this take?
The study will begin on 9/5/2021 and end on 10/8/2021. We estimate participating in the study will require 1-2 ½ hours of your time, depending on whether you choose to participate in both the one-on-one interview and the focus group.

Appendix B: IRB Approval

Winona State University Institutional Review Board (IRB)
Human Protections Administrator
Maxwell 155
Winona, MN 55987
507.457.5519 or bayers@winona.edu

DATE:	August 31, 2021
TO:	Scott Fillman
FROM:	Winona State University IRB
PROJECT TITLE:	[1797094-2] Educating 21st Century Technology Career Professionals: Perspectives on Soft Skills Integration
SUBMISSION TYPE:	Revision
ACTION:	APPROVED
REVIEW TYPE:	Administrative Review

Thank you for your submission of Revision materials for this research study. The Winona State University IRB has APPROVED your submission. This approval is based on an appropriate risk to benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

For expedited category studies, continuing review and annual reports are required when mandated by the IRB. For full board review studies conducted longer than one year, continuing review is required on an annual basis or at a period specified by the IRB.

Changes in the study must be reported and any revisions to previously approved materials must be approved by this office prior to initiation. In addition, serious and unexpected events, non-compliance issues, or complaints must also be reported to the IRB.

For all reports, please use the report form in IRBNet Forms and Templates Document Library and refer to the "How to Do Everything" document for instructions.

Remember that informed consent is a process beginning with a description of the study and insurance of participant understanding using a consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that all research records must be retained for a minimum of three years.

If you have any questions, please contact the Human Protections Administrator at 507.457.5519 or bayers@winona.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 the Winona State University IRB records.

Vitae

Scott Fillman

(646) 820 - 1666 • scott.a.fillman@gmail.com • Minneapolis, MN
https://linkedin.com/in/scottfillman

Education

EdD Winona State University — Dec 2021
Education
Dissertation: "Educating 21st Century Technology Career Professionals: Perspectives on Soft Skills Integration"
Committee: Dr. Barbara Holmes (chair), Dr. DeJuanna Parker, Dr. Kent Willis

MLS University of Minnesota — Aug 2016
Liberal Studies
Critical Inquiry: "Ownership, Aggregation, and Visualization: Exploring the Relationship Between People and Their Data"
Advisor: Dr. John Logie

BA Metropolitan State University — May 2014
Individualized Studies
Graduated Summa Cum Laude

AAS Minnesota State Community and Technical College — May 2013
Web Development
Graduated with Honors

Honors and Awards

Travelers EDGE Scholarship 2014
Travelers EDGE (Empowering Dreams for Graduation and Employment) provides a unique, holistic approach to education and career exploration designed for high achieving nontraditional students. Established in 2007, Travelers EDGE is the company's signature education program.

Research Experience

Dissertation, Winona State University, Winona, MN 2021
Advisor: Dr. Barbara Holmes

- 21st Century Technology Career Professionals: Perspectives on Soft Skills Integration

Teaching Experience

Minnesota State Community and Technical College, Detroit Lakes, MN, Aug 2016 to May 2021
Web Design Instructor, Arts, Communication and Computer Information Systems

- Taught 2-3, 3-credit web design courses per semester
- Developed projects, quizzes, exams, and homework
- Revised syllabi to meet accreditation standards
- Coordinated grading and labs

Publications, Presentations, and Invited Lectures

Web Publications

LeMieux, R.M., Brichacek, L.K., Chaison, D., Fillman, S.A., Holmes, B., Leisen, M., Luthens, D.L., Mayer, S.J., Parker, D.M., Stolpa, T. and Tamke, D.E., 2020. "Doctor of Education Newsletter 2020," Winona State University, https://openriver.winona.edu/cgi/viewcontent.cgi?article=1001&context=educationeddnewsletters

Fillman, S.A., October 28, 2015, "The Heart of Digital Marketing: Building Meaningful Experiences," SEMrush Blog, https://www.semrush.com/blog/the-heart-of-digital-marketing-building-meaningful-experiences/

Professional Training

Professional Scrum Master I (PSM I), Scrum.org Dec 2016
Description: Include a brief description, if necessary.

Professional Affiliations

International Technology and Engineering Educators Association 2021 to Present
Professional Member

Professional Experience

DecoPac, Inc. Mar 2019 to Present

Director, Customer Technology Web Team

- Managed portfolio of customer-facing web applications
- Empowered managers & direct reports to lead teams that deliver quality web production, performant digital campaigns, and effective digital strategy
- Owned the roadmap and backlog for B2B and B2C platforms
- Migrated web analytics platform from the cloud to on premise and ensured GDPR compliance

Medtronic Apr 2018 to Mar 2019

Principal Digital Strategy and Insights Analyst

- Provided requirements for critical and enhanced digital tagging
- Created and maintained dashboards that reflect imperative business and technical data
- Developed and drove strategy and approach for gathering system and customer data through survey research
- Worked across multiple projects to drive quality delivery
- Collaborated closely with business partners, User Experience and Design and various development teams to optimize solutions and processes based on feedback and data
- Led complex business requirement discussions.
- Gathered, evaluated and documented customer business needs and requirements and translated into functional specifications that balance optimization across the technology portfolio with the needs of the business
- Participated in project and design reviews to evaluate and ensure that designs meet policies, principles, and standards
- Evaluated competitors and capability leaders to provide necessary insight and recommended action
- Aligned & communicated with senior management and executives as a subject matter expert
- Organized & facilitated functional workshops and education sessions
- Provided guidance and input on how to effectively segment customers and drive critical marketing campaigns

- Created dashboards with Tableau and managed & distributed via Tableau Server

Minnesota State Technical College Aug 2016 to May 2021

Web Development Instructor

- Designed online courses, created course curricula, and developed projects for student assessment
- Instructed students regarding current best practices for user interface design, accessibility, digital analytics and content management
- Developed and successfully launched two brand new online course offerings

Radisson Hotel Group Jun 2017 to Apr 2018

Manager, Digital Analytics Implementation

- Owned architecture for data collection and data-driven marketing technology systems
- Gathered user stories and requirements for enterprise marketing technology and web analytics implementations
- Managed product backlog and prioritized feature builds in sprint planning process
- Modeled databases, created data layer specifications, and mapped API integrations
- Helped to lead the development of business strategy within implementation of marketing technology and digital analytics
- Worked with customers to determine web analytics
- Created a center of excellence for digital analytics and continuous optimization of platforms
- Integrated analytics and content experiments (multivariate, A/B testing) into systems
- Directed analysis-related items for cross-functional and / or cross-segment teams
- Predicted emerging customer needs and developed innovative solutions to meet them
- Worked with business partners to solve unique and complex problems that impact the business

- Coordinated CRM, analytics, and marketing technology needs
- Led large, complex projects to achieve key business objectives
- Translated highly complex concepts in ways that can be understood by a variety of audiences
- Influenced senior leadership to adopt new ideas, products, and / or approaches
- Guided junior-level employees through marketing technology implementation projects
- Established a new practice for data collection and tag management within the enterprise

UnitedHealth Group Apr 2016 to Jun 2017

Sr. Digital Content Business Analysis Consultant

- Gathered user stories and requirements for enterprise content management system builds, primarily using Adobe Experience Manager
- Managed content management system feature backlog and prioritizing CMS feature builds in sprint planning process
- Modeled content and mapped API integrations
- Helped to lead the development of business strategy within implementation of Adobe Analytics and AEM
- Worked with customers to determine web analytics
- Set the standard for diagramming content flows across environments
- Created a content governance and management process
- Integrated analytics and content experiments (multivariate, A/B testing) into content process
- Directed analysis-related items for cross-functional and / or cross-segment teams
- Predicted emerging customer needs and developing innovative solutions to meet them
- Worked with business partners to solve unique and complex problems that impact the business
- Coordinated web content management needs in a matrix organization
- Led large, complex content management projects to achieve key business objectives

- Translated highly complex content modeling concepts in ways that could be understood by a variety of audiences
- Influenced senior leadership to adopt new ideas, products, processes, and / or approaches to content management
- Led daily Scrums in addition to analysis tasks
- Guided junior-level employees through content management projects

DecoPac, Inc. Feb 2015 to Apr 2016

Digital Marketing Manager

- Led a newly formed team, created campaigns, and utilized formulas and methodologies to determine performance goals and conversion points based on business objectives and digital marketing strategy best practices
- Grew revenue through multi-channel digital marketing efforts, utilized predictive modeling, bid management and marketing automation to serve personalized experiences to prospects, and worked with a team of experts to implement initiatives and tactics that are based on marketing intelligence and retention strategies
- Provided leading-edge expertise, methodology and delivery of digital media measures and analysis
- Implemented and supported SEO, SEM, social integration, and usability initiatives
- Responsible for deriving tactical consumer and marketing insights and recommendations
- Optimized current and future cross-channel media plans based on KPIs
- Led a team of experts in a digital-focused marketing department
- Managed, guided and mentor direct reports to ensure consistent, quality performance
- Established an internal digital analytics practice and methodology and related service line with reporting cadence and insight generation
- Created a data-driven, scientific method-based process for all campaigns and interface updates

Spyder Trap Jan 2014 to Feb 2015

Online Marketing Manager

- Converted two, large enterprise-wide Google Analytics implementations into Google Tag Manager implementations, reducing new tracking tag implementation time from one month to one day
- Designed proof of concept, document, and prototype ideas
- Drove new service offering development for Online Marketing Department
- Led strategic online marketing campaign planning sessions with clients
- Managed direct reports and budgets for a digital-focused marketing department
- Analyzed results to inform recommendations and report back to client
- Developed quarterly business reviews and annual strategic roadmaps
- Completed front and back-end development for mobile and web
- Led testing, bug fixes, maintenance, and ongoing support
- Managed, coached, and mentored direct reports to increase skills and performance
- Created and implemented professional development plans for team members
- Established a series of “lunch and learns” to keep team current on industry trends

Russell Herder Sep 2013 to Dec 2013

Digital Specialist

- Provided leading-edge expertise, methodology and delivery of digital media measures and analysis
- Created digital marketing strategies for clients
- Monitored and digitally reported performance of analytics and PPC campaigns
- Launched social media sites and campaigns for clients and organizations
- Implemented technical support for SEO, SEM, social integration, and usability initiatives
- Responsible for deriving tactical consumer and marketing insights and recommendations

- In charge of optimizing current and future cross channel media plans based on KPI

Brand & Butter Feb 2012 to Sep 2013

Web Developer

- Designed and developed web software applications for local and national clients
- Gathered requirements, created technical documentation and training manuals
- Redesigned an e-commerce website for a national laboratory equipment company, focusing on SEO and usability, resulting in a 31% growth in organic traffic and 26% increase in lead generation
- Tested, maintained, and completed ongoing support
- Completed R&D of new technology introduction, integration, and deployment
- Built agile practice and led Scrum adoption

Blue Minnesota LLC Oct 2008 to Feb 2012

Owner/Principal and Marketing Web Developer

- Ran day-to-day business operations
- Designed and developed marketing websites and landing pages for local musicians
- Gathered requirements, created technical documentation and training manuals
- Maintain websites and web presence for businesses and individual clients, and provide leading edge expertise, methodology and delivery of digital media measures and analysis
- Implemented technical support for SEO, SEM, social integration, and usability initiatives
- Responsible for deriving tactical consumer and marketing insights and recommendations
- In charge of optimizing current and future cross channel media plans based on KPIs

Volunteer Service

Mayim Rabim Congregation Aug 2021to Present
Contributing Member of the Membership Committee
Minneapolis, MN

Languages

English: Native Language

Computer Skills

Programming: JavaScript, PHP, SQL, JSON, HTML, CSS

Applications: Excel, Access, PowerPoint, Word, Visio

Platforms: WordPress, Grav CMS, Matomo, Google Analytics, Tableau, Google Data Studio

Other

Minnesota State Parks & Historical Sites Enthusiast
United States Citizen