ABSTRACT

SOCIODEMOGRAPHIC FACTORS INFLUENCING CHOICE OF CAREER TRAINING PROGRAM: AN ANALYSIS OF WASHINGTON STATE TECHNICAL COLLEGES

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Over 219,000 students enroll in Washington State's 34 community and technical colleges annually. The Washington State Board for Community and Technical Colleges (SBCTC) also reports that of these students, 88,000, or 40%, are in career training programs. The need to examine these career training students' decision making behaviors is vital, given the $20.5 billion annual contribution these students make to the state economy. This study examines the factors that impact students' selection of a high or low wage-earning program of study, determines the extent to which the impact varies for historically underserved student populations, and delineates which sociodemographic variables influence student choice behaviors. Ordinal logistic regression was used to analyze three years of sociodemographic and program wage-level data from over 30,000 first-time enrolled students across the five technical colleges in Washington State. A more precise understanding of the relationships between various sociodemographic factors and student program selection informs and shapes practice in community and technical colleges statewide to better inform students, influence choice behavior, and improve student labor market outcomes.

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SOCIODEMOGRAPHIC FACTORS INFLUENCING CHOICE OF CAREER TRAINING PROGRAM: AN ANALYSIS OF WASHINGTON STATE TECHNICAL COLLEGES

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DEDICATION

To my husband, Joel, and my children, Mathieu and Richard: I am grateful for the sacrifices you each have made over the past three years to help me realize this dream. All that I have achieved, both professionally and personally, is largely due to your love and support. You are my motivators, and I will continue to work tirelessly every day to provide us all with a better life.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

LIST OF APPENDICES

Appendix Page

CHAPTER 1

INTRODUCTION

The higher education landscape in the United States is as diverse as the students it serves. While a majority of students enter directly into four-year institutions, community and technical college students comprise over 40% of all undergraduate students in America (Ma & Baum, 2015). Workforce education, academic transfer, and basic education for adults reflect the core mission areas of community and technical college systems across the country (American Association of Community Colleges, 2020). According to the Association for Career and Technical Education (2014), 3.9 million students enrolled in a nationwide career training program, with over 800 thousand certificates and associate degrees awarded in 2017 (American Association of Community Colleges, 2017). AACC also reported that nearly 90% of certificates and half of the associate degrees awarded were in career and technical education (CTE). Furthermore, the number of students earning a sub-baccalaureate credential in career training fields increased by 71% from 2002 to 2012 (Association for Career and Technical Education, 2020). Career and technical education enrollments comprise a significant cross-section of community and technical college students.

Previous researchers have acknowledged that when choosing a program of study, student decision making is influenced by career, institutional, interpersonal, and sociodemographic factors (Beggs et al., 2008; McKenzie et al., 2017; Wilcoxson & Wynder, 2010). While there is a

body of literature examining the relationships between these factors and the choice of a major, both the data and findings overwhelmingly represent four-year college students. The need to examine the critical decision making behaviors of the over 3.9 million career training students nationally, including over 88,000 Washington State students, is vital given the $20.5 billion annual contribution these students make to the state economy (Washington State Board for Community and Technical Colleges [SBCTC], 2020). Educating the workforce is central to mission fulfillment in Washington State.

Career training students on the postsecondary level are diverse, varied, and more likely than non-CTE students to be older, married, of color, and working part or full time (ACTE, 2020). They are also more likely to come from a family background of less educational attainment. Specifically, within the State of Washington, 47% of all enrolled two-year college students are students of color (SBCTC, 2020). Additionally, 38% of enrolled students received need-based financial aid in eligible programs. Improving labor market outcomes for these student populations is a top priority for community and technical college systems nationwide (American Association of Community Colleges, 2020).

For Washington State technical college students, the career journey begins with the selection of a program of study, which traditionally has been challenging for students of color, low-income students, and other historically underserved groups, many of whom are first-generation or are not familiar with the systems and processes within higher education (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001). The need to examine the relationships between various sociodemographic variables, including age, economic disadvantage, sex, race/ethnicity, veteran status, and program selection among Washington State community and technical college students is imperative as their decisions have long-term impacts on their

postcompletion job prospects, marketability, and wage-earning potential (Baker et al., 2018; Beffy et al., 2012; Berger, 1988; Stevens et al., 2015).

Purpose of Study

The purpose of this quantitative study is to determine if student sociodemographics influence the selection of a career training program with varying wage-earning potentials in Washington State technical colleges. In the 2018-2019 academic year, over 219,000 students enrolled in Washington State's 34 community and technical colleges (SBCTC, 2020). The SBCTC (2000) also reports that of the over 219,000 enrolled students, 88,000, or 40%, were enrolled in career training programs. The need to examine the career training students' critical decision making behaviors is vital, given the $20.5 billion annual contribution these students make to the state economy (SBCTC, 2020). The research will examine the factors that impact students' selection of a low, medium, or high wage-earning program of study, determine the extent to which the impact varies for historically underserved student populations, and delineate which sociodemographic variables influence student choice behaviors. A more precise understanding of the relationships between various sociodemographic factors and student program selection will inform and shape practice in community and technical colleges statewide to better inform students, influence choice behavior, and improve student labor market outcomes. Findings from this study will also contribute to a body of existing literature that overwhelmingly represents selective, four-year institutions of higher education. The following research questions will guide this quantitative study:

1) What is the relationship between age, economic disadvantage, sex, race/ethnicity, veteran status, and student's choice of a career training program in Washington State technical colleges?
2) To what extent does the impact vary for historically underserved groups such as economically disadvantaged students, students of color, and student veterans.

Literature Review

Selecting a program of study can be a daunting task for any college student. In the case of community and technical college students, this lifelong decision is often the first choice they make in the entry process. Unlike their four-year counterparts, most two-year college students are required to make this trajectory-setting decision with little to no direct support from college personnel (Bailey et al., 2015). The selection of a program of study is particularly challenging for students of color, low-socioeconomic students, and other historically underserved students, many of whom are first-generation college students who have not had adequate exposure to higher education (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001). Selecting the right program can have a post completion impact on students' job prospects, wage-earning potential, and marketability (Stevens et al., 2015).

When choosing a program of study, students consider many factors, including their academic interests and abilities, the psychological and social benefits or satisfaction associated with that major, as well as post graduation employment prospects (Beggs et al., 2008; McKenzie et al., 2017; Wilcoxson & Wynder, 2010). While there is a body of literature examining the relationships between these variables and choice of a major, the data and findings

overwhelmingly represent four-year college students and do not reflect community and technical college students. Furthermore, there is a need to study the relationships between various sociodemographic variables, including race, ethnicity, socioeconomic status, and veteran status, and program selection among community and technical college students because their decisions have long-term impacts on their employment prospects and earnings potential (Baker et al., 2018; Beffy et al., 2012; Berger, 1988; Hu, 1996).

Employment Outcomes and Two-Year Colleges

The mission of the traditional community college and that of the typical technical college differ in one critical aspect, an emphasis on workforce outcomes. Community colleges have focused efforts on academic transfer to four-year institutions (Bailey et al., 2015). On the other hand, technical colleges have traditionally offered terminal certificates and degrees, focusing on workforce education and career training. While both serve their communities, one is fundamentally designed to promote transfer and the other to deliver employment outcomes. The design and types of programs, curriculum, and various modes of delivery of instruction reflect this. As consumers of higher education, students are acutely aware of this important distinction and most often choose technical colleges because of their emphasis on career training and job placement (Stevens et al., 2015).

Washington State's five technical colleges have very similar missions, which all seek to create a student experience grounded in hands-on learning and focused on career training, job placement, and promoting student upward mobility (SBCTC, 2020). These technical colleges have done this, by and large, significantly outpacing their comprehensive counterparts regarding both retention and completion outcomes (SBCTC, 2020). According to the SBCTC, of the 34

community and technical colleges in the state, the five with the highest completion and job placement rates are all technical colleges (SBCTC, 2020). However, the largely unanswered question at the state level and in the literature remains: are they producing these outcomes equitably for all groups of students?

Increased pressure from federal and state legislatures, performance funding models, and college rankings have also caused many community and technical colleges to focus more on improving student outcomes (Baker et al., 2018). National organizations such as Achieving the Dream, the Aspen Institute, and the American Association of Community Colleges have also played a critical role in spotlighting community and technical colleges' need to pay attention to student employment outcomes. To transform communities and improve student career outcomes, it is necessary to understand student choice behavior concerning programs of study.

Sociodemographic Factors and Choice of Program

The gender gap between males and females and program choice is well documented (American College Testing [ACT], 2013; Jacobs, 1986, 1995; Zafar, 2013). In 2013, ACT examined selecting a college major or program of study among the ACT-tested high school graduating class of 2013. Data was collected from over 1.79 million ACT test takers, and the report found that females were more likely than their male counterparts to choose a program of study and to have confidence in that choice, although significant gender discrepancies in planned major choices in favor of females were "evident in the areas of Education, Health Sciences and Technologies, Health Administration and Assisting" (ACT, 2013). Conversely, significant gender discrepancies in planned major choices favored males in the areas of Business, Computer Science, Engineering, and Mathematics, affirming old stereotypes and early similar findings by

Jacobs (1986, 1995), who studied gender trends among college graduates in the 1980s, and Dawson-Threat and Huba (1996), who studied high school seniors.

Gender also plays a role in program selection in relation to labor market outcomes (Hu, 1996; Zafar, 2013). Hu's (1996) research on student perceptions of labor market conditions found a positive correlation between gender and major choice selection. Female students seemed to be less motivated by salaries and benefits than their male counterparts. Basit Zafar, an economist, found in a 2013 study that not only was there a gender gap in student choice of major but that choice had impacts on post completion earnings. Furthermore, he found that nonpecuniary factors drove choice in 50% of males and 75% of females.

There is also evidence of a relationship between socioeconomic status and selection of a program of study (Castleman & Goodman, 2014; Montmarquette et al., 2001; Niu, 2017). Montmarquette et al. (2001) found that a student's interests, program information, and family socioeconomic background all impact the selection of a program of study. Furthermore, the study also found that expected earnings, to a lesser degree, were also a motivator in student choice. Montmarquette et al. (2001) also concluded that there were differences in the degree of impact for women and students of color. Niu (2017) used the Education Longitudinal Study data to study patterns of choice of STEM majors and socioeconomic background. She found that "low-socioeconomic status students may not possess the information and/or skills necessary to make well-informed decisions of STEM enrollment so as to maximize their opportunity to succeed in college" (Niu, 2017, p. 311). A third study found that their socioeconomic status drove low-income college students' major choices (Castleman & Goodman, 2015). The relationship between socioeconomic status and the selection of a program of study is well documented.

Although less studied, race and ethnicity seem to influence a student's selection of a program of study (Thomas, 1985; Trent, 1984; Xie & Goyette, 2003). Thomas (1985) and Trent (1984) both found that African American students are more likely than their Caucasian counterparts to select a program of study in lower wage-earning fields like education and the social sciences. Xie and Goyette (2003) studied the patterns of choice among Asian American students. They found concentrations in areas with high earnings potential, such as engineering and business, as a way to ensure upward social mobility, reversing earlier trends that showed Asian students underrepresented in science and engineering (Astin & Astin 1992; Oakes 1990). Conversely, one study by Simpson (2001) found that "the differences in selection of academic major can no longer explain differences between racial groups in earning differential" (Simpson, 2001, p. 91). While this study did not affirm previous research in undergraduates, it did find racial differences at the graduate level. None of the studies were conducted among community or technical college students.

Career Factors and Choice of Program

There are two categories of career factors that influence a student's choice of program of study. The first, student interest and ability, is nonpecuniary, and the second, wage-earning potential and marketability, is related to labor market outcomes. The relationship between student interest and ability as a motivator in selecting a program of study is supported in the literature (Allen & Robbins, 2008; Beggs et al., 2008; Wilcoxson & Wynder, 2010; Wiswall & Zafar, 2011). Beggs et al. (2008) employed a means-end analysis to identify factors that students consider integral to the process of selecting a major. This qualitative study determined that student interest was the most significant variable in program selection. Allen and Robbins (2008)

and Wilcoxson and Wynder (2010) also found that a student is more likely to choose, persist, and complete a program of study based on interest-major fit. This fit is primarily determined by the student's initial and continued interest or fit in the subject matter.

Wiswall and Zafar's (2011) study investigated the determinants of college major choice and found that perceived ability and expected earnings were the most significant factors students consider in program selection. Aridiacono et al. (2010) and Stinebrickner and Stinebrickner (2014) also determined that a students' perceived aptitude or ability in a given field is an essential factor in the choice of a major. A study conducted by McKenzie et al. (2017) confirmed these findings. It cited academic interest, aptitude, the psychological and social benefits associated with a major, and postgraduation employment prospects as primary motivators for students when reselecting (changing) their major.

Collecting data from over 1.79 million test takers, ACT's College Choice Report (2013) study centered on interest-major fit as the critical variable in program choice. Specifically, there can be misalignment between a student's interest and planned major, and many students required assistance with their educational and occupational plans. For many students, a particular major's availability is the most critical factor in choosing a college. However, the probability of finding the interest-major fit also depends on a student's characteristics, like first-generation status and gender. Students with lower ACT composite scores were far less likely than their higher score counterparts to select a major that aligns with their interests. Similarly, first-generation college students were less likely to choose a major that was a good fit for their interests than students from families where one or more parents received formal postsecondary education (ACT, 2013).

Pecuniary factors like wage-earning potential, marketability, and other labor market outcomes, to a lesser degree, also play a role in student choice of program of study (Arcidiacono

et al., 2010; Baker, 2018; Beffy et al., 2012; Wiswall & Zafar, 2011). Studies of students in four-year colleges indicate that students choose a program of study primarily for nonpecuniary reasons, like interest and perceived ability, and that sociodemographic factors drive decision making, with labor market outcomes playing a significant but minor role (Beffy et al., 2012; Stinebrickner & Stinebrickner, 2014; Wiswall & Zafar, 2011). Wiswall and Zafar (2011) also found a correlation between student beliefs about projected earnings in a discipline and increased program completion odds.

There is also a relationship between students' perception of their wage-earning potential and marketability, and studies indicate that college students can project financial returns to various major categories or groups of majors (Arcidiacono et al., 2010; Huntington-Klein, 2015). However, students generally cannot accurately estimate the return on any given degree (Arcidiacono et al., 2010; Betts, 1996). Students from low-socioeconomic backgrounds tend to underestimate the value of a college degree (Attanasio & Kaufmann, 2017; Betts, 1996), and students with higher grade point averages make fewer errors when predicting wage-earning potential (Betts, 1996).

Only one study found in the literature explicitly examines community college students, and none study technical college students. Baker et al. (2018) studied the effects of labor market information on community college students. The study concluded that while two-year college students have some knowledge about labor market outcomes, that information is limited. In contrast to their four-year counterparts, less than 40% of students correctly ranked salaries across various major categories or groups of majors. Furthermore, students systematically overestimated wages by 13% and underestimated employment outcomes by almost 25% when projecting marketability. Like previous studies of four-year students, nonpecuniary factors like

enjoyment (interest) and grades (ability) are the most important determinants when choosing a program of study for community college students, with labor market outcomes playing a minor role. Students ultimately decide their choice of major with mostly their hearts, not their financial interests. When they make the decision for financial reasons, their assumptions about labor market outcomes are usually inaccurate.

Summary

After reviewing the literature associated with variables that influence a student's selection of program of study, it appears there is a need to investigate further the relationships between various sociodemographic factors and program selection of community and technical college students. Although two-year students comprise over 40% of the total undergraduate enrollment in the United States (Ma & Baum, 2015), community and technical college students have been largely overlooked in the literature. The two categories of variables that have been researched include sociodemographic and career factors. Most of the studies conducted were done so with students enrolling in a four-year college or university. More research is specifically needed that explores the variables that impact community and technical college students' choices. This research project will determine if there is a relationship between various sociodemographic factors, including race, ethnicity, socioeconomic status, and first-generation status, and choice of a career training program among students in Washington State's five technical colleges.

Theoretical Framework

The theoretical framework that guides the study is Lent et al.'s (1997) social cognitive career theory (SCCT). This theory finds origins in Albert Bandura's social cognitive theory (Bandura, 1977). It addresses issues of culture, gender, social context, and life events that may interact with and supersede the effects of career-related choices (Lent & Hackett, 1987). social cognitive career theory seeks to explain three interrelated aspects of career development: (1) how primary academic and career interests develop, (2) how educational and career choices are made, and (3) how academic and career success is obtained (Lent et al., 1994). The theory centers on the connection of three factors: self-efficacy, outcome expectations, and personal goals that influence an individual's career choice (Lent et al., 1994). This study centers on how educational and career choices are made by examining the relationship between various sociodemographic factors and the selection of a career training program.

Bandura (1977) defines self-efficacy as the set of beliefs we hold about our ability to complete a particular task or behaviors required to produce a specific goal or outcome (Bandura, 1977). Bandura outlined four primary ways self-efficacy can be attained: (1) by personal performance accomplishments, (2) by vicarious learning strategies such as modeling, (3) by social persuasion, and (4) by an individual's physiological and emotional states (Bandura, 1977; Lent et al., 1994). The theory states that there is variance in self-efficacy related to one's ability to choose and successfully perform in various career fields. The more individuals believe they are likely to be successful in a given career field, the more likely they are to select that career (Bandura, 1986; Lent et al., 1994).

SCCT defines outcome expectations as "beliefs about consequences or outcomes of performing particular behaviors" (Lent & Brown, 2006, p. 17). Outcome expectations, like self-efficacy, influence behavior. When individuals expect that a given behavior produces positive outcomes, they are more likely to engage in the behavior (Lent et al., 1994). For example, students are more likely to choose a program of study if they perceive their engagement as ultimately leading to positive internal and external outcomes (social status, self-approval, marketability, attractive work conditions). This study examined decision making patterns among various groups of students, with attention to historically underserved student populations. A lack of self-efficacy in historically underserved groups may manifest itself in selecting a program of study that leads to lower wage outcomes.

Lastly, personal goals refer to an individual's intention to participate in any particular activity or produce a desired outcome (Bandura, 1986). SCCT discusses two types of goals, choice-content goals and performance goals. Choice-content goals are goals related to an individual's interests, and performance goals are goals related to an individual's requisite level of performance to obtain that goal (Lent et al., 1994). Lent (2005) asserted that choice and performance goals are related to self-efficacy and outcome expectations. Both choice-content goals and performance goals impact student decision making in this study. Different groups of students entering into career training programs in two-year colleges have varied interests and academic backgrounds.

Figure 1 provides a visual depiction of Lent et al.'s (1994) social cognitive career theory choice model. The model shows the three interrelated aspects of career development, self-efficacy, outcome expectations, personal goals, and how individual career interests develop over time. This study explores the relationships and impact of various

sociodemographic factors, or person inputs and context, on student program selection or choice goals.

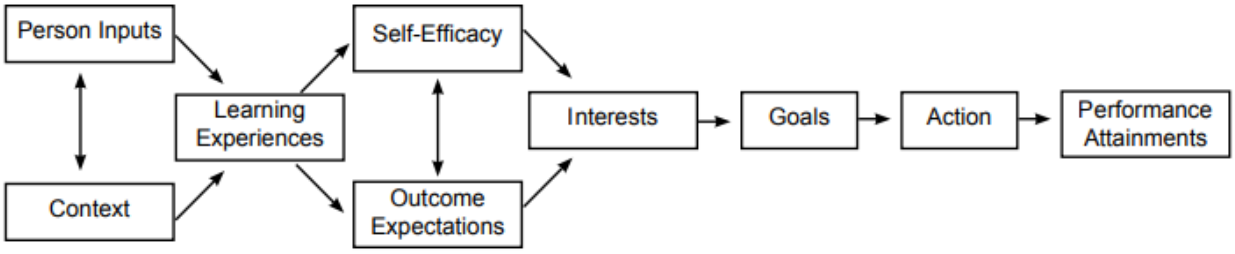

Figure 1. social cognitive career theory (Lent et al., 1994).

Methods

This study used a quantitative approach to examine the relationship between the factors that influence the selection of a low, medium, or high wage-earning career training program in Washington State technical colleges, with a primary focus on student demographics. I employed quantitative correlational methodologies in the design. "Correlational designs are procedures in quantitative research in which investigators measure the degree of association or relationship between two or more variables using the statistical procedure of correlational analysis" (Creswell, 2015, p. 21). This methodology is appropriate for answering the research questions as I sought to explain the relationship between the independent variables (student sociodemographics) and the dependent variable (student wage-earning potential). Creswell (2015) further states that "in correlational research designs, investigators use the statistical correlation test to describe and measure the degree of association between two or more

variables" (p. 339). This study examined the relationship between variables with a particular interest in their impact on historically underserved students.

Research Hypotheses

Guided by the theoretical framework and relevant literature, the following research hypotheses were formulated to describe the predicted relationships between the dependent variable (wage-earning potential) and independent variables (sociodemographics):

Null Hypothesis: There is no relationship between sociodemographics and career training program selection among Washington State technical college students.

Hypothesis One: Students of color are more likely to select a lower wage-earning career training program of study in Washington State technical colleges.

Hypothesis Two: Economically disadvantaged students are more likely to select a lower wage-earning career training program of study in Washington State technical colleges.

Hypothesis Three: Veteran students are more likely to select a lower wage-earning career training program of study in Washington State technical colleges.

Research Site

The research design utilized for this study was a quantitative statistical analysis of secondary data provided by the SBCTC. The population from which I drew a sample were students enrolled in career training programs at Washington State's five technical colleges: Bates Technical College, Bellingham Technical College, Clover Park Technical College, Lake Washington Institute of Technology, and Renton Technical College. These five colleges, all located in western Washington, range in size, serving 5,000-9,000 students annually. Two of

them, Bellingham Tech and Bates Tech, are urban, and the other three, suburban. Four of the five colleges are located in the Seattle/Tacoma greater metro area. Thirty to sixty percent of students across the five campuses are students of color. Appendix A provides a brief introduction and profile of the five Washington State technical colleges in the study.

Data Source and Sample

I obtained Institutional Review Board (IRB) approval from Northern Illinois University and the Washington State Board for Community and Technical Colleges. The Washington State Board for Community and Technical Colleges collects data from all 34 community and technical colleges in the state quarterly, and this data is factual information (Creswell, 2015, p. 151), reported by all member colleges. The SBCTC provided sociodemographic, program wage-level, and covariate data from all first-time enrolled students with a valid program code from the 2017, 2018, and 2019 fall quarters, for an estimated total number of 30,000 students (unduplicated headcount).

Variables

The dependent (outcome) variable is an ordinal indicator of the wage-earning potential for the student's current or last enrolled program based on a six-digit Classification of Instructional Programs (CIP) code (SBCTC, 2020). The United States Department of Education creates CIP codes to describe courses' subject areas and major areas of study. The five technical colleges in the State of Washington use standard CIP codes for all workforce programs. The dependent variable is coded as 1 if the program is of low wage-earning potential, 2 if the program is of medium wage, and 3 if it is of high wage-earning potential. Appendix B provides a

list of programs and wage-earning categories. The Washington State Board for Community and Technical Colleges classifies all workforce programs as either low, medium, or high wage based on state employment data.

The independent (predictor) variables in this study are age, economic disadvantage, prior college, sex, race/ethnicity, and veteran status. These variables are sociodemographic as they are related to a combination of social and demographic factors. Socioeconomics, family status, first-generation status, sex, and race/ethnicity are prevalent in the literature (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001) and correlate to employment completion outcomes in four-year environments. They also are relevant to the theoretical framework, as Lent's career choice model (Lent & Brown, 2013) asserts that individuals tend to pursue those outcomes they perceive as achievable and interesting. This study examined choice patterns among student sociodemographics to determine if a relationship exists between these various groups of students and the selection of a high or low wage-earning career training program. All variables used in the study and their characteristics are presented in Table 1.

These descriptive statistics summarize and describe the population, entering fall students in Washington State's five technical colleges. By examining the population, a profile of the dependent variable, wage-earning potential, and the independent variables (age, economic disadvantage, prior college, sex, race/ethnicity, veteran status) may be established. The distribution, measures of central tendency, and measures of dispersion of variation for the dependent and independent variables will be visualized to provide an easily digestible overview of the population.

Table 1

Description of Proposed Variables

	Variable	Definition
Dependent Variable	Wage-Earning Potential	1 = High wage-earning 2 = Medium wage-earning 3 = Low wage-earning
Independent Variables	Age	1= 0-19 2 = 20-24 3 = 25-29 4 = 30-39 5 = 40-Over
	Economic Disadvantage	0 = No; 1 = Yes
	Prior Credits Earned	0 = No; 1 = Yes
	Sex	0 = Male; 1 = Female
	Race/Ethnicity	1 = White 2 = Black/African American 3 = Hispanic/Latinx 4 = Asian 5 = Pacific Islander/Native Hawaiian 6 = American Indian/Alaska Native 7 = Other
	Veteran Status	0 = No; 1 = Yes
Covariates	High School Completion (not available)	0 = No; 1 = Yes
	High School GPA (not available)	Continuous

I used ordinal logistic regression in the inferential analysis. This statistical technique is appropriate as I sought to predict the relationship between the independent or predictor variables (age, economic disadvantage, prior college, sex, race/ethnicity, veteran status) and the ordinal, categorical dependent variable (wage-earning potential), which is ordered and nonbinary (Gravetter & Wallnau, 2014). The logistic regression predicted the likelihood of the selection of a low, medium, or high wage-earning program based on a student's age, economic disadvantage, family status, first-generation status, sex, or race/ethnicity.

Limitations

This research study's results may be generalized to entering technical college students in the State of Washington as the population was sampled from all five technical colleges across the state. However, this study's findings may not be generalized to all students in the United States, which may pose a threat to ecological validity. There is no threat to population or time validity, as I had access to a large sample of data across five colleges over three years.

Due to limitations in the data set, some contributing factors were not adequately measured. The Washington State Board for Community and Technical Colleges does not capture high school grade point average at the point of entry, despite previous research showing students with higher grade point averages are more likely to complete (Bowen et al., 2009; Dougherty & Reddy, 2013) and make fewer errors when predicting wage-earning potential (Betts, 1996). Therefore, it was not easy to control for this variable. I also anticipated that there would be some missing program code data and some missing sociodemographic data in the data set and thus employed a listwise deletion technique to address it. While this decreased the sample size and

possibly bias, there was still a large sample size, leading to robust estimation and practical implications for Washington State technical college students.

Significance

The research will contribute to the literature and practice. There is little research in the literature examining the relationships between age, family status, race/ethnicity, and the selection of a career pathway. The primary sociodemographic factors that have been researched include sex and socioeconomic status. It is essential to understand the relationships between students of color and family status (single parents), as they may influence student success outcomes and potential future earnings and career trajectory. Additionally, data from the five Washington State technical colleges show the most significant equity gaps with students of color, single parents, and low-socioeconomic students (SBCTC, 2020). These populations of students are being retained and completing at statistically lower levels than other students. The research findings can support practitioners in evidence-based intervention design to support student decision making in the entry process, along their pathway, and in postcompletion labor outcomes. Suppose we find that historically underserved populations make decisions differently, leading to less equitable outcomes. We can adjust the conversations we have in the entry process to ensure these students understand the resources available to them, connect to those resources, and are exposed to the full menu of program options and pathways, including those that lead to better completion employment outcomes.

Additionally, the existing research that has been conducted overwhelmingly represents students enrolling in a four-year college or university. More research is needed to explore the factors that impact community and technical college students' choices. Findings will contribute

to the body of literature on this topic and offer practitioners more insight into the factors that influence student decision making when selecting a program of study. This research will benefit practitioners as they reimagine entry processes to close opportunity gaps and design interventions to close achievement gaps, supporting students in making better informed career decisions.

Current admissions and entry services practices among the five technical colleges vary, with most requiring students to meet with an entry advisor before enrolling in first-term classes. While more community and technical colleges in the State of Washington and nationwide are moving towards a more proactive, high-touch approach to student services, many are not there yet. Findings from the research will help guide evidence-based decision making around the types of resources available to students, how referrals are made to those resources, and how admissions and entry services practitioners interface with students.

Furthermore, the research can inform new intervention design that will lead to a more equity-minded approach to advising different groups of students. Current practices treat students equally (giving everyone the same thing) and not equitably (giving each person what they need). A more equity-based, individualized approach is intended to better inform students and produce better program selection, completion, and employment outcomes, particularly for historically underserved student populations who already experience equity gaps. This research will assist community and technical college professionals statewide as they reimagine entry processes through Washington State's guided pathways efforts.

CHAPTER 2

SOCIODEMOGRAPHIC FACTORS INFLUENCING CHOICE OF CAREER TRAINING PROGRAM: AN ANALYSIS OF WASHINGTON STATE TECHNICAL COLLEGES

Community and technical college students comprise over 40% of all undergraduate students in America (Ma & Baum, 2015). In contrast to their four-year counterparts, they are more likely to belong to historically underserved groups and come from economically disadvantaged backgrounds (Bailey et al., 2005). Across the country, workforce education, along with academic transfer and basic education for adults, reflects the core mission areas of community and technical college systems (American Association of Community Colleges, 2020). Central to workforce development is the improvement of labor market outcomes, particularly for historically underserved student populations (American Association of Community Colleges, 2017), and at the institutional, state, and federal levels, close attention has recently been paid to accomplish this goal (Jepsen et al., 2014; Xu & Trimble, 2016). Unfortunately, the labor market outcomes of various certificates and degrees at community colleges vary significantly. Many yield positive increases in postcompletion earnings, but others have fallen short (Stevens et al., 2015).

There are 3.9 million students enrolled in career training programs nationwide (Association for Career and Technical Education, 2014), with over 800,000 thousand certificates and associate degrees awarded in 2017 (American Association of Community Colleges, 2017). Nearly 90% of certificates and half of associate degrees awarded were in career and technical

education. Furthermore, the number of students earning a sub-baccalaureate credential in career training fields increased by 71% from 2002 to 2012 (Association for Career and Technical Education, 2020). Career and technical education enrollments comprise a significant cross-section of community and technical college students.

Career and technical education students are more diverse and more likely than non-CTE students to be older, married, of color, and working part or full time (ACTE, 2020). They are also more likely to come from a family background of less educational attainment. Specifically, within the State of Washington, 47% of all enrolled two-year college students are students of color (SBCTC, 2020). Additionally, 38% of enrolled students received need-based financial aid in eligible programs. Improving labor market outcomes for these student populations is a top priority for community and technical college systems nationwide (American Association of Community Colleges, 2020).

Previous researchers have acknowledged that when choosing a program of study, student decision making is influenced by career, institutional, interpersonal, and sociodemographic factors (Beggs et al., 2008; McKenzie et al., 2017; Wilcoxson & Wynder, 2010). While there is a body of literature examining the relationships between these factors and the choice of a major, both the data and findings represent four-year college students. The need to examine the critical decision making behaviors of the over 3.9 million career training students nationally, including over 88,000 in Washington State, is vital, given the $20.5 billion annual contribution these students make to the state economy (SBCTC, 2020). Educating the workforce is central to mission fulfillment in Washington State.

For Washington State technical college students, the career journey begins with the selection of a program of study, which traditionally has been challenging for students of color,

low-income students, and other historically underserved groups, many of whom are first-generation students who are not familiar with the systems and processes within higher education (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001). The need to examine the relationships between various sociodemographic variables, including age, economic disadvantage, prior college, sex, race/ethnicity, and veteran status, and program selection among Washington State community and technical college students is imperative, as their decisions have long-term impacts on their postcompletion job prospects, marketability, and wage-earning potential (Baker et al., 2018; Beffy et al., 2012; Berger, 1988; Stevens et al., 2015).

Background and Literature Review

The selection of a program of study is challenging for all students, and for community and technical college students, it is particularly daunting as they are less resourced than their four-year counterparts (Bailey et al., 2015). For students of color, low-socioeconomic students, and other historically underserved students, many of whom are first-generation students who have not had adequate exposure to higher education (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001), there are additional hurdles in the decision making process. Unlike their four-year counterparts, most two-year college students are required to make this trajectory-setting decision with little to no direct support from college personnel (Bailey et al., 2015). Selecting the right program impacts students' postcompletion job prospects, wage-earning potential, and marketability (Stevens et al., 2015).

Students consider many factors when selecting a program of study, including their academic interests and abilities, the psychological and social benefits or satisfaction associated with that major, as well as postgraduaton employment prospects (Beggs et al., 2008; McKenzie

et al., 2017; Wilcoxson & Wynder, 2010). While there is a body of literature examining the relationships between these variables and the choice of a major, the data and findings overwhelmingly represent four-year college students. There is a need to study the relationships between various sociodemographic variables, including age, prior college, race/ethnicity, socioeconomic status, and veteran status, and program selection among community and technical college students, as their decisions have long-term impacts on their employment prospects and earnings potential (Baker et al., 2018; Beffy et al., 2012; Berger, 1988; Hu, 1996).

Employment Outcomes and Two-Year Colleges

Community and technical college students select majors in a complex choice environment. There are many options and modes of delivery, and students consider several dimensions, including required courses, expected rigor, and perceived labor market outcomes. Understanding how two-year students make this critical decision has significant consequences, as the choice of a major can have implications for future earnings and employment (Seifert et al., 2008). Furthermore, increased pressure from federal and state legislatures, performance funding models, and college rankings have also incentivized many community and technical colleges to focus more on improving student outcomes (Baker et al., 2018). National organizations such as Achieving the Dream, the Aspen Institute, and the American Association of Community Colleges have also played a critical role in spotlighting community and technical colleges' need to pay attention to student employment outcomes. To transform communities and improve student career outcomes, it is necessary to understand student choice behavior concerning programs of study.

The mission of the community college and that of the technical college differ in one critical aspect, a single emphasis on workforce outcomes. Community colleges have traditionally designed programs of study with academic transfer to four-year institutions in mind (Bailey et al., 2015). Conversely, technical colleges have historically offered terminal certificates and degrees, focusing on workforce education and career training. While both meet critically important community needs, one is fundamentally designed to promote transfer and the other to deliver employment outcomes. The design and types of programs, curriculum, and various modes of delivery of instruction reflect this. As consumers of higher education, students are acutely aware of this important distinction and most often choose technical colleges because of their emphasis on career training and job placement (Stevens et al., 2015).

Washington State's five technical colleges have similar missions, which seek to create a student experience grounded in hands-on learning and center on career training, job placement, and promoting student upward mobility (SBCTC, 2020). These technical colleges have done this quite effectively, outpacing their comprehensive counterparts in both retention and completion outcomes (SBCTC, 2020). According to the SBCTC (2020), of the 34 community and technical colleges in the state, the five with the highest completion and job placement rates are all technical colleges. While these performance metrics are impressive, are they producing these outcomes equitably for all groups of students?

Sociodemographic Factors and Choice of Program

The gender gap between males and females and program choice is well documented (ACT, 2013; Jacobs, 1986, 1995; Zafar, 2013). A 2013 ACT study examined program selection data from over 1.79 million ACT test takers and found significant gender discrepancies in

planned major choices in favor of females in the areas of Education, Health Sciences and Technologies, Health Administration and Assisting. Conversely, significant gender discrepancies in planned major choices favored males in the areas of Business, Computer Science, Engineering, and Mathematics, affirming old stereotypes and early similar findings by Jacobs (1986, 1995), who studied gender trends among college graduates in the 1980s, and Dawson-Threat and Huba (1996), who studied high school seniors. Additionally, gender also plays a role in program selection in relation to labor market outcomes (Hu, 1996; Zafar, 2013). Hu (1996) and Zafar (2013) found a positive correlation between gender and major choice selection. Hu (1996) found that female students seemed to be less motivated by salaries and benefits than their male counterparts, and Zafar (2013) found that not only was there a gender gap in student choice of major, but that choice had impacts on postcompletion earnings.

There is also a relationship between socioeconomic status and program selection (Castleman & Goodman, 2014; Montmarquette et al., 2001; Niu, 2017). Montmarquette et al. (2001) found that a student's interests, program information, and family socioeconomic background all impact the selection of a program of study and concluded that there were differences in the degree of impact for women and students of color. Niu (2017) used the Education Longitudinal Study data to study patterns of choice of STEM majors and socioeconomic background and found that "low-socioeconomic status students may not possess the information and/or skills necessary to make well-informed decisions of STEM enrollment" (p. 311).

Although less studied, race and ethnicity seem to influence a student's selection of a program of study (Thomas, 1985; Trent, 1984; Xie & Goyette, 2003). Thomas (1985) and Trent (1984) both found that African American students were more likely than their Caucasian

counterparts to select a program of study in lower wage-earning fields like education and the social sciences. Xie and Goyette (2003) studied the patterns of choice among Asian American students. They found concentrations in areas with high earnings potential, such as engineering and business, as a way to ensure upward social mobility, reversing earlier trends that showed Asian American students underrepresented in science and engineering (Astin & Astin, 1992; Oakes, 1990).

Career Factors and Choice of Program

There are two categories of career factors that influence a student's choice of a program of study. The first, student interest and ability, is nonpecuniary, and the second, wage-earning potential and marketability, is related to labor market outcomes. The relationship between student interest and ability as a motivator in selecting a program of study is supported in the literature (Allen & Robbins, 2008; Beggs et al., 2008; Wilcoxson & Wynder, 2010; Wiswall & Zafar, 2011). Beggs et al. (2008) identified factors that students consider integral to the process of selecting a major and determined that student interest was the most significant variable in program selection. Allen and Robbins (2008) and Wilcoxson and Wynder (2010) also found that a student is more likely to choose, persist, and complete a program of study based on interest-major fit.

Wiswall and Zafar's (2011) study investigated the determinants of college major choice and found that perceived ability and expected earnings were the most significant factors students consider in program selection. Aridiacono et al. (2010) and Stinebrickner and Stinebrickner (2014) also determined that a student's perceived aptitude or ability in a given field is an essential factor in the choice of a major. A study conducted by McKenzie et al. (2017) confirmed

these findings. It cited academic interest, aptitude, the psychological and social benefits associated with a major, and postgraduaton employment prospects as primary motivators for students when reselecting (changing) their major.

Pecuniary factors like wage-earning potential, marketability, and other labor market outcomes also play a minor role in student choice of a program of study (Arcidiacono et al., 2010; Baker, 2018; Beffy et al., 2012; Wiswall & Zafar, 2011). Students can project financial returns to various major categories or groups of majors (Arcidiacono et al., 2010; Huntington-Klein, 2015). However, they generally cannot accurately estimate the return on any given degree (Arcidiacono et al., 2010; Betts, 1996). Students from low-socioeconomic backgrounds tend to underestimate the value of a college degree (Attanasio & Kaufmann, 2017; Betts, 1996), and students with higher grade point averages make fewer errors when predicting wage-earning potential (Betts, 1996). Only one study found in the literature explicitly examined community college students, and none studied technical college students. Baker et al. (2018) studied the effects of labor market information on community college students and concluded that while two-year college students have some knowledge about labor market outcomes, that information is limited. Students ultimately decide their choice of major with mostly their hearts, not their financial interests, and when they make the decision with their heads, their assumptions about labor market outcomes are usually inaccurate.

Theoretical Framework

The theoretical framework that guides the study is Lent et al.'s (1997) social cognitive career theory (SCCT). SCCT has been widely used in higher education research to examine historically underserved students' STEM participation (Fouad & Santana, 2017; Wang, 2013)

and centers on the connection of three factors: self-efficacy, outcome expectations, and personal goals that influence an individual's career choice (Lent et al., 1994). Guided by SCCT, this study examines the relationship between student sociodemographics and the selection of programs with varying earning potential.

Bandura (1977) defines self-efficacy as the set of beliefs we hold about our ability to complete a particular task or behaviors required to produce a specific goal or outcome (Bandura, 1977). The more individuals believe they are likely to be successful in a given career field, the more likely they are to select that career (Bandura, 1986; Lent et al., 1994). Outcome expectations are defined as "beliefs about consequences or outcomes of performing particular behaviors" (Lent & Brown, 2006, p. 17). Outcome expectations, like self-efficacy, influence behavior. When individuals expect that a given behavior produces positive outcomes, they are more likely to engage in the behavior (Lent et al., 1994). A lack of self-efficacy in historically underserved groups may manifest itself in selecting a program of study that leads to lower wage outcomes. Finally, personal goals refer to an individual's intention to participate in any particular activity or produce a desired outcome (Bandura, 1986). Lent (2005) asserted that two types of goals, choice and performance, are related to self-efficacy and outcome expectations.

In historically underserved student groups, self-efficacy, outcome expectations, and personal goals may be influenced by the larger social and economic contexts. For example, gender plays a role in program selection in relation to labor market outcomes (Hu, 1996; Zafar, 2013). Hu's (1996) research on student perceptions of labor market conditions found that female students seemed to be less motivated by salaries and benefits than their male counterparts, and Wilson et al. (2015) found that women students may underestimate their academic ability and thus be less likely to major in STEM fields, which typically leads to higher earnings. African

American students are more likely than their Caucasian counterparts to earn undergraduate degrees in academic fields associated with careers in labor-intensive and low wage-earning jobs due to decades of systemic oppression (Karanja & Austin, 2014; Valencia, 2015).

Methods

This study employed a quantitative correlational methodology to examine the relationship between the factors that influence the selection of a low, medium, or high wage-earning career training program in Washington State technical colleges, with a primary focus on student demographics. "Correlational designs are procedures in quantitative research in which investigators measure the degree of association or relationship between two or more variables using the statistical procedure of correlational analysis" (Creswell, 2015, p. 21). This methodology is appropriate for answering the research questions as I sought to explain the relationship between the independent variables (student sociodemographics) and the dependent variable (student wage-earning potential). Creswell (2015) further states that "in correlational research designs, investigators use the statistical correlation test to describe and measure the degree of association between two or more variables" (p. 339). This study examines the relationship between variables, with a particular interest in their impact on historically underserved students, by answering the following research questions:

1) What is the relationship between age, economic disadvantage, sex, race/ethnicity, veteran status, and student's choice of a career training program in Washington State technical colleges?
2) To what extent does the impact vary for historically underserved groups such as economically disadvantaged students, students of color, and student veterans?

Data Source and Sample

A quantitative statistical analysis of secondary data was conducted by analyzing student records provided by the SBCTC. The population from which the sample was drawn includes records from students enrolled in career training programs at Washington State's five technical colleges: Bates Technical College, Bellingham Technical College, Clover Park Technical College, Lake Washington Institute of Technology, and Renton Technical College. Appendix A provides a brief introduction and profile of the five Washington State technical colleges in the study.

The Washington State Board for Community and Technical Colleges collects data from all 34 community and technical colleges in the state quarterly, and this data is factual information (Creswell, 2015, p. 151) reported by all member colleges. The SBCTC provided sociodemographic, program wage-level, and covariate data from all first-time enrolled students with a valid program code from the 2017, 2018, and 2019 fall quarters for an estimated total number of 30,000 students (unduplicated headcount).

Variables

The dependent (outcome) variable is an ordinal indicator of wage-earning potential for the student's current or last enrolled program based on a six-digit Classification of Instructional Programs (CIP) code (SBCTC, 2020). The United States Department of Education creates CIP codes to describe courses' subject areas and major areas of study, and the five technical colleges in the State of Washington use these standard CIP codes across all workforce programs. The SBCTC also classifies all workforce programs as either low, medium, or high wage based on

state employment data. A comprehensive listing of all programs categorized by low, medium, or high wage may be found in Appendix B.

The independent (predictor) variables in this study are age, economic disadvantage, prior college, sex, race/ethnicity, and veteran status. These variables are sociodemographic as they are related to a combination of social and demographic factors. Specifically, the SBCTC defines the term "economic disadvantage" as a student who received need-based financial aid during the year of enrollment (SBCTC, 2020). Socioeconomics, family status, first-generation status, sex, and race/ethnicity are prevalent in the literature (Montmarquette et al., 2001; Niu, 2017; Simpson, 2001) and correlate to employment completion outcomes in four-year environments. They also are relevant to the theoretical framework, as Lent's career choice model (Lent & Brown, 2013) asserts that individuals tend to pursue those outcomes they perceive as achievable and interesting. All variables and their characteristics are presented in Table 2.

Analytic Strategy

The descriptive analysis includes a frequency table that summarizes and describes the population, entering fall students in Washington State's five technical colleges. By examining the population, this study establishes a profile of the dependent variable (wage-earning potential) and the independent variables (age, economic disadvantage, prior college, sex, race/ethnicity, veteran status) and discusses the distribution of the values for the total sample by wage-earning group.

Table 2

Description of Final Variables

	Variable	Definition
Dependent Variable	Wage-Earning Potential	1 = Low wage-earning 2 = Medium wage-earning 3 = High wage-earning
Independent Variables	Age	1= 0-19 2 = 20-24 3 = 25-29 4 = 30-39 5 = 40-Over
	Economic Disadvantage	0 = No; 1 = Yes
	Prior Credits Earned	0 = No; 1 = Yes
	Race/Ethnicity	1 = White 2 = Black/African American 3 = Hispanic/Latinx 4 = Asian 5 = Pac Islander/Native Hawaiian 6 = American Indian/Alaska Native 7 = Other
	Sex	0 = Male; 1 = Female
	Veteran Status	0 = No; 1 = Yes

Given the nature of the outcome variable, ordinal logistic regression was employed in the inferential analysis. This statistical technique was selected because I sought to predict the relationship between the predictor variables (age, economic disadvantage, prior college credits, sex, race/ethnicity, veteran status) and the ordinal, categorical outcome variable (wage-earning potential), which is defined to be three level and ordered (Gravetter & Wallnau, 2014). High wage-earning potential was used as the reference group.

Before conducting the ordinal logistic regression, both multicollinearity and proportional odds assumptions were tested. The assumption of multicollinearity (Gareth et al., 2017) was met, indicating no multicollinearity issue. A score test for checking the proportional odds assumption was also executed. This assumption was violated, which is common given the liberal nature of the test of the proportional odds assumption (O'Connell, 2006). As a result, it was necessary to fit the ordinary logistic regression with unequal slopes. In other words, violation of the assumption of proportional odds means that at least one independent variable does not have an identical effect at each cumulative split of the ordinal dependent variable. To determine which independent variables should have unequal slopes across the cumulative odds for ordinal responses, stepwise selection was performed. Upon execution of this test, it was determined that all six predictor variables (age, economic disadvantage, prior college, race/ethnicity, sex, and veteran status) required unequal slopes.

The ordinal logistic regression was then run again with unequal slopes. In these specifications, unequal slopes remove the assumption that coefficients are equal between categories and instead produce an estimate for each model term at each partition of the scale. Odds ratios were then reported for each independent variable with equal and unequal slopes. Findings are outlined below in the results section.

Limitations

This research study's results should be generalized to entering technical college students in the State of Washington because the population was sampled from all five technical colleges across the state. Due to limitations in the data set, some contributing factors could not be adequately measured. The Washington State Board for Community and Technical Colleges does not capture high school grade point average at the point of entry, despite previous research showing students with higher grade point averages are more likely to complete (Bowen et al., 2009; Dougherty & Reddy, 2013) and make fewer errors when predicting wage-earning potential (Betts, 1996). The SBCTC also does not collect high school completion data at the point of application. Neither variable was able to be analyzed as covariates.

There are also limitations regarding how the Washington State Board for Community and Technical Colleges captures and operationalizes data. While the SBCTC does capture gender data, including trans and nonbinary categories for matriculated students, it continues to capture and report data on biological sex at the point of entry. Additionally, the SBCTC uses deficit language to define terms like "economic disadvantage," referring to lower socioeconomic status students. Both of these examples underscore the need to further examine data collection methods and semantics in a way that reflects today's students.

Results

Descriptive Statistics

Descriptive statistics were computed to explore the relationship among the variables and compare participants' demographic characteristics (age, economic disadvantage, prior college,

sex, race/ethnicity, veteran status). The outcome variable, wage-earning potential, shows that of the 30,258 student records analyzed, 27.77% of students selected a low wage-earning program (wage=1), 52.52% of students selected a medium wage-earning program (wage=2), and 19.70% of students selected a high wage-earning program (wage=3). A summary of the predictor variables (age, economic disadvantage, prior college, race/ethnicity, sex, and veteran status) by wage-earning group is provided in Table 3.

Multicollinearity Assumption

The first assumption underlying ordinal logistic regression is that there is no multicollinearity issue (i.e., the independent variables are not highly correlated). Variance inflation factor (VIF) is commonly used to check for multicollinearity among independent variables in regression models (Gareth et al., 2017). When dealing with categorical independent variables (in this case, race and age), generalized VIF (GVIF) can be used (Fox & Monette, 1992). GVIF^(1/(2*Df)) was calculated to make GVIF comparable across dimensions, where Df is the number of coefficients in the subset. GVIF^(1/(2*Df)) is acceptable when the result is smaller than 2. All of the GVIF^(1/(2*Df)) values are significantly smaller than 2, indicating no multicollinearity issue. Table 4 shows the test for multicollinearity assumption.

Table 3

Descriptive Frequencies by Wage-Earning Potential

Variable	Full Sample	Wage-Earning Group (%) Low	Medium	High
Sex				
Male	14458	22.3	67.3	10.4
Female	15800	32.8	39.0	28.2
Race/Ethnicity				
Not Reported	2609	22.4	56.7	20.9
White	15580	25.3	53.6	21.1
Black/African American	2585	38.0	45.5	16.5
Hispanic/Latinx	2226	35.8	48.9	15.3
Asian	2970	27.2	53.3	19.5
Pacific Islander/Native Hawaiian	291	34.0	46.0	20.0
American Indian/Alaska Native	313	46.6	39.9	13.4
Other	3684	28.3	53.1	18.5
Age				
0-19	5310	32.4	57.7	9.9
20-24	8114	27.5	53.3	19.3
25-29	5643	24.3	51.1	24.6
30-39	6397	26.9	49.3	23.8
40-Over	4794	28.5	51.4	20.1
Economic Disadvantage				
No Economic Disadvantage	18083	28.0	52.3	19.7
Economic Disadvantage	12175	27.8	52.5	19.7
Veterans Status				
Non-Veteran	28099	28.1	51.6	20.3
Veteran	2159	23.9	64.7	11.4
Prior Credits Earned				
No Prior Credits	9283	30.2	53.4	16.4
Prior Credits	20975	26.7	52.1	21.1
Number of Observations	30,258	8,404	15,893	5,961

Table 4

Test for Multicollinearity Assumption

Variable	GVIF	Df	GVIF^(1/(2*Df))
Age (Factor)	1.188248	4	1.021794
Economic Disadvantage	1.058753	1	1.028957
Prior Credits Earned	1.052915	1	1.026116
Race/Ethnicity (Factor)	1.062509	7	1.004340
Sex	1.072049	1	1.035398
Veteran Status	1.102218	1	1.049866

Proportional Odds Assumption

The second assumption underlying ordinal logistic regression is that the relationship between each pair of outcome variables is the same often referred to as the proportional odds assumption or assumption of parallel lines (National Centre for Research Methods, 2011). Ordinal logistic regression assumes that the coefficients that describe the relationship between, for example, the lowest versus all higher categories of the response variable are the same as those that describe the relationship between the next lowest category and all higher categories (Harrell, 2001). This is called the proportional odds assumption. The score test for the proportional odds assumption (Table 5) demonstrates that the proportional odds assumption is violated since the p-value is less than 0.05 (p <.0001). Therefore, it is necessary to fit the ordinal logistic regression with unequal slopes.

Table 5

Score Test for Checking Proportional Odds Assumption

Chi-Square	Df	Pr > ChiSq
2840.8878	15	<.0001

Ordinal Logistic Regression (Equal Slopes)

Table 6 shows the odds ratio for each predictor variable with equal slopes. Every independent variable is significant at a 5% level except economically disadvantaged students and students in the age range of 20-24. The odds of choosing a low wage-earning program over a high wage-earning program were increased by a factor of 1.421 for students between the ages of 0-19 compared to the reference group (age 40-over; $p < .05$). Females were statistically less likely to select a low wage-earning program by a factor of 0.870 ($p < .05$). Veterans were more likely to select a low wage-earning program than non-veterans by a factor of 1.206 ($p < .05$).

All students of color (non-White students) were statistically more likely to select a lower wage-earning program of study than their White counterparts. Asian students' odds of choosing a low wage-earning career rather than a high wage-earning career increase by a factor of 1.162 compared with White students ($p < .05$). The odds of selecting a low wage-earning career for American Indian/Alaska Natives increase by 2.492 ($p < .05$). Black/African American students' odds of choosing a low wage-earning career increase by a factor of 1.775 compared with the reference group ($p < .05$). For Hispanic/Latinx students, the odds of choosing a low wage-earning program increase by 1.540 ($p < .05$), and for Pacific Islanders, the odds of selecting a low wage-earning career increase by a factor of 1.347 when compared with White students ($p <$

.05). Lastly, the odds of choosing a low wage-earning career for students who identify as "other" increase by a factor of 1.167 compared with White students ($p < .05$).

However, the estimates in Table 6 are biased, as the proportional odds assumption has been violated. Stepwise selection was performed, and it was determined that all independent variables should have unequal slopes across the cumulative odds for ordinal responses.

Ordinal Logistic Regression (Unequal Slopes)

A description of the odds ratios for each predictor variable using unequal slopes for low wage-earning potential compared with high wage-earning careers is represented in Table 7. In other words, the violation of the proportional odds assumption indicates that the relationships between each pair of outcome groups are not all the same and that different models are needed to describe these relationships.

The odds of choosing a low wage-earning career rather than a high wage-earning career increase by a factor of 1.136 and 1.012 respectively for students aged 0-19 and 20-24 versus the reference age group (40-Over; $p < .05$). However, the odds of choosing a low wage-earning career are lower for students aged 25-29 and 30-39 by a factor of 0.823 and 0.919, respectively, versus the comparison group (40-Over; $p < .05$). The odds of females choosing a low wage-earning career increase by a factor of 1.735 when compared with males ($p < .05$).

Table 6

Odds Ratio Estimates (Equal Slopes)

Variable	Point Estimate	95% Wald Confidence Limits		Standard Error
Age				
0-19	1.421*	1.316	1.536	0.0395
20-24	1.000	0.933	1.071	0.0353
25-29	0.770*	0.715	0.830	0.0378
30-39	0.837*	0.779	0.899	0.0367
Economic Disadvantage	1.041	0.995	1.089	0.0231
Prior College Credits	0.870*	0.829	0.913	0.0245
Race/Ethnicity				
Not Reported	0.922*	0.851	0.998	0.0406
Black/African American	1.755*	1.619	1.902	0.0412
Hispanic/Latinx	1.540*	1.414	1.677	0.0436
Asian	1.162*	1.078	1.253	0.0384
Pac Islander/Hawaiian	1.347*	1.079	1.682	0.1133
Am Indian/Alaska Native	2.492*	2.009	3.091	0.1099
Other	1.167*	1.089	1.250	0.0352
Female	0.870*	0.832	0.910	0.0228
Veterans	1.206*	1.105	1.317	0.0448
Number of Observations	14,365			

Notes. Reference groups: 40-over, no economic disadvantage, no prior credits, White, male, non-veterans. * $p < .05$

The odds of choosing a low wage-earning career is statistically higher for all students of color (i.e., Black/African American, Hispanic/Latinx, Asian, Pacific Islander/Native Hawaiian, American Indian/Alaska Native, other) compared to their White counterparts. Asian students' odds of choosing a low wage-earning career rather than a high wage-earning career increase by a factor of 1.096 compared with White students ($p < .05$). For Black/African American students, the odds of choosing a low wage-earning career increase by a factor of 1.796 when compared with White students ($p < .05$). The odds of choosing a low wage-earning program for Hispanic/Latinx students increase by 1.544 ($p < .05$); Pacific Islander/Native Hawaiians' odds of selecting a low wage-earning career increase by a factor of 1.481 when compared with White students ($p < .05$). The odds of selecting a low wage-earning career for American Indian/Alaska Natives increase by a factor of 2.537 ($p < .05$). Lastly, the odds of choosing a low wage-earning career for students who identify as "other" increase by a factor of 1.128 compared with White students ($p < .05$).

Finally, the odds of choosing a low wage-earning career decrease by a factor of 0.941 for economically disadvantaged groups when compared with groups not economically disadvantaged ($p < .05$). Students with prior college credits were also less likely by a factor of 0.902 to select a low wage-earning program when compared with their peers with no college credits ($p < .05$). The odds of choosing a low wage-earning career are not statistically related to student veterans status.

Table 7

Odds Ratio Estimates – Low vs. High Wage Earning (Unequal Slopes)

Variable	Point Estimate	95% Wald Confidence Limits		Standard Error
Age				
0-19	1.316*	1.204	1.438	0.0454
20-24	1.012	0.933	1.098	0.0415
25-29	0.823*	0.754	0.900	0.0452
30-39	0.919*	0.845	1.001	0.0432
Economic Disadvantage	0.941*	0.892	0.993	0.0274
Prior College Credits	0.902*	0.853	0.954	0.0284
Race/Ethnicity				
Not Reported	0.867*	0.785	0.957	0.0507
Black/African American	1.796*	1.643	1.964	0.0455
Hispanic/Latinx	1.544*	1.404	1.699	0.0486
Asian	1.096*	1.002	1.198	0.0455
Pac Islander/Native Hawaiian	1.481*	1.156	1.896	0.1261
Am Indian/Alaska Native	2.537*	2.022	3.184	0.1158
Other	1.128*	1.040	1.223	0.0414
Female	1.735*	1.645	1.831	0.0274
Veterans	1.072	0.962	1.194	0.0553
Number of Observations	14,365			

Notes. Reference groups: 40-over, no economic disadvantage, no prior credits, White, male, non-veterans. * $p < .05$

Table 8 shows the odds ratios for each predictor variable when comparing low or medium vs. high wage-earning programs of study with unequal slopes. The odds of choosing a low or medium wage-earning career increase by a factor of 1.999 and 1.018 respectively for students aged 0-19 and 20-24 versus the reference age group (40-Over; $p < .05$). The odds of choosing a low or medium wage-earning career increase by a factor of 1.190 for economically disadvantaged groups vs. groups not economically disadvantaged ($p < .05$), a statistically significant effect.

The odds of choosing a low or medium wage-earning program of study is statistically higher for all students of color (Black/African American, Hispanic/Latinx, Asian, Pacific Islander/Native Hawaiian, American Indian/Alaska Native, other) compared to their White counterparts. Asian students' odds of choosing a low or medium wage-earning career increase by a factor of 1.295 compared with White students ($p < .05$). For Black/African American students, the odds of choosing a low or medium wage-earning career increase by a factor of 1.539 ($p < .05$). The odds of choosing a low or medium wage-earning program for Hispanic/Latinx students increase by a factor of 1.544 when selecting a career ($p < .05$). Pacific Islander/Native Hawaiians' odds of selecting a low or medium wage-earning career increase by a factor of 1.176 when compared to White students ($p < .05$), and the odds of selecting a low or medium wage-earning career for American Indian/Alaska Natives increase by a factor of 1.969 ($p < .05$). Lastly, the odds of choosing a low or medium wage-earning career for students who identify as "other" increase by a factor of 1.224 compared with White students ($p < .05$).

The odds of choosing a low or median wage-earning career increase by a factor of 1.521 for veterans vs. non-veterans ($p < .05$), a statistically significant effect. Table 8 shows the odds

ratios for each predictor variable when comparing low or medium vs. high wage-earning programs of study with unequal slopes.

Table 8

Odds Ratio Estimates – Low or Medium vs. High Wage Earning (Unequal Slopes)

Variable	Point Estimate	95% Wald Confidence Limits		Standard Error
Age				
0-19 vs 40-over	1.999*	1.777	2.248	0.0600
20-24 vs 40-over	1.018	0.929	1.116	0.0468
25-29 vs 40-over	0.723*	0.657	0.795	0.0486
30-39 vs 40-over	0.753*	0.687	0.827	0.0475
Econ Disadvantage	1.190*	1.120	1.264	0.0309
Prior College Credits	0.818*	0.766	0.874	0.0338
Race/Ethnicity				
Not Reported	0.972	0.875	1.079	0.0534
Black/African American	1.539*	1.375	1.722	0.0574
Hispanic/Latinx	1.544*	1.365	1.746	0.0629
Asian	1.295*	1.171	1.432	0.0513
Pacific Islander/Native Hawaiian	1.176	0.877	1.578	0.1499
Am Indian/Alaska Native	1.969*	1.421	2.728	0.1665
Other	1.224*	1.115	1.344	0.0477
Female	0.310*	0.290	0.331	0.0336
Veterans	1.521*	1.321	1.752	0.0721
Number of Observations	30,258			

Notes. Reference groups: 40-over, no economic disadvantage, no prior credits, White, male, non-veterans. * $p < .05$.

Discussion

The results from the ordinal logistic regression models (with equal slopes and unequal slopes) reveal that all six predictor variables (age, economic disadvantage, prior college experience, race/ethnicity, sex, and veteran status) are associated with students' choice of a career training program in Washington State technical colleges. These critical findings among two-year college students align largely with and expand upon the existing research on four-year students.

Younger students were more likely to select a lower wage-earning career training program of study, but their likelihood of selecting a higher wage-earning program increases as they age. Students age 25-over selected higher wage-earning programs. These findings contribute to a sociodemographic variable largely absent in the literature. As students age (gain more life experience), their confidence in their ability to complete a chosen program increases (Lent et al., 1994), as does their outcome expectations.

In contrast to age, the relationship between socioeconomic status and major selection is widely addressed in the literature among four-year students (Castleman & Goodman, 2014; Montmarquette et al., 2001; Niu, 2017). Similar to findings in the literature, this study determined that economically disadvantaged students were more likely to select a low or medium wage-earning program of study.

Similar to age, students without prior college credits are more likely to select a low or medium wage-earning career training program of study in Washington State technical colleges. The more experience a student has taking college-level coursework, the more their self-efficacy

and outcome expectations (Bandura, 1986; Lent et al., 1994), thus influencing choice behaviors around program selection.

Consistent with earlier findings from Thomas (1985) and Trent (1984), African American students were more likely to select a lower wage-earning career training program of study. Furthermore, all other students of color were also less likely to select a high wage-earning program, which is in contrast to a study by Simpson (2001) that found "the differences in selection of academic major can no longer explain differences between racial groups in earning differential" (Simpson, 2001, p. 91). In the case of the over 30,000 students studied in the five participating technical colleges, race and ethnicity, with the exception of only White students, led to the selection of a lower wage-earning program of study.

Findings from the study reveal that women were more likely than men to choose a lower wage-earning career training program, affirming previous studies in four-year students that found that gender played a role in program selection in relation to labor market outcomes (Hu, 1996; Zafar, 2013). Female students are less motivated by salaries and benefits than their male counterparts (Hu, 1996), and major selection impacts postcompletion earnings (Zafar, 2013). Nonpecuniary factors drove choice in 50% of males and 75% of females.

Previous research on veterans' labor market outcomes is limited, but the consensus is that veterans do exhibit some postcompletion labor market advantages (Steele et al., 2018). These findings, however, only speak to postbaccalaureate employment and earnings. The veteran students who participated in this study of two-year students were more likely to select a low or medium wage-earning career training program than their non-veteran counterparts.

These research findings establish a clear relationship between all historically underserved groups researched and their selection of a lower wage-earning program of study. These groups of

students make decisions differently, leading to less equitable outcomes. Findings should support practitioners in designing evidence-based interventions to support student decision making in the entry process, along their pathway, and in postcompletion labor outcomes. Furthermore, interventions should be intentionally provided based on students' academic performance rather than demographic characteristics when possible. This task becomes a bit more complex in technical college environments of primarily adult learners.

These findings also raise some important questions regarding the larger contexts underlying (sometimes false) assumptions surrounding dominant discourses in practice. For example, there is an assumption in practice that students have free agency when selecting a major. Are students of color and other historically underserved groups choosing a major, or are they systematically funneled into lower-wage programs? Admittedly, one's social class and available resources can largely structure their education opportunities and outcomes (McDonough, 1997; St. John, 2004).

Additionally, the study presupposes that higher wage-earning careers are more desirable than their low or medium wage-earning counterparts. While increased earnings and upward economic mobility are core to the mission of technical colleges, communities still need early childhood educators, auto mechanics, and cosmetologists. While the Washington State technical colleges advise prospective students before enrollment, student affairs practitioners often possess unconscious biases. Continued training and development of staff can help them work more effectively with students in an effort to interrupt these discourses.

CHAPTER 3

REFLECTION

Reflection on the Dissertation Process

As I reflect on this process, first, I think about my original goals and interests and compare and contrast those to the course of actions I ultimately took. Then in hindsight, I think about what went well and what perhaps could have been done a little differently. Lastly, I reflect on what I would have done differently as I navigated the research and writing process.

My passion for working with community and technical college students has spanned more than fifteen years. I knew early on that I wanted to engage in research that would be meaningful in two ways to me and the students I serve. First, I wanted to support students in their decision making process from the very beginning of their journey. Over the years, I have seen so many community and technical college students make the critical decision of selecting a program of study with very little rhyme or reason, all too often leading to less than favorable outcomes. To properly support them, I felt I needed to study them adequately. Second, I wanted to impact equity outcomes. Like so many others, my college's data show that students of color and other historically underserved populations were completing at significantly lower levels than their Caucasian counterparts. My job as Vice President for Student Affairs is to create meaningful pathways and engagement, ensure all students are learning both inside and outside of the classroom, and improve completion outcomes that lead to better jobs. My college's mission is

"educating tomorrow's workforce," and I am in the business of changing student lives, improving economic conditions, and impacting my community for the better.

To support my college in its mission fulfillment, I knew we needed to do things differently. As part of its statewide Guided Pathways efforts, the community and technical college system in Washington State began a five-year process to transform how it supports and delivers student success, emphasizing improving historically underserved students' outcomes. Bailey et al. (2015) define the Guided Pathways model as an integrated, institution-wide approach to student success based on intentionally designed, clear, coherent, and structured educational experiences, informed by available evidence, that guide each student effectively and efficiently from their point of entry through to the attainment of high-quality postsecondary credentials and careers with value in the labor market. My college has reimagined its entry process through its Guided Pathways efforts employing a high-touch, intrusive approach to new-student intake. The most critical part of its reimagined process is selecting a program of study. I chose to engage in this research because I wanted to better understand the decisions students were making at the point of entry, with an eye towards historically underserved students. I hoped that with a better understanding of student decision making, colleges around the state could provide more informed, data-driven student supports that lead to more equitable outcomes.

I knew even before I began the doctoral program that this is where my passion lay, and while I have learned so many new things from the program, ultimately, my research interests have remained the same. A very wise colleague of mine told me that if I knew what I wanted to study early on, I should review as much literature as I could find and write as many papers as possible on the topic, and that is precisely what I did. In reflection, this recommendation was probably the best piece of advice I received. The research courses in the program also affirmed

my passion for quantitative research. This program has been a fantastic learning tool and vehicle to refine, hone, and execute my research skills and plan.

In hindsight, many things went well in the dissertation process. First, because I identified my research interest early on in the program, I already had a wealth of knowledge and writing on the topic. I immersed myself in the subject matter, literature, and data for two years before writing the dissertation, making the process far more efficient than I thought it would be. Additionally, I heeded another piece of advice from a colleague who suggested that I choose existing data at the state level to work with that was factual and accessible. This advice was yet another piece of great counsel. Second, I identified an advisor early on. I selected an advisor who specialized in quantitative research, expressed an interest in my topic, and matched my work style. Lastly, I was offered a three-month paid sabbatical to write the dissertation, which I gladly accepted. It indeed has been a gift, and without it, I undoubtedly would not have moved through this process as quickly.

The writing process also went well. I spent a month of my sabbatical alone abroad, which allowed me to focus solely on writing. I do not know that I would say that something did not go well. It took a bit longer than expected to receive the Washington State Board for Community Colleges data than I thought it would. Given the size and scope (five colleges) of the data request and requisite paperwork, it still came in within a reasonable time frame. I also originally planned to conduct a binary logistic regression on the data. Upon receipt, I determined that I needed to run ordinal logistic regression, which was a bit more technical and required additional training and analysis. In retrospect, I would have spent more time studying these statistical procedures.

Honestly, there is not much that I would do differently. I was given excellent advice from colleagues and my advisor, and I listened. If I could do anything differently, I think I would have

been more disciplined with writing time. I am a full-time professional and father of two. Before my sabbatical, balancing my full-time job, my family, and my research was challenging. I am not sure how some are doing it, and I can easily understand why almost half of the students who begin a doctorate never finish it. Sacrifices have to be made to complete, and each of us has to determine whether they are worth the benefits. While I have missed out on some valuable moments with my family, I feel that in the end, it will be worth what I will be able to provide for them as a college president.

Application to Professional Practice

Existing research on program selection behaviors overwhelmingly represents students enrolling in a four-year college or university. While these findings were a critical first step in the literature, more research was needed to explore the factors that impact community and technical college students' choices. It was particularly crucial to understand the relationships between various sociodemographic factors influencing community and technical college student success outcomes, potential future earnings, and career trajectory because they directly impact mission fulfillment. This study's research findings establish a clear relationship between all historically underserved groups and their selection of a lower wage-earning program of study in all five Washington State technical colleges, including my own. These groups of students make decisions differently, leading to less equitable outcomes. Findings from this research will support me as a leader and practitioner on my campus as we continue to implement Guided Pathways in evidence-based intervention design to support student decision making in the entry process.

While current admissions and entry services practices among technical colleges across the state vary, most require students to meet with an entry advisor before enrolling in first-term

classes. In contrast to comprehensive community colleges in the state, there are no general studies or general transfer options for students in technical colleges, and students must declare a major prior to enrollment. Findings from this study will support practitioners statewide as they make evidence-based decisions around the types of resources available to students, how referrals are made to those resources, and how admissions and entry services practitioners support students as they navigate the entry process.

Furthermore, the research findings will inform new intervention designs that promote a more equity-minded approach to advising historically underserved students. Current practices approach students equally (giving everyone the same thing) and not equitably (giving each person what they need). A more equity-based, individualized approach is designed to better inform students and produce better program selection, completion, and employment outcomes, particularly for historically underserved student populations who already experience equity gaps. These research findings will be shared statewide and provide community and technical college professionals insight as they reimagine admissions and entry processes. This research has established that all groups of historically underserved students make program selection choices differently. We now have a responsibility to intervene to continue to improve completion and employment outcomes for these students.

Specifically, on my campus, we will use the research findings as a launchpad for continued transformation in our entry process. Students need more direct career support in the entry process. Notably, students of color, economically disadvantaged students, veterans, younger students, and students without prior college experience tend to make decisions about career pathways without enough breadth or depth of exposure to the full menu of options. It is incumbent upon community and technical college professionals to spend more time engaged in

conversations around career as well as introduce students to career instruments that will provide them with more information regarding pathways, outcomes, and postcompletion earnings. My campus has recently begun to pilot a required career interest inventory in the entry process, and the findings from this study support scaling it to all prospective students. For students of color and other historically underserved students, more exploration and exposure will hopefully lead to selecting a medium- or high-wage program of study.

Additionally, more thought needs to be given to the types of conversations and advising we provide to students in the entry process. The entry process is where critical career decisions are made. From this research, we know that historically underserved students are systematically making decisions to enroll in lower wage-earning programs of study. To change this, our approach to advising these students must change. Higher education and its systems were built by Caucasian men for Caucasian men. It should be no surprise that these systems are not working for the new, more diverse community and technical college demographic. I look forward to working with my team to reinvent what these conversations look like to impact our programs' composition and outcomes.

It will also be necessary as a campus to have conversations around the breadth of programs that we offer and the labor market outcomes they are currently (not) producing. This research has been eye opening, and the realization that only 19.7% of the Washington State technical colleges' pathways lead to a high wage-earning job is alarming. Furthermore, the majority of students accessing these programs are Caucasian students. Data is a potent tool for change, and clearly, further introspection is needed statewide if we genuinely want to produce more equitable outcomes and create systems that work for all students.

Implications for Future Research

This study will hopefully serve as a catalyst for future research among community and technical college students as they are largely left out of the literature. Specifically, more research is needed that studies two-year students in traditional community college environments, as this study was conducted using technical college students. Similar findings in student populations primarily engaged in transfer pathways would have broad equity implications. Are students of color and other historically underserved student populations selecting lower wage-earning transfer pathways? Are they transferring to four-year institutions at equitable rates? What are postcompletion outcomes for these students? These are all critical questions still to be investigated.

Also, now that the types of decisions students are making have been established, it will be essential to determine why students are making the decisions they are making. More qualitative inquiry is needed to better understand the psychology of community and technical college students as they enter college and select a program of study. Lastly, future research should address limitations in this study. Due to data collection processes in Washington State, high school completion and high school grade point average are not systematically captured at the point of application. Additional research may be able to better analyze the impact these covariates have on student decision making.

This doctoral program, its coursework, and the process of writing a dissertation have taught me so many valuable lessons and skills that I believe will make me a better practitioner and professional. Earning a doctorate is so much more than what we learn in the classroom, and executing a research project from beginning to end is a vital part of that learning process. It is

about honing problem-solving and critical-thinking skills, learning how to vet and review existing literature on a topic, developing a sound analytic strategy, conducting statistical analysis, and interpreting and translating those findings into concrete recommendations for practice. At the end of this process, I am a more thorough researcher, willfully data driven in my approach, and a better writer. I have added some essential tools to my toolbelt by completing the coursework and the dissertation (a proposal, journal article, and reflections). This process has also given me a greater appreciation of why it is so important that college leaders have terminal degrees.

Writing a journal article(s) for publication is one of the new, essential skills I have learned. Many community and technical college leaders take on leadership roles both on and off campus, present nationally, write grants, implement new programs and services, and manage large budgets. I am one of those leaders and have been refining those skills for over twenty-five years. I must admit that, like many other community college leaders, the one area lacking in my resume is publications. Community college leaders do not contribute to the literature enough, and the process of writing a journal article has given me this essential tool for my toolkit. My article-writing process was educational, mind opening, and enriching. It has opened a very important door to an entirely new realm of professional interest and development.

What I have learned about conducting and publishing research from this experience is that community and technical college leaders can be great practitioners as well as thoughtful contributors to scholarly research. As young higher education professionals, we are generally taught to leave practice to the practitioners and research to the professors. The field can only benefit from more cross-pollination in this area. Having completed this research project, I look at research differently. As is the case with many things, more exposure has made me more

comfortable and competent around the literature and research. I no longer feel like it is something that only professors do, but a practice in which community and technical college leaders must also engage. If we as community and technical college leaders want to improve our students' outcomes, we must contribute to the body of knowledge that will lead us to mission fulfillment.

Going forward, I will certainly be more aware of the literature, the data, and the research process. I am confident this will make me a better community college leader and scholar. How I think about any given subject has changed. I am more critical and vet information more thoroughly. I have always been data driven in my approach. Still, I now question a bit more when others make statements in absolutes without data that has been under statistical scrutiny or espouse facts that are not grounded in the literature. This doctoral program, the coursework and the dissertation, has genuinely been rewarding and transformational. I am a better person, practitioner, and researcher because of it.

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APPENDIX A

PARTICIPATING COLLEGE PROFILES

Bates Technical College

Bates Technical College is located in Tacoma, Washington, an urban area of more than 200,000 people in the greater Seattle Metro area. Bates serves over 7,000 students annually, with 32% of its student body identifying as students of color. Seventy percent of the student body at Bates are pursuing workforce education programs, and the median age of its student body is 32 (SBCTC, 2019).

Bellingham Technical College

Bellingham Technical College serves over 5,300 students annually and is located in northwestern Washington State adjacent to the Canadian border. Seventy-six percent of its student body are enrolled in workforce development programs, 53% of students receive need-based financial aid, and the average student is 27 years old (SBCTC, 2019).

Clover Park Technical College

Clover Park Technical College is located in suburban Tacoma, Washington. In 2019, over 6,500 students were enrolled, with 84% of the student body pursuing workforce development programs. Its student body is racially and ethnically diverse, with students of color comprising 40% of the campus. Its student body's median age is 30, and Clover Park has the most gender diversity among all technical colleges, with women representing 66% of the population (SBCTC, 2019).

Lake Washington Institute of Technology

Lake Washington Institute of Technology is comprised of over 6,500 students annually and is located in an affluent suburb of Seattle, Washington. Sixty-four percent of the student body are enrolled in workforce programs, and 62% of students identify as Caucasian; 38% are non-White, with the most significant representation of Asian students, at 21%. Students

receiving need-based financial aid are the lowest of all technical colleges, at 38%, and the average student is 31 years old (SBCTC, 2019).

Renton Technical College

Renton Technical College is located in Renton, Washington, a large suburb of Seattle. The college served over 9,400 students in 2019, and RTC students represented the most racial and ethnic diversity in the state, with 60% identifying as non-White. Seventy-six percent of the student body was enrolled in workforce education programs, and almost half of enrolled students held a job while they were attending college. The median age of the student body is 30 (SBCTC, 2019).

APPENDIX B

CLASSIFICATION OF CIP PROGRAM CODES BY WAGE-EARNING CATEGORIES

Earning Potential	Program Name	CIP Code
Low Wage Earning *(less than $14.00 per hour)*	Administrative Assistant & Secretarial Science	520401
	Animation, Interactive Tech, Video Graphics	100304
	Autobody/Collision & Repair Technology	470603
	Automotive Mechanic/Technician	470604
	Baking & Pastry Arts/Baker/Pastry Chef	120501
	Building Construction Technology/Technician	469998
	Child Care Provider/Assistant	190709
	Community Health Services/Liaison	511594
	Cosmetology, Barber/Stylist & Nail Instructor	120413
	Culinary Arts/Chef Training	120503
	Culinary Miscellaneous	129903
	Dental Laboratory Technician	510603
	Desktop Publishing & Digital Imaging Design	100303
	Early Childhood Education & Teaching	131210
	Electrical & Electronics Engineering Technology	141001
	Entrepreneurship	520701
	Executive Assistant/Executive Secretary	520402
	Fishing & Fisheries Sciences & Management	030301
	Information Technology	110103
	Legal Administrative Assistant/Secretary	220301
	Mechanical Engineering Technology	141901
	Medical Admin Assistant/Medical Secretary	510716
	Medical Insurance Coding Specialist	510713
	Medical Receptionist	510712
	Motorcycle Maintenance & Repair Technology	470611
	Musical Instrument Fabrication & Repair	470404
	Nursing Assistant/Aide	513902
	Office Automation/Data Entry	520407
	Office Management & Supervision	520204
	Office Occupations & Clerical Services	520408
	Pre-Nursing	240101
	Receptionist	520406
	Small Engine Mechanics & Repair Technology	470606
	Sport & Fitness Management	310504
	Vehicle Parts & Accessories Marketing Operations	521907
	Veterinary Science	510808

Earning Potential	Program Name	CIP Code
Medium Wage Earning *($14.00-$17.55 per hour)*	Emergency Medical Technician (Paramedic)	510904
	Engineering Technologies/Technicians	150000
	Environmental Engineering Technology	150507
	Fire Science/Firefighting/Fire Systems Technology	430203
	Funeral Direction/Service	120302
	Health Services/Allied Health/Health Sciences	510000
	Health Unit Coordinator/Ward Clerk	510703
	Heating/Air Conditioning/Ventilation Technology	470201
	Horticulture	010601
	Human Resources Management/Personnel Admin	521001
	Human Services, General	440000
	Industrial Electronics Technology	470105
	Industrial Mechanics and Maintenance Technology	470303
	Interior Design	500408
	Laser and Optical Technology/Technician	150304
	Machine Tool Technology	480501
	Manufacturing Engineering Technology	150613
	Marketing Management	521401
	Massage Therapist	513501
	Mechanical Drafting & Mechanical Drafting	151306
	Mechanical Engineering Technology	150805
	Medical Office Management	510705
	Medical/Clinical Assistant	510801
	Microcomputer Applications, General	110601
	Ophthalmic Technician/Technologist	511803
	Pharmacy Technician	510805
	Phlebotomy Technician	511009
	Radio & Television Broadcasting Technology	100202
	Renal/Dialysis Technician	511011
	Retail Management	520212
	Sheet Metal Technology	480506
	Somatic Bodywork & Related Therapeutic Services	513599
	Sterile Processing Technology/Technician	511012
	Substance Abuse/Addiction	511501
	Surveying Technology	151102
	System, Networking & LAN/WAN Management	111002
	Truck & Bus Driver/Commercial Vehicle Operator	490205
	Upholstery	480303
	Web Page, Digital & Multimedia Design	110801
	Welding Technology	480508

Earning Potential	Program Name	CIP Code
High Wage Earning *(more than $17.55 per hour)*	Biomedical Technology	150401
	Building/Home/Construction Inspection	460403
	Building/Property Maintenance	470498
	Carpentry/Carpenter	460201
	Computer Science	110701
	Construction Management	522001
	Data Modeling/Warehousing & Database Admin	110802
	Dental Hygienist	510602
	Energy Systems Installation and Repair Technology	470501
	Hearing Instrument Specialist	510918
	Histologic Technology	511008
	Industrial Mechanics and Maintenance Technology	470396
	Instrumentation Technology	150404
	Licensed Practical Nursing	513901
	Logistics, Materials & Supply Chain Management	520203
	Medical Radiologic Technology (Radiation Therapist)	510907
	Occupational Therapy Assistant	510803
	Operations Management & Supervision	520205
	Physical Therapy Assistant	510806
	Public Health, General	512201
	Registered Nursing	513801
	Surgical Technology	510909