

UNDERSTANDING TEACHER RETENTION THROUGH THE LENS OF SECONDARY
MATHEMATICS TEACHERS IN HAWAI'I: A MIXED METHODS STUDY

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI'I AT MĀNOA IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF EDUCATION
IN

PROFESSIONAL EDUCATIONAL PRACTICE

AUGUST 2020

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Keywords: teacher retention, self-determination theory, Hawai'i mathematics teachers, school leadership, teacher job satisfaction, teacher autonomy, teacher competence, teacher relationships

Dedication

This paper is dedicated to my trail-blazing grandmother, Virginia Martin-Boulton, and her precious daughter, my mother, Virginia Ann Foster. These two strong women taught me about love, perseverance in the face of adversity, and to cherish all living things placed before us by our Creator.

Acknowledgements

First, I would like to express my deepest appreciation to the chair of my committee, Dr. Trúc Nguyen. Dr. Nguyen's intellect, peppered with a sense of humor, scholarly advice, and guidance have been an endless source of inspiration and support to me. I am also grateful to my committee members, Dr. Nathan Murata, Dr. Sylvia Hussey, and Dr. Steven Nakasato, all busy educators and leaders who readily shared their time and expertise with me. Their encouragement, feedback, and confidence in me helped me more than they know. To Dr. Larson Ng, thank you for providing me "just-in-time" advice, which helped me get to the finish line.

Second, to Hawai'i's 115 dedicated mathematics teachers who participated in this study, I am grateful to all of you for selflessly sharing your time, thoughts and experiences with me. This study would not have been possible without the critical input from all of you. I am also appreciative of the Hawai'i Department of Education principals who supported this research by sharing the survey with the teachers in their schools. To my classmates in cohort 3, mahalo for sharing your aloha and mana'o over our three years together.

Finally, I am forever grateful to my family. To my parents, Forrest and Virginia Ann Foster; my in-laws, Paul and Joan Carpenter, and my brothers Ed and Tom Foster, thank you for your love and moral support during this study and throughout my life. To my children Jill, Sarah and Kekoa, Jim Jr and his wife Sydney, and grandchildren, Jordan, Ava, Hunter, Kilinahe, Sanoë, Lilinoë, and one on the way, my deepest love and gratitude for your loving encouragement and patience throughout this journey. To my husband, my best friend and number one supporter, I love you and thank you for challenging my thinking and pushing me to finish.

Abstract

Mathematics teacher shortages have been a chronic problem in Hawai'i, particularly in middle and high schools. The purpose of this study was to gain a better understanding of the self-reported factors that impact secondary mathematics teachers' retention decisions. Using Deci and Ryan's (1995) self-determination theory, teachers' perceptions of their sense of autonomy, competence and belonging were studied to examine how these factors relate to teachers' feelings around motivation and job satisfaction. Using a mixed methods design, data were collected through an on-line survey of 101 secondary mathematics teachers followed by focus groups and interviews with an additional 15 teachers. Results suggest that making a difference in student academic and personal growth mattered most to teachers and was the strongest motivational factor influencing job satisfaction. Moderate significance was found in the relationship between job satisfaction and teacher relationships with colleagues, students, and administrators that kept them committed to teaching in Hawai'i's public schools. Other factors that influenced teachers job satisfaction included having a supportive working environment, classroom autonomy, and acknowledgement received about the value of their work. Factors that negatively impacted teachers included low pay, perceptions of a lack of administrator support, and job stress. Study findings include implications for administrators, educators and policy makers such as fostering a culture of autonomy, efficacy and relationship-supportive behaviors which might include: consideration of competitive salaries, increased participation in relevant professional and leadership development, giving teachers voice and choice, providing strong instructional support, and creating collaborative opportunities for teachers to enhance student learning.

Table of Contents

Dedication.....	ii
Acknowledgements	iii
Abstract.....	iv
List of Tables	x
List of Figures.....	xi
Chapter 1. Introduction.....	12
Statement of the Problem	13
Purpose	16
Research Questions	16
Significance of the Study.....	17
Theoretical Framework	18
Summary of Methodology.....	19
Role of the Researcher.....	21
Definitions and Baseline Data	22
Organization of the Dissertation.....	25
Chapter 2. Literature Review.....	27
Overview	27
Background.....	27
Teacher Retention and Motivation	30
Self-Determination Theory.....	33
Autonomy	38
Teacher Autonomy and Retention.....	42

Autonomy and School Leadership	43
Autonomy and the Expectancy-Value Theory	48
Fit-Choice Model.....	50
Teacher Compensation	53
Mathematics Teacher Retention and Autonomy	56
Competence	58
Competence and the Achievement Goal Theory	59
Competence and Professional Development	62
Principal Support to Teacher Learning.....	64
Relatedness	67
Relatedness and Teacher Retention	69
A Sense of Belonging in Hawai‘i	75
Conceptual Framework	77
Problem Statement.....	77
Concept.....	77
Summary.....	78
Chapter 3. Methodology	80
Overview	80
Research Design	80
Quantitative Research.....	81
Qualitative Research.....	82
Mixed Methods Research	83
Theoretical Framework	88

Study Description	88
Participants	89
Phase One Participants	90
Phase Two Participants.....	91
Instrumentation and Procedures	91
Phase One Instrumentation	91
Phase Two Instrumentation	93
Data Collection.....	94
Phase One Quantitative Data Collection	94
Phase Two Qualitative Data Collection.....	95
Data Analysis.....	95
Phase One Quantitative Data Analysis	95
Phase Two Qualitative Data Analysis	97
Methods for Reliability and Validity.....	97
Study Limitations	99
Role of the Researcher.....	100
Positionality	101
Delimitations	102
Assumptions	102
Ethical Considerations.....	103
Summary.....	103
Chapter 4. Results.....	104
Phase One: Quantitative Results	105

Phase One Participants 106

Research Question One 113

Research Questions Two and Three 126

Phase Two: Qualitative Results 137

Phase Two Participants 137

Phase Two Data Analysis 139

Research Question One 140

Research Question Two 146

Research Question Three 148

Summary 150

Chapter 5. Discussion 154

Summary of the Study 154

Discussion of the Findings 155

Theme 1: Making a Difference 155

Theme 2: School Leadership 157

Theme 3: Supportive Workplace 158

Theme 4: Continuous Learning and Development 162

Theme 5: Meaningful Relationships 165

Limitations of the Study 168

Implications 170

Theoretical Implications 170

Policy Implications 171

Practical Implications 172

Recommendations	176
Future Research	176
Conclusion	177
Appendix A Institutional Review Board Approval	179
Appendix B Hawai‘i Department of Education Approval to Conduct Research	180
Appendix C Initial Email Invitation to Participate in Phase One Survey	182
Appendix D Survey Flyer	183
Appendix E Consent Form to Participate in Survey	184
Appendix F Reminder Email to Participate in Survey	186
Appendix G Permission to Use Survey Instrument	187
Appendix I IRB Modification Approval	191
Appendix J Consent to Participate in a Research Project: Focus Group	203
Appendix K Semi-Structured Interview Protocol	206
Appendix L Survey Participants	208
Appendix M Chi Square Crosstabs	216
References	231

List of Tables

Table 1. Features of Qualitative, Quantitative and Mixed Methods Research.....	86
Table 2. Frequencies of Participant Gender from Phase One Survey	106
Table 3. Frequencies of Participant Age Group from Phase One Survey	107
Table 4. Ethnicity of Participants from Phase One Survey	108
Table 5. Education of Participants from Phase One Survey.....	108
Table 6. School Level of Participants from Phase One Survey.....	109
Table 7. Years at School of Participants from Phase One Survey	110
Table 8. Satisfaction Level by Ethnicity, School Type, and School Level, Phase One Survey..	112
Table 9. Frequencies of Satisfaction Level	113
Table 10. Motivational Teaching Job Factors	120
Table 11. Motivational Teaching Incentives	122
Table 12. Rank Order of Reasons to Leave Teaching.....	124
Table 13. Rank Order of Reasons to Stay Teaching.....	126
Table 14. Descriptive Statistics of Study Variables	127
Table 15. Group Statistics by Gender.....	128
Table 16. Independent Samples Test.....	129
Table 17. Analysis of Variance	131
Table 18. Descriptive Statistics Based on Years of Teaching.....	132
Table 19. Bivariate Correlation	133
Table 20. Teacher Participant Demographics.....	139
Table 21. Integrated Key Factors Influencing Job Satisfaction.....	152

List of Figures

Figure 1. Reasons for Teacher Voluntary Separations	15
Figure 2. Diagram of Sequential Explanatory Mixed Methods Design	20
Figure 3. Hawai'i Teacher Vacancies and Positions Filled.....	25
Figure 4. Percentage of Teacher Positions Filled	28
Figure 5. Hawai'i Average Scores on Eighth Grade Mathematics Assessment.....	29
Figure 6. Smarter Balanced Assessment Results for Hawai'i Public School.....	30
Figure 7. Ryan and Deci (2000) Self-Determination Continuum	36
Figure 8. Theory of Self-Determination	38
Figure 9. Model of Educational Leadership	47
Figure 10. Hawai'i Department of Education Learning Organization	65
Figure 11. Hawai'i Department of Education Beginning Teacher Retention	68
Figure 12. Word Model: Word Describing Teachers Working Together	73
Figure 13. Nā Hopena A'o (HĀ) Framework.....	75
Figure 14. Conceptual Framework and Teacher Retention.....	78
Figure 15. Explanatory Sequential Design of this Study.....	85

Chapter 1. Introduction

“The most important thing we can do to address the teacher shortage is to create the conditions under which more teachers stay in the profession.”

- R. Kahlenberg (2016)

Currently teacher shortages are being experienced across the United States. In Hawai‘i, as well as in 42 other states, there is a shortage of secondary mathematics teachers (Sutcher et al., 2016, p. 5). Carver-Thomas and Darling-Hammond’s (2017) analysis of a nationwide representative teacher survey showed higher attrition rates from mathematics teachers than other fields (p. v.). As noted in the United States Department of Education’s Annual Report of Teacher Shortages (2019), Hawai‘i has experienced secondary mathematics teacher shortages for over twenty years. To close the gap, the Hawai‘i Department of Education (HIDOE) needs to recruit and retain more mathematics teachers.

Sutcher et al. (2016) claim the nationwide teacher shortage is driven by four key factors: (a) a decline in teacher preparation program enrollment, (b) school districts reducing pupil-teacher ratios, (c) increasing student enrollment, and (d) high teacher attrition (p. 1). Sutcher et al. also point out that of these four key factors “attrition remains the most important driving factor of the teacher shortage...and swamps the other variables as a driver of teacher demand (p. 38).” Ingersoll and Smith (2003) also point to the need to focus the solutions to the teacher shortage on teacher retention. In a recent report on the U. S. teacher shortage, Carver-Thomas and Darling-Hammond (2017) assert that school leaders and policymakers may be tempted to solve teacher shortages by focusing solely on recruiting however, their research shows that a “better approach begins with understanding teacher attrition and turnover” (p. 1).

The need to recruit teachers each year in Hawai‘i is affected by teacher turnover. With over 1,000 teachers leaving the HODOE annually, the demand for new teachers remains constant. Out of the 1,000 teachers who leave each year, approximately 30 percent retire (HODOE employment report, 2019). Reducing the number of Hawai‘i’s teachers who voluntarily leave (other than retirement), would likely have a positive effect on driving down the overall teacher shortage, including the mathematics teacher shortage.

This chapter discusses the problem of practice that drove this study; the purpose of the study and associated research questions; and the significance of the study. A summary of the study’s methodology and conceptual framework will be provided followed by a description of the role of the researcher, definitions of key terms used in the study, and an overview of the study’s organization.

Statement of the Problem

Students need a solid foundation in math to succeed in STEM careers and fields that contribute to a vibrant innovation and knowledge society. In many careers, a sound grasp of mathematics is needed, especially for careers related to science, technology, engineering and mathematics that drive innovation and knowledge economics. To teach mathematics that leads up to gateway courses like Algebra and beyond, students need qualified mathematics teachers. In Hawai‘i however, there is a shortage in its secondary math teacher population. For the last five years, the Hawai‘i Department of Education (HODOE) has started the school year with between 400 to 500 overall teacher vacancies, with the highest percentage of shortages in special education, followed by secondary mathematics and science teacher vacancies. (HODOE Employment Report, 2019). In school year 2019–20,

HIDOE began the school year with approximately 50 secondary mathematics teacher vacancies (HIDOE Every Student Succeeds Act [ESSA], 2020). While recruiting mathematics teachers is a continuous process, more information and data are needed to understand factors influencing Hawai'i's mathematics teacher retention.

The Hawai'i Department of Education (HIDOE) requires teachers leaving the HIDOE to complete a separation survey which asks teachers to pick a "reason" for leaving when they separate from the Department. While the broad categories of why teachers leave are tracked over time, there is a gap in the knowledge of the underlying motivational and job satisfaction factors that influence a teacher's decision to stay.

Of Hawai'i's 13,000 public school teachers, between eight and 10% leave each year. Figure 1 shows that approximately 28% of teachers retire each year, another 35% leave Hawai'i, and the remaining 37% leave for other reasons including non-teaching jobs, personal and family reasons, or due to their workplace environment. Learning more about why teachers leave, and perhaps more importantly, why they stay, was the primary focus of this study.

Recent national research on teacher turnover discusses the importance of *working conditions* to teacher retention. Working conditions are generally described in the context of a school as the place of work. "Measures of school working conditions typically include factors such as administrative support and communication, teacher empowerment and influence over school policy, opportunities for professional development and advancement, level of teacher collaboration, use of teachers' time, student behavior, school facilities, school resources, school culture, and community support" (Burkhauser, 2017, p. 127).

Simon and Johnson (2015) found teachers attitudes about their working conditions are salient predictors of their job satisfaction and predicted retention.

Figure 1

Reasons for Teacher Voluntary Separations

Separation Reason	SY 2014-2015	SY 2015-2016	SY 2016-2017	SY 2017-2018	SY 2018-2019
Resignation	688	827	862	820	755
a. Leaving Hawaii	325	396	412	423	375
b. Non-DOE Teaching	42	53	51	68	65
c. Non-Teaching Job/Education	108	127	131	116	106
d. Work Place Environment	52	68	73	66	70
e. Family/Personal/Other	161	183	195	147	139
Retirement	341	306	338	275	274
Total	1,029	1,133	1,200	1,095	1,029

Note. From 2018–19 Hawai‘i Department of Education Employment Report,
<http://hawaiipublicschools.org/employment-report>

Because dissatisfaction with working conditions is one of the key reasons teachers report they stay or go (Sutcher et. al., 2017, p. 51), gaining a clearer understanding of how these conditions influence Hawai‘i’s teachers’ retention decisions is needed. There is currently a gap in the knowledge around why Hawai‘i’s mathematics teachers choose to stay. An exploration of the factors Hawai‘i’s mathematics teachers perceive as impactful to job satisfaction is necessary to understand how to shape retention practices and policies to influence more math teachers to remain teaching in Hawai‘i.

Purpose

The purpose of this mixed method study was to improve the understanding of factors that contribute to teachers' decisions to stay and continue as secondary mathematics teachers in Hawai'i's public schools. Using Deci and Ryan's (2000) theory of self-determination, teachers' perceptions of their sense of autonomy, competence and belonging were examined to better understand teachers' job satisfaction and motivation to stay. Teachers perceptions as to why they stay were generally defined as self-identified personal, professional, and institutional factors that influenced their decisions to stay in teaching. It was anticipated that, through a better understanding of these factors, the HIDOE may be able to improve its practices to improve retention of skilled mathematics teachers across the state.

Research Questions

To help better understand the problem, the following research questions will be addressed:

1. What do secondary mathematics teacher identify as reasons for remaining in Hawai'i's classrooms as secondary mathematics teachers?
2. In what ways do factors associated with professional identity such as a sense of autonomy differ in beginning and seasoned teachers?
3. In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?

Significance of the Study

While the Hawai‘i Department of Education applies various recruiting, development and retention strategies to attract and keep highly qualified teachers, there is a gap in understanding the factors that influence Hawai‘i’s secondary mathematics teachers to stay in the classroom. This study will provide insight into what self-reported factors motivate secondary math teachers to continue to teach math in Hawai‘i. A significant math teacher shortage exists in Hawai‘i and a better understanding of teachers’ perceptions about their job satisfaction will help the Hawai‘i Department of Education educators, administrators and policy makers better understand the types of incentives and job satisfaction factors that secondary math teacher retention report as positive in influencing them to stay in the classroom. The long-term goal is to improve secondary math teacher retention which will likely have a positive impact on student achievement outcomes in math.

Reducing the math teacher shortage is important to support the academic growth and achievement of Hawai‘i’s students in the field of mathematics. Schools experiencing a shortage of teachers tend to have lower levels of student achievement and less positive student outcomes overall (Cardichon et al., 2020; Castro et al., 2018). The latest published math scores on the U.S. Department of Education’s national report card (2019), reflect only 28% of Hawai‘i’s eighth grade students are proficient in math. While Hawai‘i’s scores in math proficiency have slowly improved over the last ten years, there is more work that needs to be done to improve math proficiency statewide, but also to close the math achievement gap between high needs students and all other students.

In addition, the future workforce of the United States needs more mathematicians to stay competitive globally. The U. S. Bureau of Labor Statistics (2018) projects the continued growth of math occupations stating the “overall employment of mathematics occupations is projected to grow by 26% from 2018 to 2028, much faster than the average for all occupations.” (bls.gov.ooh.math). In addition, the local trade jobs in Hawai‘i require basic mathematics skills to be successful in jobs such as welding, automotive repair, or information technology.

To meet the needs of Hawai‘i’s future workforce, and to support the academic success of all of Hawai‘i’s students, a qualified and motivated math teacher is needed in every math classroom in the state.

Theoretical Framework

The framework for this study was based on Deci and Ryan’s (1985) self-determination theory (SDT). SDT involves three innate psychological needs (autonomy, competence and relatedness) that humans need to have satisfied in order to be intrinsically motivated and self-directed. (Ryan, 2019; Ryan & Deci, 2000a, 2000b, 2006, 2017, 2020).

Ryan and Deci’s (2017) self-determination theory distinguishes between *autonomous motivation* and *controlled motivation*. “Autonomy involves acting with a sense of volition and having the experience of choice...in contrast, being *controlled* involves acting with a sense of pressure, a sense of *having* to engage in the actions” (Gagne & Deci, 2005, p. 333). Ryan and Deci’s (2017) self-determination theory describes how extrinsic motivators can support or detract from intrinsic (self) motivation. While teacher pay (an extrinsic motivator) may serve to attract and retain teachers, other factors such as

classroom autonomy, a sense of purpose and continuous development may also play critical roles. For example, if a teacher is able to develop curriculum based on students' needs rather than being required to follow a highly prescriptive standard, they are likely to be more motivated to stay in the classroom. The self-determination theory also proposes that "extrinsic motivation can vary in the degree to which it is autonomous versus controlled" (p. 334).

While the research on SDT in education was initially about understanding learners' motivation to support educating children to become self-directed and lifelong learners, it was later applied to what motivates teachers in the classroom. Teachers bring their own needs to the classroom. "Too often, teachers' own autonomy, competence and relatedness is undermined by administrative control, inflexible curricula or lack of support. During the past decade, more and more SDT researchers have examined the contextual factors that influence teacher motivation, while concurrently taking into consideration the role that teachers' motivation plays for their way of interacting with their students" (Haerens, L. n.d., para.6). The SDT will be applied to this study to examine how teachers' feelings about their competence, autonomy and, sense of belonging, influence their perceptions about job satisfaction and motivation to remain in the profession.

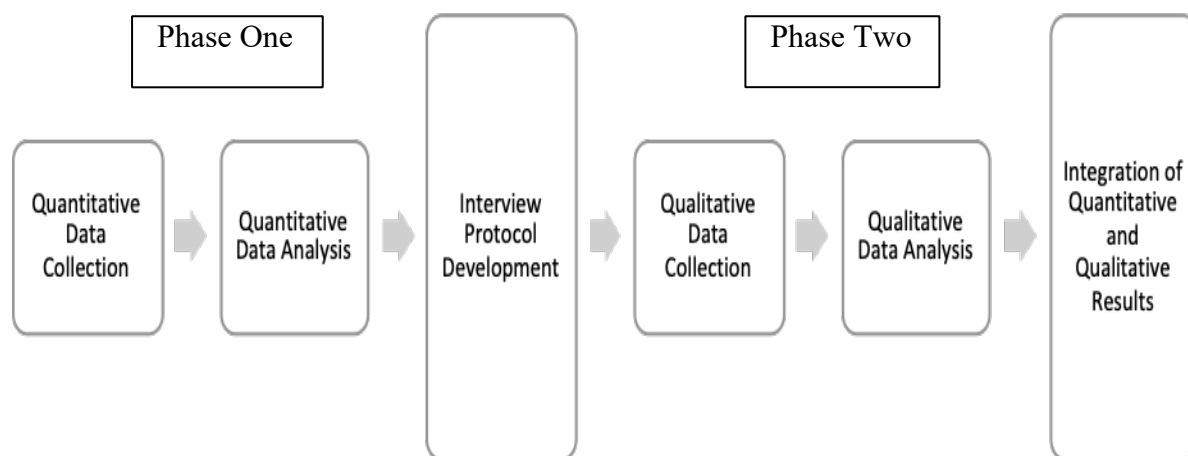
Summary of Methodology

An explanatory, sequential, mixed methods research design will be used to understand the experiences and perceptions of a select group of secondary mathematics teachers, as seen in Figure 2. The mixed method approach will consist of two distinct phases: a quantitative phase using a valid survey instrument, followed by a qualitative

phase using interview questions informed by the results of the survey. As noted by Creswell and Plano Clark (2018), sometimes the results of a single qualitative or quantitative study may provide an incomplete understanding of a research problem and therefore there is a need for further explanation and understanding of the study results. In the case of math teacher retention, the data from the quantitative phase of the study will be examined to determine the relationships between teachers' stated perceptions of factors influencing their job satisfaction and their retention behavior. The qualitative phase consisting of semi-structured focus group interviews, will help make sense of and explain the relationships among the variables in the survey results.

Figure 2

Diagram of Sequential Explanatory Mixed Methods Design



A mixed methods approach is most suited for this dissertation as the combination of quantitative and qualitative data will provide a more complete picture of the factors influencing math teachers' reasons for staying and leaving teacher positions in Hawai'i. Using a mixed

methods approach for data collection and then integrating the results, will allow for a detailed description of the context and perceptions of the participants, accompanied by an analysis of the quantitative data results. To answer the research questions, administering a survey followed by semi-structured interviews with selected participants will help build understanding of what motivates math teachers in Hawai‘i.

Role of the Researcher

For the duration of this study, the researcher served as the Assistant Superintendent of the Office of Talent Management in the Hawai‘i Department of Education. As such, this research directly supported a problem of practice within the Office of Talent Management. Given the shortage of mathematics teachers in Hawai‘i’s secondary schools, the researcher explored mathematics teachers’ self-described reasons for staying in the classroom. As a leader in the Department of Education, the researcher’s ability to collect authentic feedback from participants was challenging and required that participants be approached in a manner that allowed them to provide meaningful and honest input. Participants were reminded that their responses would be “masked” and that responses would not be reported by individual names or work locations. Vigilance and care were taken so as that ethical lines were not crossed regarding data mining and collection of non-disclosed data from the work environment. The researcher was careful to ensure the role as a student did not conflict with the researcher’s official role and duties. As a senior representative of the Hawai‘i Department of Education, the researcher carefully conducted the research study so as not to have a conflict of interest or preconceived answers to the research questions.

Definitions and Baseline Data

For the purpose of this research, the following terms and definitions were utilized:

Autonomy – Described by Ryan and Deci (2000a) as one of three basic psychological needs that lead to human growth, social development, and personal well-being. Defined as the need to self-regulate one’s experiences and actions (Ryan & Deci, 2017, p. 10).

Autonomy refers to an individual’s psychological need for choice or self-determination (deCharms, 1968; Deci, 1975).

Competence - Described by Ryan & Deci (2000a) as one of three basic psychological needs that lead to human growth, social development, and personal well-being. Ryan and Deci (2017, p. 11) state competence “refers to humans basic need to feel effectance and mastery.”

Emergency Hire – an unlicensed individual employed by the Hawai‘i Department of Education when there is a position for which fully licensed teachers are not available. The Hawai‘i Teachers Standards Board issues emergency hire permits for a maximum of three years. A teacher on emergency hire status must annually demonstrate active pursuit of obtaining a Hawai‘i teacher license (HIDOE Every Student Succeeds Act (ESSA) report, 2020, p. 16.). Hawai‘i employed 508 emergency hire teachers in SY18-19 (HIDOE Employment Report, 2019).

Employee turnover rate – the rate at which employees leave an organization. For this study, teacher turnover rate follows the standard Human Resources definition of employee turnover which is calculated by dividing the number of employees who left the organization voluntarily by the average number of employees multiplied by 100. (Society

of Human Resource Management, 2020). Hawai‘i’s turnover rate for schools and complex area teachers was calculated at the end of the school year 2019 as 8.9% (Hawai‘i Department of Education Board of Education Data Retreat presentation, November 2019; HIDOE Employment Report 2019). The national teacher turnover rate is often reported as not only those who separate (or leave) but also those who move schools (movers).

According to Carver-Thomas and Darling-Hammond (2017), the “the percentage of teachers leaving the profession – known as “leavers” has increased over the past two decades: 5.1% of public school teachers left the workforce in 1992, while 8.4% left in 2005. Attrition rates have continued to hover around 8% since then.” (p. 3). In addition to the 8% who separate (or leave the profession), an additional 8% shift schools, thus the “overall” national teacher turnover rate is reported to be about 16% (p. 4). The Hawai‘i Department of Education uses voluntary separation data (leavers) to determine the statewide and complex area turnover rates while a separate calculation is used at the school level to view “overall” turnover rates (leavers and movers).

Extrinsic Motivation – refers to behaviors performed to obtain some outcome separable from the activity itself (Ryan & Deci, 2000a). “SDT specifies four types of extrinsic motivation that vary in the degree to which they are experienced as autonomous and that are differentially associated with classroom practices (e.g. autonomy-supportive versus controlling instruction) and learning outcomes (e.g. conceptual learning versus rote memorization)” (Niemiec & Ryan, 2009, p. 138).

Intrinsic Motivation – refers to behaviors done in the absence of external impetus that are inherently interesting and enjoyable (Ryan & Deci 2000b). “For example, when people are

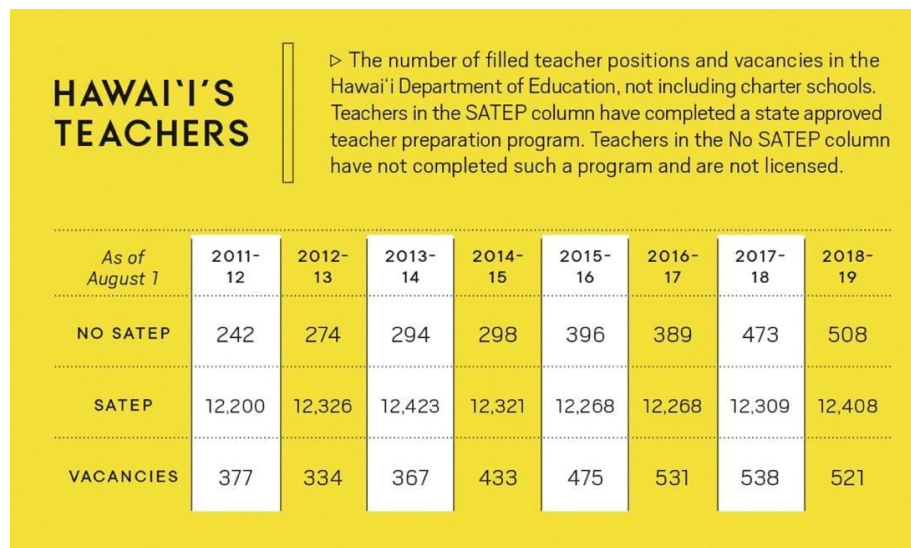
intrinsically motivated, they play, explore, and engage in activities for the inherent fun, challenge, and excitement of doing so” (Niemi & Ryan, 2009, p. 134).

Job Satisfaction – Skaalvik and Skaalvik (2011) define job satisfaction as having positive reactions to work or role. These authors stressed job satisfaction is affected by different circumstances and the value of each circumstance for each teacher. Therefore, understanding the variables that affect teacher job satisfaction can aid in teacher retention.

Relatedness - described by Ryan and Deci (2000) as one of three basic psychological needs that lead to human growth, social development, and personal well-being. The basic human need for *relatedness*, or a sense of belonging and social integration, is described as an individual’s aspiration to maintain close, safe and satisfying relationships (Baumeister & Leary, 1995; Reis, 1994; Reis et al., 2000; Ryan, 1995).

Self-determination theory (SDT) – a macro theory of human motivation and personality that concerns peoples’ inherent growth tendencies and innate psychological needs. It is concerned with the motivation behind choices people make without external influence and interference. SDT focuses on the degree to which an individual’s behavior is self-motivated and self-determined (Ryan & Deci, 2000).

Teacher Vacancies – a funded teacher position that is not filled. There were 521 teacher vacancies at the beginning of school year 2018/2019 (HIDOE Employment report, 2019) as seen in Figure 3.

Figure 3*Hawai'i Teacher Vacancies and Positions Filled*

Note. Chart showing Hawai'i teacher vacancies and positions filled with teachers who completed a State Approved Teacher Education Program (SATEP) versus no SATEP and vacancies.

Fujii-Oride, N., (2019, March 21). Education in Hawai'i: Smart innovations and persistent problems. *Hawai'i Business Magazine, Change Report.*

<https://www.hawai'ibusiness.com/changereport-education/>

Organization of the Dissertation

This study is organized into five chapters. This chapter (chapter one) presented a broad overview of the study including a statement of the problem, the purpose and significance of the study, and a short summary of the methodology used for this study. Chapter two reviews the literature around teacher retention as it relates to self-motivation and job satisfaction and a discussion of Deci and Ryan's (2000) self-determination theory

which was used as the theoretical framework for this study. Chapter three describes the methodology used to conduct the study and includes a description of the research design. Chapter four provides an analysis of the data and describes the study's limitations. Chapter five provides a discussion of the findings and recommendations for future research and discusses the implications of this study when extended to practice.

Chapter 2. Literature Review

Overview

This study explored the factors that secondary mathematics teachers' reported had an impact on their decisions to remain teaching in Hawai'i. This chapter will discuss the literature on teacher motivation theory and examine the research associated with job-related aspects that influence teachers, including mathematics teachers, to stay. Using Ryan and Deci's (2000) self-determination theory (SDT) as a framework, this chapter is organized around the SDT's three basic psychological needs that lead to human growth and well-being: autonomy, competence and relatedness, or a sense of belonging.

The literature review will also support the study's three research questions (RQ):
RQ1: What do secondary mathematics teachers identify as reasons for remaining teaching in Hawai'i?

RQ2: In what ways do factors associated with professional identity such as a sense of autonomy differ in beginning and seasoned teachers?

RQ3: In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?

Additionally, a conceptual framework and diagrammatic model will be introduced to help describe the relationships between the theoretical variables in the study.

Background

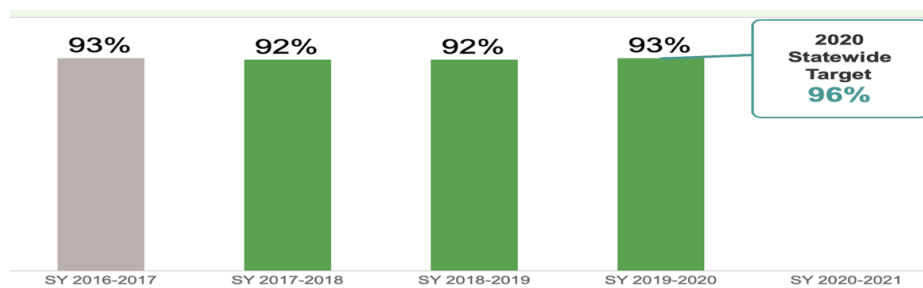
Hawai'i needs more mathematics teachers. The most recent U.S. Department of Education report on teacher shortage areas (2019), shows continued shortages in secondary (grades 6 to 12) mathematics teachers nationwide. Hawai'i has experienced a shortage in

secondary mathematics teachers for over twenty years (U.S. Department of Education Annual Report on Teacher Shortages, 2019).

While Hawai‘i’s Department of Education strives to meet its teacher recruiting and retention goals, it falls short each year. The Hawai‘i Board of Education identified a recruiting goal of having 96% percent of teacher vacancies filled with teacher who has been through a state approved education program. Figure 4 shows the percentage of filled teacher positions for the past four years.

Figure 4

Percentage of Teacher Positions Filled



Note. Chart shows the percentage of teacher positions filled with teachers who have completed a State Approved Teacher Education Program. (Hawai‘i Board of Education Data Retreat, 2019)

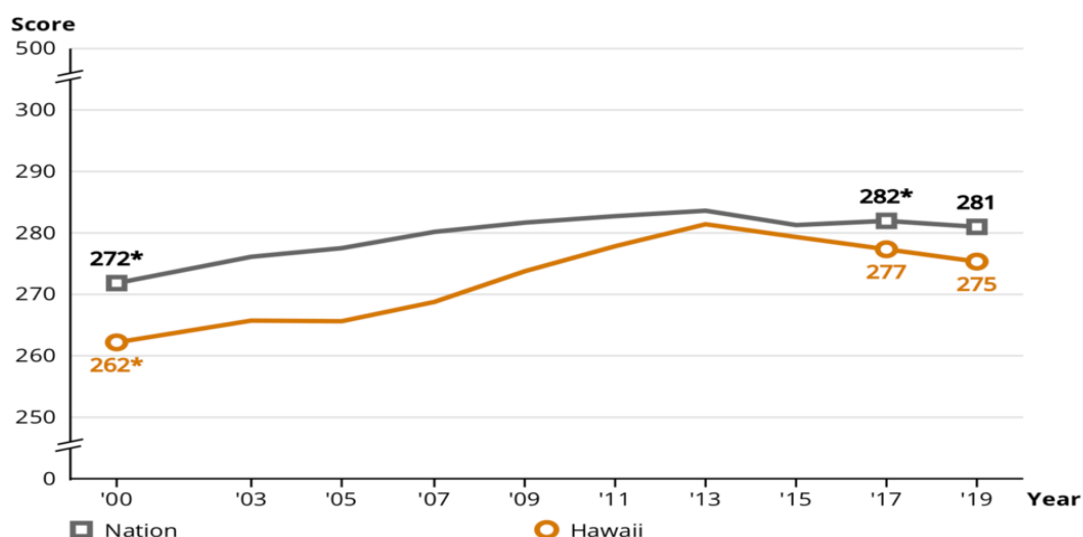
Hawai‘i has schools on seven islands and in several rural areas, and equity becomes an issue when hard-to-staff geographic locations make it difficult to staff rural schools with qualified mathematics teachers. A review of the mathematics scores on Hawai‘i’s Smarter Balanced Assessments (2019) show that the high-poverty, rural areas frequently score lower in math than the more populated, lower poverty level areas.

In addition, as shown in Figure 5, eighth grade mathematics proficiency scores have not improved in Hawai‘i’s public schools for the past eight years with only 28% of the students testing proficient in mathematics in the most recent nationwide assessment and the average scale score for Hawai‘i (275) is significantly lower than the National average (281) (U.S. Department of Education, 2019).

Figure 5

Hawai‘i Average Scores on Eighth Grade Mathematics Assessment

Average Scores for State/Jurisdiction and Nation



* Significantly different ($p < .05$) from 2019. Significance tests were performed using unrounded numbers.

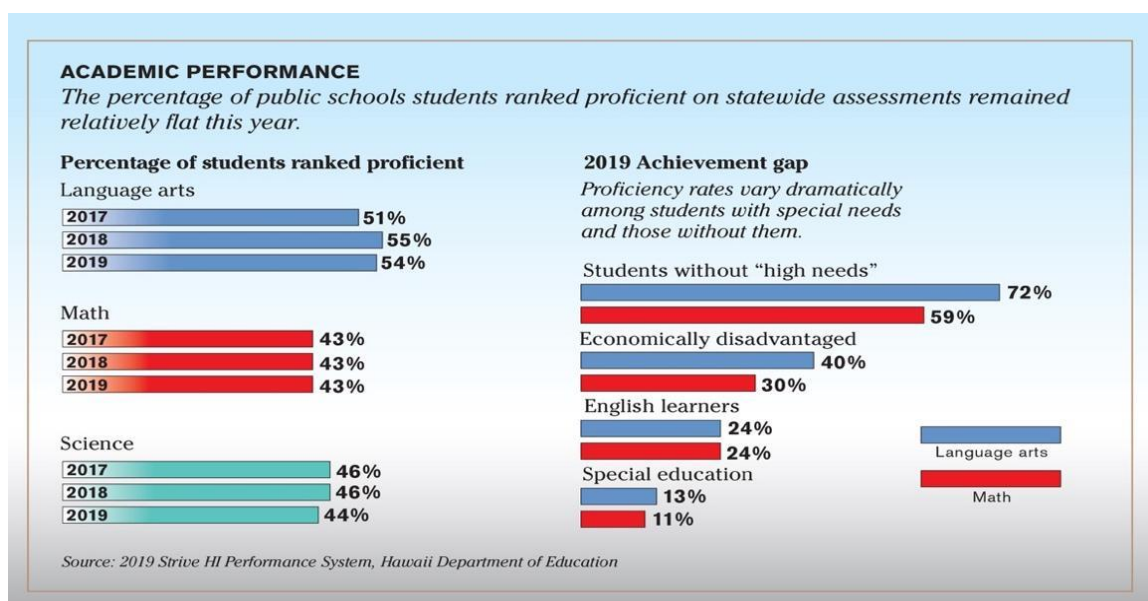
Note. This graph compares Hawai‘i eighth grade NAEP scores to the national average, <https://nces.ed.gov/nationsreportcard/subject/publications/stt2019/pdf/2020014HI8.pdf>

The Hawai‘i Statewide Smarter Balanced Assessment (SBA) aligns to the Hawai‘i Common Core Standards and measures whether students are on track for readiness in college and/or career. The SBA is given annually to students in grades 3 through 8 and grade 11. Figure

6 shows the scores for math have been flat for the past three years. In addition, there is a significant math proficiency gap between special needs students and those without special needs.

Figure 6

Smarter Balanced Assessment Results for Hawai‘i Public Schools



Note. From the Star Advertiser, October 4, 2019, “Test Scores Stall for Hawai‘i Students” Susan Essoyan

Teacher Retention and Motivation

A review of the literature related to teacher retention resulted in a large number of studies discussing the reasons teachers choose to leave the field (Boe et al., 1997; Carver-Thomas & Darling-Hammond, 2017; Darling-Hammond, 1997; Guarino et al., 2006; Hope, 1999; Johnson & Birkeland, 2003; Johnson, 2019; Sutchter, Darling-Hammond, & Carver-Thomas, 2016, 2019; Sutchter, Podolsky, & Espinoza, 2017). However, there are a fewer number of empirical studies

and research about what motivates teachers to remain in the field. There are also historical and contemporary research studies on motivational theories related to students and academic outcomes (Blackwell et al., 2007; Burnette et al., 2012; Chen & Pajares, 2010; Dweck, 1999; Dweck & Leggett, 1988; Haimovitz & Dweck, 2017; Robins & Pals, 2002), however the research and literature specifically focused on teacher motivation is less robust and does not begin until early in the 21st century.

Han and Yin (2016) conducted a comprehensive review of teacher motivation research and the associated diverse theoretical perspectives. They found that teacher motivation research has expanded since the late 1990's and attribute the surge in interest to the 2008 special issue of *Learning and Instruction* which called on researchers throughout the world to begin to focus on motivational theories related to the domain of teaching. Watt and Richardson (2008) wrote a guest editorial in the 2008 *Learning and Instruction* issue to highlight the critical need for additional research in the area of teacher motivation (p. 405). Watt and Richardson (2008) pointed out the relevance of existing theories of motivation to teacher motivation and how the existing research might be applied to teacher education candidates as well as to new and seasoned teachers.

“Teachers’ motivations, aspirations, and early career development have increasingly been the focus of research attention in the climate of escalating teacher shortages and concerns regarding teacher quality – in Australia, the United States, and among many country members of the Organization for Economic Co-operation and Development (OECD)” (Watt & Richardson, 2008, p. 408). Early in the 21st century, and continuing today, there has been an increased interest in studying teacher motivation. Research studies drawing on existing motivational

theories, particularly those that have previously focused on student motivation, provide increased knowledge and focus on the contextual factors that sustain teacher commitment, interest and enthusiasm.

In the 21st century, there was a shift from Watson's (Watson & Morgan, 1917) and Skinner's (1953) behaviorist worldview of human motivation which focused on external and environmental factors to a more organismic view of motivation that considers the inner workings of self and personality (Ryan, 2019). "As a field of scientific inquiry, motivation research has been evolving in its explanation of behavior, becoming more complex, as well as moving more and more from the outside in" (Ryan, 2019, p.6). Motivational science has shifted from a focus on external factors to being more "about understanding people's goals, purposes and meanings, and pinpointing the mediators and mechanisms, cognitive, emotional, and biological, underpinning complex behaviors" (Ryan, 2019, p. 4).

Kreitner (1986) defined motivation as "the psychological process that gives behavior purpose and direction" (p. 381). Pinder (1998) further defined work motivation as "a set of energetic forces that originates both within, as well as beyond an individuals' being, to initiate work-related behavior, and to determine its form, direction, intensity and duration" (p. 11). Ryan and Deci's (2000) self-determination theory, based on the notion that there are three basic psychological human needs (autonomy, competence, and relatedness), has been applied to the context of student motivation and later, to teacher motivation (Fernet et al., 2013; Roth et al., 2007). Using SDT as the theoretical basis for this literature review provides insight into how teachers' job satisfaction, especially as it relates to their school environments, directly impacts their psychological needs for autonomy, competence and belonging.

Two additional motivation theories that align with SDT will be discussed as subsets to the SDT framework. The expectancy-value theory (Eccles et al.1983; Pinder, 1988; Porter & Lawler, 1968; Vroom, 1964; Watt & Richardson, 2007) aligns with SDT's *autonomy* construct as it discusses how humans, including teachers, are motivated to act when they view the efforts they put into an action as valuable to the outcomes they expect as a result of their actions. The achievement-goal theory (Butler 2007, 2012; McClelland, 1987; Nicholls, 1979, 1984, 1989) aligns with SDT's psychological *competence* need as it helps explain teachers' actions and attitudes around mastery of their craft and their perceived performance as compared to others.

Together, these three theories provide valuable insight on motivational factors underlying teacher retention including intrinsic, extrinsic and altruistic motivators as well as the need for teachers to experience psychological fulfillment and well-being. While initially developed to understand student motivation, these theories have been reformed and adapted to shed fresh light on teacher motivation (Richardson & Watt, 2010; 2014; Richardson et al., 2014). There is not yet extensive teacher motivation research that has differentiated various subgroups of teachers by content area or grade level (Watt et al., 2012, 2017), however the research that discusses overall teacher motivation is useful to consider when studying Hawai'i's secondary mathematics teacher retention.

Self-Determination Theory

In psychology, self-determination is an important concept that refers to each person's ability to make choices and manage their own life. The concept of self-determination has been applied to a wide variety of fields including education, work, health and parenting. The self-determination theory (SDT), is an approach to motivation that considers people's innate

psychological needs and differentiates between *autonomous motivation* which involves behaving with a full sense of volition and choice versus *controlled motivation* which involves acting based on pressure or demands external to the self (Ryan & Deci, 2000a). Application of SDT to education “focuses on facilitating satisfaction of the basic psychological needs of teachers and students in order for the schools to be places in which all parties can be more autonomously motivated and empowered to engage in their activities” (Ryan & Deci, 2017, p. 380).

SDT grew out of the work of psychologists Edward Deci and Richard Ryan, who first introduced their ideas in their 1985 book *Self-Determination and Intrinsic Motivation in Human Behavior*. SDT is “centrally concerned with the social conditions that facilitate or hinder human flourishing. The theory examines how biological, social, and cultural conditions either enhance or undermine the inherent human capacities for psychological growth, engagement, and wellness...” (Ryan & Deci, 2017, p. 3).

Two key assumptions of the theory are that autonomous or self-directed motivation is important (people are driven by internal sources of motivation), and the desire to learn drives behavior (people need to gain a mastery of tasks and learn different skills). The research on SDT inquires “into factors, both intrinsic to individual development, and within social contexts, that facilitate vitality, motivation, social integration and well-being, and, alternatively, those that contribute to depletion, fragmentation, antisocial behaviors, and unhappiness” (Ryan & Deci, 2017, p. 3).

Sources of motivation can be *extrinsic* where a person completes a task or activity mainly because doing so will yield some kind of reward or benefit, or punishment if not completed; and *intrinsic* which is characterized by a person doing something purely because they enjoy it and

want to do it. Intrinsic and various types of extrinsic motivation represent *intentional* or *personally caused* actions (de Charms, 1968; Deci & Ryan, 2000a).

Figure 7 is the SDT model developed by Deci and Ryan (2000), which shows the range of human behavior which moves from *controlled by others* to the other end of the spectrum where behavior is *self-determined*.

Ryan and Deci (2017) also use the concept of *amotivation* “to describe people’s lack of intentionality...that is, to describe the extent to which they are passive, ineffective or without purpose with respect to any given set of potential actions” (p. 16). There are three types of amotivation: (a) lack of action as a result of a person’s perception that they personally cannot effectively complete the action, that is, they lack a sense of competence; (b) lack of interest, relevance or value; and (c) defiance or resistance to influence, or a “motivated non-action or oppositional behavior to defy demands that are thwarting a basic need for autonomy or relatedness” (p.16).

Figure 7

Ryan and Deci (2000) Self-Determination Continuum

	<i>Non self-determined</i>				<i>Self-determined</i>	
	Amotivation	Extrinsic Motivation			Intrinsic Motivation	
Regulatory style:	Non-Regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Source of motivation:	Impersonal	External	Somewhat external	Somewhat internal	Internal	Internal
Motivation regulators:	No intention Incompetence Lack of control	Compliance External rewards or punishments	Ego-involvement Approval from others	Valuing an activity Endorsement of goals	Congruence Synthesis with self	Interest Enjoyment Inherent satisfaction

The Self-Determination Continuum

Note. Self-determination theory is viewed as a continuum between self-determined and non-self-determined behaviors. Self-determined behaviors tend to be intrinsically driven and are done for enjoyment, interest, and inherent satisfaction for the action itself. Amotivation reflects behaviors that are performed only because they must be done. Guyan, M. (2014, October 3) Motivation and eLearning. Blog. <https://www.mattguyan.com/motivation-and-elearning/> Creative Commons Attribution-ShareAlike 4.0 International License

Extrinsic motivators can sometimes lower a person's self-determination. According to Ryan and Deci (2017) and Pink (2009), giving people extrinsic rewards for already intrinsically motivated behavior can undermine autonomy. As the behavior becomes increasingly controlled by external rewards, people begin to feel less in control of their own behavior and intrinsic motivation is diminished.

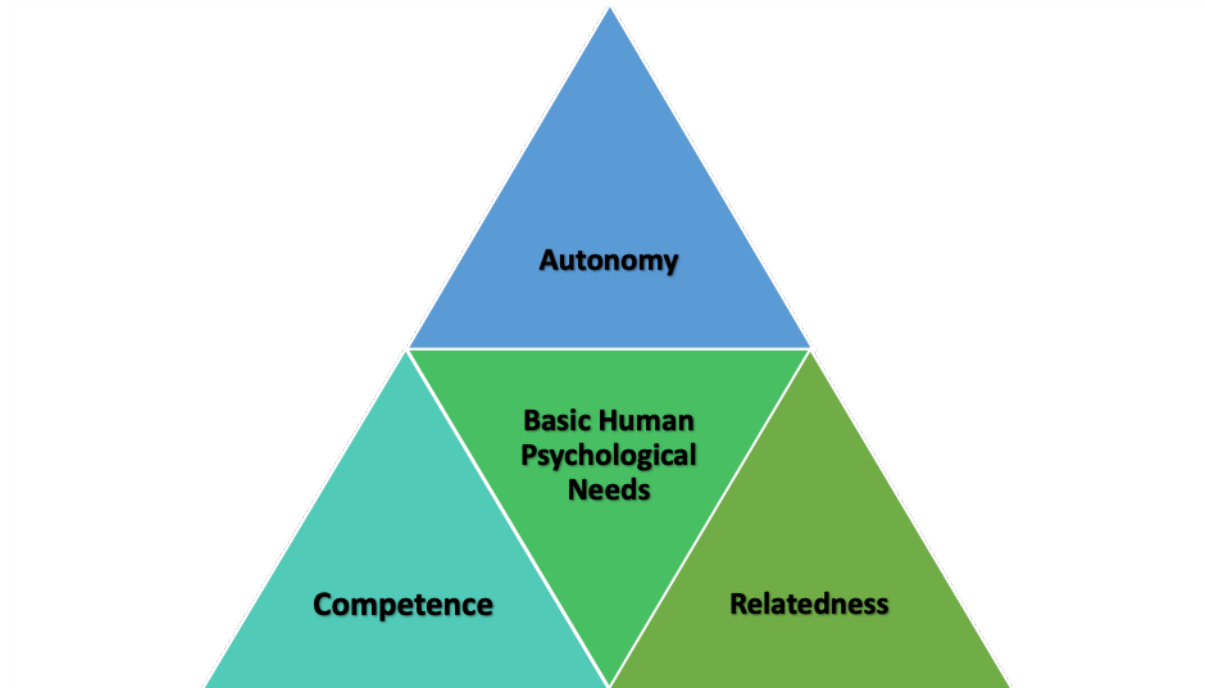
SDT identifies three basic psychological needs that lead to human growth, social development, and personal well-being: *autonomy*, *competence*, and *relatedness*. Autonomy refers to an individual's psychological need for choice or self-determination (deCharms, 1968; Deci, 1975). Ryan and Deci (2017) define *autonomy* as "the need to self-regulate one's experiences and actions" (2017, p. 10). *Competence* "refers to humans basic need to feel effectance and mastery" (p. 11). Humans want to feel competent and confident in their work. The basic human need for *relatedness*, or a sense of belonging and social integration, is described as an individual's aspiration to maintain close, safe and satisfying relationships (Baumeister & Leary, 1995; Reis, 1994; Ryan, 1995). Fulfillment of these three basic psychological needs is essential for people's psychological health and growth, autonomous motivation, optimal functioning, and self-actualization (Deci & Ryan, 2000).

Additionally, Ryan and Deci (2017) "characterize social environments in terms of the extent to which they are (a) *autonomy supportive* (versus demanding and controlling); (b) *effectance supporting* (versus overly challenging, inconsistent, or otherwise discouraging; and (c) *relationally supportive* (versus impersonal and rejecting)" (p. 12).

The three psychological needs (autonomy, competence, relatedness) are inter-related and influence behavior, as seen in Figure 8. Reviewing teacher motivation through the lens of the SDT helps improve the understanding of factors that may influence teachers' feelings of autonomy, competence and a sense of belonging which ultimately may impact their retention decisions. Further discussion of each of the three needs as they relate to teacher motivation and retention will be described in the next three sections.

Figure 8

Diagram of Self-Determination Theory



Autonomy

According to Deci and Flaste (1995), to be autonomous means to “act in accord with one’s self, it means to feel free and volitional of one’s actions” (p. 2). Humans embrace an activity because of interest and commitment, stemming from a true sense of self or authenticity. The opposite of autonomous is the element of control, or acting without a sense of personal choice, where the action becomes submissive to the controls (Deci and Flaste, 1995). Autonomy is different from independence. “It is not the rugged, go-it-alone, rely-on-no-one nobody individualism of the American cowboy. It means acting with choice – which means we can be both autonomous and highly interdependent with others” (Pink, 2012, p. 88).

There is some consensus that teachers need to have autonomy (Brunetti 2001; Erpelding, 1999; Greenville-Cleave & Boniwell, 2012; Pearson & Moomaw, 2005). A teacher who is free to make decisions and choices in the classroom is motivated by acting on free will. Carbonneau et al. (2008) studied the influence of teachers' love or passion for teaching on teachers' burnout symptoms, workplace satisfaction, and perceptions of positive student outcome behaviors. The study found that teachers who were harmoniously passionate, that is, they had autonomously internalized teaching as an activity that is important to them, revealed boosted job satisfaction and decreased risks of burnout over time.

By contrast, a teacher who succumbs to the pressure of an administrative decision, knowing that it may not be what is best for student success, is being controlled and acting under controlled autonomy. Deci and Flaste (1995) propose that any activity that undermines a person's feeling of autonomy gives them a sense of feeling controlled, thereby decreasing their motivation and could potentially lead to negative consequences.

Teacher autonomy or the lack thereof, seems to be a critical component in the motivation of teachers to stay or leave the profession (Ingersoll & Perda, 2010; National Center for Education Statistics, 1997; Pearson & Moomaw, 2005). Several studies have demonstrated that the degree of autonomy and decision making perceived by teachers is indicative of their job satisfaction (Brunetti, 2001; Pearson & Hall, 1993; Pelletier, Seguin-Levesque, & Legault, 2002).

Teacher autonomy has been described as the perception that teachers have regarding whether they control themselves and their work environment (Pearson & Hall, 1993). Charters (1976) described teacher autonomy as a "psychological construct representing a teachers' belief

about his or her freedom from external pressure, interference, or control in performing the work of classroom instruction” (p. 217). There are distinctions made between teachers’ roles in classroom autonomy versus organizational, or school level autonomy.

Classroom autonomy includes teachers having decision making authority to improve classroom performance through being involved in selecting materials and curriculum, planning the daily agenda, exerting classroom discipline, and affecting students’ learning. “A positive form of autonomy represents a teacher’s freedom to construct a personal pedagogy which entails a balance between personality, training, experience and the requirements of the specific educational context” (Hoyle & John, 1995, p. 92).

School level autonomy refers to teachers having input and decision-making authority into factors impacting the school as a whole. Teachers appreciate being involved in topics such as developing goals for the school, deciding on planning time and professional development topics, and having input into budget decisions. Teachers want a voice in factors that impact them and their students. In addition, teachers who experience autonomy-supportive behavior from their administrators are more likely to use autonomy-supportive behavior with their students.

Some people have argued that the SDT may not be applicable to cultures that do not support independence and autonomous behavior but rather value interdependence and collective behavior. Some have claimed that the concept of autonomy is a western concept that relies on values of individualism and independence (Iyengar & Lepper, 2000; Markus & Kitayama, 1991). However, Ryan and Deci (2017) point out that self-determination and autonomy are about volitional behavior and that autonomy is not the same as independence. “SDT supports diversity rather than hegemony” (Ryan & Deci, 2017, p. 589).

A study on the impacts of teachers' autonomy-supportive behavior on students had positive results and "shows promise among Native Hawaiian and Pacific Islander students for promoting students' sense of belonging at school, intrinsic motivation for math, rigorous math course selection, and enhanced math achievement" (Froiland, Davison & Worrell, 2016, p. 890). The authors of the study suggested that teacher and parent autonomy-supportive behaviors would be useful in Hawai'i as well as among various involuntary minority groups, such as the Māori people in New Zealand.

An example of fostering increased autonomy-supported behavior within the Hawai'i Department of Education (HIDOE), is around school design. In 2019, the HIDOE initiated a new, purposeful, strategic change which allows for schools to redesign their curriculum, infrastructure, and practices to adapt to meet the needs of their students and communities. The purpose of school redesign is "to ensure that every student is highly engaged in a rigorous, creative and innovative academic curriculum, in their learning environment, and in powerful applied learning practices aligned to college and careers" (HIDOE, School Design, 2019).

Each of HIDOE's 256 schools had been given authority and guidance to create unique school models to meet their students' needs. "Teachers as well as school leaders, staff and community members [were] intimately engaged in creating the school designs and conditions to support student learning" (HIDOE State Superintendent, Christina Kishimoto, personal communication, January 7, 2019). In addition, 2020 was the third year that the HIDOE was offering innovation grants to teachers. In 2020, the grants awarded ranged from \$2,000 to \$10,000 and were given to teachers who submitted creative ideas for projects in their classrooms or schools that were intended to improve student success in new and innovative ways.

Teacher Autonomy and Retention

A 2013 survey of the nation's teachers revealed the top five reasons they stated for leaving the profession (in priority order): (a) job dissatisfaction, (b) family/personal reasons, (c) retirement, (d) to pursue another job, and (e) financial reasons (Carver-Thomas & Darling-Hammond, 2017, p.6). The category for job dissatisfaction was further broken down into school factors distinguished by (a) physical condition of the school including class sizes, facilities, and classroom resources; (b) unhappiness with school administrative practices including lack of support, classroom autonomy and input to decisions; and (c) policy issues, such as the effects of testing and accountability (Sutcher et al., 2016, p. 49).

The Economic Policy Institute published a series of reports which describe the factors most frequently cited as impacting teacher retention thereby contributing to the shortage: school environment, professional development, recognition, and teacher pay (Garcia & Weiss, 2019a). Other researchers have also identified the strong role school environment (or working conditions) play in teachers' career decisions (Allensworth et al., 2009; Boyd et al., 2005; Johnson & Birkeland, 2003; Johnson et al., 2012; Loeb et al., 2005; Simon & Johnson, 2015). As the leader of the school, the school principal was shown to have a significant impact on teacher satisfaction and teacher turnover (Grissom, 2011; Levin et al., 2020). When examining teacher turnover as a function of the school context, it has been found that "the most salient predictors of their [teacher] satisfaction and predicted retention are social in nature – school leadership, collegial relationships, and elements of school culture (Simon & Johnson, 2015, p. 4)."

In her book, *Where Teachers Thrive: Organizing Schools for Success*, Johnson (2019) describes factors teachers say matter most to them in their schools: (a) the knowledge and skills

of the principal, (b) the effectiveness of schoolwide order and discipline, (c) how time is used, and (d) whether or not they have a meaningful curriculum. Johnson argues that “however important it is to attract knowledgeable, skilled and dedicated individuals to teaching, whether they perform well and stay in their school will depend not only on who they are – their training, skills and disposition – but also on whether their school supports their development and multiplies the strengths of their human capital throughout the school” (2019, p.4).

Autonomy and School Leadership

School principals play an essential role in supporting and fostering teacher autonomy and satisfaction. Johnson (2019) argued that professional working conditions are the key to teachers thriving professionally and that school leaders must build a strong organizational culture for schools, teachers and students to succeed. School principals strengthen teachers’ sense of autonomy and competence by supporting their development. They also multiply their teachers’ talent throughout their schools by offering opportunities for collaboration and team training. In her book, Johnson (2019) argued that principals who allowed teachers time to improve and reflect on their practice, collaborated with other teachers to improve curriculum and practices to meet student needs, and involved teachers in decision making both at the school level and in developing policy recommendations set the tone for teacher productivity and satisfaction.

Researchers have also studied the positive impact of school leaders who practice transformational leadership (Bass, 1985; Kukla-Acevedo, 2009; Leithwood et al., 1996; Leithwood and Jantzi, 2005; Leithwood et al., 2008; Marinell & Coca, 2013; Wahlstrom & Louis, 2008). “In as much as transformational leadership involves dimensions such as individualized consideration, intellectual stimulation, and inspiration by articulating a clear and

justified vision, scholars have suggested that this type of leadership behavior is autonomy supportive” (Gagne & Deci, 2005; Sheldon et al., 2004). Principals who are able to share a value-laden vision and empower teachers to take part in its development, interpretation and implementation are able to build interest and “buy-in” from them. Teachers can then construct meaning in their own work and see how their actions support the school’s mission and vision. “Transformational school leaders are able to communicate a mission, encourage development, and build a community with the aim of empowering the teachers to contribute to the school’s overall results, thereby indirectly influencing student learning through improvements in staff motivations, commitment and working conditions” (OECD, 2018, p. 75).

Susan Moore Johnson, cofounder of Harvard’s Project on the Next Generation of Teachers, found principals played a significant role in school and teacher effectiveness in selected schools she has been studying for over ten years. Johnson provided descriptive case studies and explained how six high-achieving low-income schools use various practices for supporting and retaining teachers. In schools that were failing or foundering, many teachers voiced feelings that their principals were either “ineffectual or high-handed” (Johnson, 2019, p. 236). The principals who were viewed as authoritarian ignored or rejected teachers’ capacity to diagnose problems, develop solutions and implement them. “In response, teachers resisted either openly or covertly, sometimes feigning compliance while withdrawing to their classrooms. Some chose to leave their school in search of another where their views and voice would matter” (p. 239).

In Hawai‘i’s annual School Quality Survey (2019), 70% of the teachers ($N = 9,697$) agreed with the statement, “My leadership provides me with effective advice when I have

problems on the job.” 62% of Hawai‘i’s teachers agreed with the statement “I am satisfied with the opportunities I have to contribute to policy decisions that affect my school.”

Jonathan Medeiros, one of Hawai‘i’s teacher leaders on the island of Kauai published an opinion piece in Education Week (2019) that described the “magic” teachers need from their principals. Medeiros compared teachers opening their hearts and their classrooms to students and parents each year to how administrators might also open themselves up to teachers. He discussed small but powerful acts where administrators could consistently and purposefully make their teachers feel known and seen. “They leave a note during a class visit or ask us to share a thought during a faculty meeting. They design professional development around our needs and include themselves in the learning. They learn our skills and passions and call us in to the cooperative work of running the school” (Medeiros, 2019).

An additional aspect of principal leadership that impacts teachers’ motivation and retention behaviors is the principal’s skills as an instructional leader. According to the Association for Supervision and Curriculum Development (ASCD), instructional leadership for principals involves “sustaining a school vision, sharing leadership, leading a learning community, using data to make instructional decisions, and monitoring curriculum and instruction” (Fink, 2018).

A model of educational leadership developed in New Zealand demonstrates how principal leadership exhibited both inside and external to a school, helps to build relationships and support teachers. In this model as seen in Figure 9, principals are at the center of the school and must navigate internal and external factors to build and sustain a thriving school culture; one where teachers feel appreciated, welcomed and supported.

Studies have shown that strong principal instructional leadership affects student outcomes both directly and indirectly by creating the conditions that support teachers' ability to teach thereby impacting students' learning (Porter et al., 2010). "These conditions include high standards for student learning, rigorous curricula, quality instruction, a culture of learning and professional behavior, connections to external communities, and performance accountability" (Eyal & Roth, 2011, p. 260). Principals also enact instructional leadership practices to provide teachers useful feedback about their classroom practices and assist them in improving those practices (Robinson et al., 2008). Johnson (2019) advocates that "if principals are to be the instructional leaders their schools need, they must bring to their position deep expertise as teachers" (p. 247). Further, Johnson describes instructional leadership in action stating that "...principals who are instructional experts concentrate on the systems and practices that have the most direct effect on students' learning: recruiting and hiring promising candidates, supporting and guiding teachers' growth, and overseeing the curriculum and its development" (p. 247).

In a recent New York Times opinion piece, columnist David Brooks (2018), noted the importance of school leadership and described a study completed by researchers from the University of Minnesota and the University of Toronto which examined 180 schools across nine states and concluded, "We have not found a single case of a school improving its student achievement record in the absence of talented leadership" (para. 7). Brooks also noted that the role of the principal has changed. "Principals used to be administrators and middle managers, overseeing budgets, discipline, schedules. The goal was to be strong and decisive. Today's successful principals are greeting parents and students outside the front door in the morning. The

Minnesota-Toronto study found successful principals made 20 to 60 spontaneous classroom visits and observations per week” (para. 10).

Figure 9

Model of Educational Leadership



Note. This model of principal leadership shows the principal at the middle and the factors that are associated both internally and externally within the context of the school. The Māori words *pono* (true, sincere), *awhinatanga* (empathy and interpersonal relationships) *manaakitanga* (hospitality) and *ako* (to teach and to learn). Position paper published by the New Zealand Ministry of Education (2008). Reprinted with permission.

<http://www.educationalladers.govt.nz/Leadership-development/Key-leadership-documents/Kiwi-leadership-for-principals>

In summary, school principals can be autonomy supportive to teachers by allowing time for them to improve and reflect on their practice; by supporting their efforts to collaborate with other teachers to improve their own practices to meet student needs; by providing them timely and valuable feedback; and by involving them in decision making both at the school level and in developing policy recommendations.

Autonomy and the Expectancy-Value Theory

The expectancy-value theory is worth considering in the context of this research study in that it contributes to understanding teachers' feelings of autonomy and their stated reasons for staying in the profession. The application of the expectancy-value theory (EVT) to teacher retention behavior helps us to understand the impact of extrinsic motivational factors such as teacher compensation, but also the reasons teachers state that they enter the profession as well as why they remain in the profession. In addition, because the current teacher workforce is multi-generational with variation in teachers' years and level of experience, how their varying expectations influence their job satisfaction and retention behavior are important to consider.

Victor Vroom (1964) developed the expectancy motivation theory (which later became the expectancy-value theory) with direct application to work settings. Vroom's expectancy theory is based on "the idea that people believe there are relationships between the effort they put forth at work, the performance they achieve from that effort, and the rewards they receive from their effort and performance" (Lunenburg, 2011, p. 1). In other words, employees, including teachers, may be motivated to behave in a certain way if they believe that strong effort will lead to good performance and good performance will lead to desired results.

Similar to Vroom, Locke's (1969) view of motivation theory explored how "job satisfaction and dissatisfaction are a function of the perceived relationships between what one wants from one's job and what one perceives it is offering or entailing" (p. 316). Locke (1976, p.2.) provided an explanation of how one's values influence their appraisal of a job's ability to bring them satisfaction or displeasure. As such, Locke's view is that the causes of job satisfaction are not solely in the job or in the employer but rather are in the relationship between the two. The expectancy-value models of motivation assume that an individual's choice, persistence, and related achievement behaviors are directly linked to expectancy-related beliefs and the subjective weight individuals place on task values (Atkinson, 1964).

While there is not a single expectancy-value model, the model developed by Eccles, Wigfield, and their colleagues was originally developed to examine student motivation for learning, and a tool was developed to study students' choices to participate in high school mathematics (Eccles et al., 1983, 2005, 2009; Wigfield & Eccles, 2000). Eccles et al. (2005) "proposed that educational, vocational, and other achievement-related choices are directly impacted by one's abilities, beliefs, and expectancies for success on the one hand, and the value one attaches to the task on the other" (Richardson et al., 2014, p. 5). The Eccles et al. EVT model has four value components: *intrinsic value* relates to how much a person enjoys the task; *utility value* indicates whether the activity is seen as useful; and, the *attainment value* is related to whether or not the action is important for achieving a person's own goals. "The less studied negative "cost" value component captures what an individual must give up (opportunity cost), and has negative outcomes such as financial loss, psychological experiences (e.g. anxiety) and time and effort required" (Richardson et al., 2014, p. 3).

Fit-Choice Model

The focus on teacher quality as the most important factor impacting student learning (Hattie, 2009), lead researchers Watt et al. (2014) to the notion that “there are different types of teachers who possess different ambitions, goals, aspirations, values, abilities and skills, and that these differences may be important in relations to teachers’ career aspirations, development and commitment, and thereby student learning” (p. 24). Using the EVT as their conceptual framework, Richardson and Watt (2006) developed the now widely used *Factors Influencing Teaching-Choice* (FIT-Choice model) to assess the primary motivations of student teachers to teach and teacher retention. The FIT-Choice model is grounded in the expectancy-value theory and is also based on altruistic, intrinsic and extrinsic motivation theories from teacher education literature (Book & Freeman, 1986; Brown, 1992; Johnson, 2006; Lortie, 1975; Serow & Forrest 1994, Watt et al., 2017).

Using the FIT-Choice model as a framework, Watt and Richardson (2007) conducted a study of over 1,600 Australian beginning teachers to determine how initial motivation for teaching impacted their attraction and desire to continue in the profession. They not only studied how initial motivations for teaching impacted beginning teachers’ professional engagement, motivation and teaching style but also continued to follow the teachers for up to eight years into their teaching career. The findings from the Australian study and additional studies based on the Fit-Choice model provide useful considerations for policy makers and school leaders who are interested in improving teacher autonomy, competence and sense of belonging.

One of the findings was that many Australian preservice teachers were well aware of the job difficulties, low pay and low status of the profession but chose to enter any way and after

they became teachers, they experienced high satisfaction with their career choice (Richardson & Watt, 2006). An additional finding was that many teachers reported that they had no intention of staying in the profession for a full career even before they entered (Richardson & Watt, 2006). Some said they saw teaching as a “stepping stone” to other careers in education while others identified as “free spirits” who did not wish to remain in any career for the long term (Watt et al., 2014).

Since Richardson & Watt’s initial study (2006), additional global research has shown that the FIT-Choice model provides a valid and reliable framework to examine motivations for teaching and has implications for teacher retention. Studies of teachers from various cultures around the world using the FIT-Choice model [United States and China (Lin et al., 2012); Australia (Watt & Richardson, 2007); Turkey (Eren & Tezel, 2010; Kilinc et al., 2012; Richardson, 2012); Switzerland (Berger & D’Ascoli, 2012); Germany (Konig & Rothland, 2012; and Croatia (Jogovic et al., 2012)] revealed that there were differing perceptions and motivations as to why teachers choose to teach (and to remain teaching) based on cultural and social meaning attached to the teaching profession. However, there were also distinct similarities.

Similarities included teachers self-reported initial desires to teach and also their stated reasons for persisting and being motivated to stay in the profession. One notable similarity was that teachers worldwide stated the reason they stayed in the profession was the desire to positively impact students’ lives (Watt et al., 2014).

In the United States, “making a difference” clearly stood out as a job motivating factor for the majority of teachers. Brunetti (2001) studied teacher satisfaction in a group of high school teachers from a large school district in Northern California and found that the principal motivator

for job satisfaction and retention was identified as “working with young people and seeing them learn and grow” (p. 68). Similarly, a Scholastic and Gates survey (2013), polled teachers across the United States and found “nearly every teacher (98%) agrees that teaching is more than a profession; it is how they make a difference in the world – one child at a time – as they share their love of teaching and learning to help students reach their full potential” (p. 11). Nearly all (99%) of the Hawai‘i participants in the Scholastic and Gates survey (2013) said they saw their roles as teachers extending beyond academics to include things like reinforcing good citizenship, building resilience and developing social skills.

Because teachers cited differing reasons for entering the profession as well as various motivations for teaching as a career choice, there may be implications for those who lead and manage the teacher workforce based on the knowledge that new teachers may have distinctly different career plans, hopes, and goals, and that these plans might not necessarily be fulfilled by a traditional career in classroom teaching” (Watt et al., 2014, p.38). From an SDT perspective, individual desires and choices are driven by both intrinsic and extrinsic factors. While many teachers are driven by the desire to give back to their communities, or to contribute to society by influencing the lives of children and adolescents, others may see teaching as an ideal family-friendly job, or as a “fallback” career, which Watt (2006) defined as those who enter teaching being unsure of what career they wanted, not being accepted into their first choice of careers, or choosing teaching as a “last resort” career.

Another finding from the Australian study (Watt & Richardson, 2011) was that teaching required increased teacher accountability and that testing and comparative student achievement data brought significant changes to teachers’ work. “While schools have been given a level of

self-managing autonomy, teachers and principals are faced more and more with achievement targets, out-of-class administrative duties and reporting requirements that have little to do with the relational work with students” (Watt & Richardson, 2011. p. 28). Butler (2012) noted that if teachers’ motivations were distracted by excessively bureaucratic policies that took them away from the relational and valued work they did with students, then these teachers were likely to experience frustration and a lack of career satisfaction.

The length of experience of teachers may also impact their desire for more or less autonomy. Beginning teachers may want less classroom autonomy during their first three years while seasoned teachers appreciate having the ability to make decisions for their classrooms and for the school. In their global study of teachers, Watt et al. (2014) discovered that in many countries the first five years of teaching is a critical time, with similar patterns of attrition of beginning teachers observed. Strong beginning teacher induction and mentoring programs have proven helpful and supportive to new teachers (Goldhaber et al., 2018; Ingersoll & Strong, 2011; Inman & Marlow, 2004; Sorensen & Ladd, 2018). A final area of consideration related to teacher autonomy and the expectancy value theory is in the area of teacher compensation.

Teacher Compensation

Self-determination (SDT) theory does not label extrinsic rewards, such as pay and compensation, as bad, or non-motivating. Rather “when rewards are administered in an autonomy-supportive climate, they are less likely to undermine intrinsic motivation and, in some cases, can enhance intrinsic motivation” (Gagné & Deci, 2005, p. 354). There is research at the organizational level that shows pay can have a positive impact on employees perceived autonomy (DeVaro & Kurtulus, 2010; Fang & Gerhart, 2012). From the perspective of the

expectancy-value theory, employees expect to be fairly compensated and adequate pay is both a physiological and psychological need for teachers. Teachers typically do not enter the profession expecting to become rich, but they do need a living wage to be able to support themselves and their families and not have to work more than one job.

In 2018, teacher strikes caught national headlines as teachers marched by the thousands on state capitols in West Virginia, Kentucky, Arizona and Oklahoma, protesting low pay and their state's failure to adequately fund schools (Johnson, 2019). Not surprising was that teachers are and continue to be speaking out about their low pay. Economists Sylvia Allegretto and Lawrence Mishel (2018) compared teachers' weekly salaries with those of other college graduates and found what they call a "pay penalty" for teachers. The pay penalty (or gap in pay between teachers and other college graduates) has grown steadily over the past twenty years (Allegretto & Mishel, 2018). "After accounting for education, experience, and other factors known to affect earnings, teachers' weekly wages in 2018 were 21.4 percent lower than their non-teaching peers" (Garcia & Weiss, 2019c, p. 1.). Additionally, the percent of teachers moonlighting to earn extra pay has increased. "In the 2015–2016 school year 59 percent of teachers took on additional paid work either in the school system, or outside of it - up from 55.6 percent in the 2011-2012 school year" (Garcia & Weiss, 2019c, p.1). In its 2020 nationally representative survey of public and charter school teachers, Gotham Research Group found that teacher compensation was top of mind and that "67% of all teachers currently have or had a second job to make ends meet" (Educators for Excellence, 2020, p. 20).

Teachers are not only working second jobs to make ends meet, but many are also eligible for federally funded benefits programs (Shapiro et al., 2018). Mid-career teachers with over 10

years of service who serve as the primary breadwinner for their family of four may qualify for federally funded benefit programs designed for families in need of financial assistance (Boser & Straus, 2014).

In January 2020, the Hawai‘i Department of Education released the results of a compensation study on teacher pay which found that teachers face an extremely high cost of living in Hawai‘i, which makes it difficult to stay in the teaching profession. The study found that in Hawai‘i, “the cost of living leads many teachers to make unsustainable financial sacrifices, taking additional jobs that negatively impact their primary role as educators, and consider leaving the profession or moving somewhere else to teach” (Augenblick, Palaich and Associates (APA), 2020, p. 61). As part of the compensation review, APA conducted four listening sessions throughout the islands and several teachers attended to share their stories. “Many told stories of living paycheck to paycheck, buried under student loans and high rents” (Finnerty, Hawai‘i Public Radio, 2019). In addition, Hawai‘i’s teachers have been ranked by the personal finance website, WalletHub, as the worst paid in the nation when factoring in the cost of living (McCann, 2019, September 23). A separate analysis of teachers’ salaries found that Hawai‘i’s public school teachers would need to spend 70 percent of their pre-taxed salary to afford the median rent in Hawai‘i (Richards, 2019).

Numerous studies have documented the influence of salary on employee and teacher retention (Benner et al., 2018; Choi & Dickson, 2009; Hinkin & Tracey, 2010; Ingersoll, 2001; Murnane et al., 1991; Murnane & Olsen, 1989; Ondrich et al., 2008; Sturman, 2003) and suggest a relationship between low salaries and quitting (Garcia & Weiss, 2019c).

The Learning Policy Institute discusses the need for policy makers to improve three areas to improve teacher recruiting and retention: (a) teacher compensation, (b) teacher preparation and support, and (c) school leadership” (Carver-Thomas & Darling-Hammond, 2017 p. vi).

Mathematics Teacher Retention and Autonomy

Mathematics teacher retention is influenced by many of the same factors described for all teachers however, researchers describe how math, science and special education teachers who have had chronic shortages nationwide are impacted in slightly different ways. Using data from the National Center for Education Statistics, nationally representative Schools and Staffing Survey, and its longitudinal supplement, and the Teacher Follow-up survey, Ingersoll and May (2010) found that rates of mathematics and science teacher turnover, both those moving between schools and those leaving teaching altogether, have increased over the last two decades, but have not been consistently different than those of non-mathematics/science teachers” (p. 1). While a commonly held belief is that math and science teachers are more likely than other teachers to leave for alternative career options in the private sector (Murnane et al., 1991; Rumberger, 1987; National Research Council 2002; National Academy of Sciences, 2007), Ingersoll and May (2010) found that math teachers were no more likely than other teachers to take non-education jobs, such as in the technological fields, or to be working for private business or industry (p.1). Rather, of the 51,400 math and science teacher departures in 2004–2005, just under one third retired, and another one third were job shifters who did not leave education but took other jobs in the larger education sector, such as school administrator, curriculum development or educational publishing. The remainder moved to another school or left to care for family members

(predominantly for pregnancy and raising children), or to enroll full-time in university or college programs.

Ingersoll and May (2010) reported that the strongest school factors self-reported by mathematics teachers for leaving their schools were (a) the degree of individual classroom autonomy held by teachers, (b) the provision of useful professional development, and (c) the degree of student discipline problems. Also, after controlling for other characteristics, the study showed (a) the odds of a math teacher departing were 42 percent higher than non-math or science teachers, (b) schools with lower levels of student discipline problems had turnover rates distinctly lower for math/science and other teachers, (c) individuals who reported positive levels of leadership support were less likely to depart, (d) individuals who reported high levels of faculty decision-making influence had lower levels of turnover, and (e) individuals with higher levels of classroom autonomy had lower levels of turnover. Another key finding from this study was that the “data show 45% of all public school teacher turnover, after the 2004–05 year, took place in just one quarter of the population of public schools” (p. 42). This study showed that school to school differences matter to teachers and that improved organizational conditions at schools may support improved mathematics teacher retention at a particular school.

In a 2012 national survey of math and science teachers in all grade levels, it was found that autonomy was also perceived as important to the survey participants. The survey found that teachers were more likely to perceive themselves as having strong control over pedagogical decisions such as determining the amount of homework to be assigned, selecting teaching techniques, and choosing criteria for grading student performance than in having strong autonomy over curriculum choices such as selecting content and textbook. However, it was also

found that perceived control in making autonomous decisions tended to increase with grade range (Banilower et al., 2013).

A Hechinger Report (2010, para. 5) noted that “secondary schools in high-poverty areas, both urban and rural, have the most trouble finding and keeping math teachers.” In Hawai‘i, this is also true. The rural areas on the smaller islands such as Lanai, Moloka‘i, Hana, Maui and Ka‘ū, Hawai‘i island, have a difficult time recruiting and retaining math teachers. Henry Kepner, past president of the National Council of Teachers of Mathematics (NCTM) said in the “rural areas, it’s almost a disaster for math” (Hechinger Report, 2010, para. 5).

Competence

Competence “refers to humans basic need to feel effectance and mastery” (Ryan & Deci, 2017, p. 11). Personality psychologist Robert White’s (1959) paper about “The Concept of Competence” argued that people yearn so strongly to feel competent or effective in dealing with their environment that competence could be thought of as a fundamental human need.

Self-determination theory defines competence as one of three innate human psychological needs and “postulates that humans are endowed with inherent and deeply evolved propensities to explore, assimilate knowledge, and develop new skills” (Roth in Richardson, Karabenick, & Watt, 2014, p. 42). Competence involves feelings of effectiveness and having opportunities to express one’s skills and capacities (Deci, 1975; Harter, 1983; White, 1959).

Additionally, Daniel Pink (2009) built on the self-determination theory by describing three elements he deemed necessary for genuine, human, intrinsic motivation: autonomy, *mastery*, and purpose. Pink defined *mastery* as “the desire to get better and better at something that matters” (p. 109). According to Pink, the twenty-first century requires humans to have

inquiring minds and the willingness to experiment to develop solutions to today's problems. Pink described the "three laws of mastery" (pp. 123 – 135): (a) *mastery as a mindset* based on our beliefs about ourselves and the nature of our abilities (based on Dweck, 1999), (b) *mastery as a pain* meaning it requires grit or "perseverance and passion for long-term goals" (Duckworth, et.al., 2007), and (c) *mastery as an asymptote* – meaning you can approach it, home in on it, but never quite touch it.

Given the need to retain talented teachers, it is useful to review the literature around how meeting teachers' basic psychological needs for competence (or mastery) serves to inspire and motivate them. Three areas that will be reviewed include (a) achievement-goal theory as it relates to teachers' motivation to teach, (b) teacher competence and professional development, and (c) school leader role in supporting teachers' professional learning.

Competence and the Achievement Goal Theory

Teachers are no different than other humans who are "innately curious, interested creatures who possess a natural love of learning and who desire to internalize the knowledge, customs and values that surround them" (Niemi & Ryan, 2009, p. 133). Yet for teachers, sometimes there are barriers to what otherwise might be an intrinsic motivation to learn. Sometimes there are external controls (rules, regulations, lack of funding), or overly prescriptive tasks or requirements that do not make a difference for teachers in their classrooms, or extrinsic demotivators (test scores, performance evaluations) or boring content, that hold teachers back from pursuing their learning and professional development. The achievement-goal theory provides a construct that helps describe factors that influence teacher's self-regulation of their own learning.

The achievement goal theory of motivation was initially used to study students' motivation to learn and centers around the idea that students' perceptions, strategies and outcomes depend on what they want to achieve and thus their goals for schoolwork (Butler, 2014, p. 21). An achievement goal involves processes that have "cognitive, affective and behavioral consequences" (Elliott & Dweck, 1986, p. 11) and can be understood by reviewing the purposes of the achievement behavior (Ames, 1992). The achievement goal theory distinguishes between peoples' actions and motivations that support learning and development for the purpose of gaining knowledge and skills (mastery and ability goals) versus people who exhibit avoidance behavior in order not to appear incompetent or inferior (ability-avoidance goals), or to avoid doing the tasks required to accomplish the goal (work-avoidance goals) (Ames & Archer, 1987, 1988; Dweck, 1986; Dweck & Elliot, 1983; Elliot et al., 2017; Maehr, 1974; Maehr & Nicholls, 1980; Nicholls, 1979, 1984, 1989; Wang et al., 2017).

Butler (2007) proposed that the achievement goal theory which was focused for many years solely on students' motivation to learn, might also provide a framework for conceptualizing teachers motivation for learning and teaching. Butler extracted from the concept of achievement goal theory to ascertain whether the four broad classes of achievement goals (mastery, ability-approach, ability-avoidance, and work-avoidance) could be used to conceptualize teacher motivation for learning and teaching (Butler, in Richardson, Kanaberick & Watt, 2014, p. 20). Butler used the terms *mastery and ability* goals to highlight the differences between striving to learn and acquire competence versus striving to prove ability. Others extended the basic mastery and ability goals to include *ability-avoidance goals* which serve to

avoid failure or demonstration of inferior ability (Elliott & Church, 1997) and *work-avoidance goals* whereby students or teachers get by with little effort (Nicholls, 1989).

Butler (2014) describes the important differences and actions related to *mastery* and *ability* goals. *Mastery* goals require effort and “are associated with tendencies to define and evaluate competence relative to task demands or prior outcomes, to attribute outcomes to effort, to prefer challenging tasks, to construe difficulty as diagnostic of the need for further learning and to respond by increasing effort, trying different strategies, and actively seeking help or information that can support learning” (Butler, p. 22). In contrast, “*ability* goals are oriented to defining and evaluating competencies relative to others, to attribute outcomes to ability, to construe difficulty as a diagnostic of low ability, and thus to respond to setback by disengaging, self-handicapping and refraining from exposing inadequate ability by not asking questions or seeking help” (p.22).

Butler and others (Butler, 2007; Dickhauser et al., 2007; Nitsche et al., 2011) found that the achievement goal theory helped describe teachers’ help seeking behavior. Teachers frequently encounter dilemmas, difficulties and conflicting demands which may result in teacher burnout, or contrastingly lead to resilience and constructive coping strategies. Study findings (Butler, 2007; Nitsche et al., 2011) suggested that teacher mastery goals are associated with positive perception of help seeking as beneficial for learning, with preferences for receiving help in the form of consultation or workshops that could enable them to become more knowledgeable and effective. Teachers pursuing mastery goals also reported that they had turned frequently to colleagues for help with professional questions and problems. In contrast, the more teachers were motivated by ability-avoidance goals, the more likely they were to perceive help seeking as a

threatening admission of low ability and the less likely they were to report having turned to colleagues for help or advice (Butler, 2007, 2012).

In a similar vein, Parker et al. (2012) found that mastery goal orientation was associated with constructive problem-solving strategies while strategies to avoid failure were associated with disengagement and procrastination. Thus, there are grounds for anticipating that teachers who strive to learn and develop professional competence, and who cope constructively with the challenges of their profession, will enjoy their work more than teachers who are motivated by concerns to avoid failure or to minimize effort and investment. Indeed, in several studies a mastery goal orientation for teaching was associated with interest in teaching and job satisfaction, and protected teachers from burnout, while work-avoidance and ability-avoidance goals were associated with high burnout and low job satisfaction (Papaioannou & Christodoulidis, 2007; Parker et al., 2012; Retelsdorf et al., 2009).

Another interesting outcome of achievement goal theory research is the discovery of the role between teachers' autonomous motivation for teaching and its positive effect on teachers' autonomy supportive behavior toward students (Roth in Richardson et al., 2014). In other words, teachers who learn and experience the value of autonomously motivated, self-directed, teaching are more likely to provide autonomy supportive teaching behaviors or practices for their students by upholding the value and relevance of certain topics and providing a wider range of choices of tasks and avenues to help students learn (Roth, in Richardson et al., 2014).

Competence and Professional Development

In a knowledge-based profession such as teaching, continuous learning is critical for beginning and experienced teachers alike. Continuous learning helps teachers keep up with

advances in research on effective teaching and updates in subject/content areas, as well as with the changing demands of the profession. Professional development provides ongoing opportunities for teachers to continue to improve their knowledge and skills so they can help students achieve. When teachers learn, students learn more. A recent Economic Policy Institute (EPI) report (Garcia & Weiss, 2019e) discusses the importance of professional development and a culture of learning stating it “not only validates teachers’ professional standing and strengthens the teacher workforce, but it also correlates with teacher retention and could contribute to ameliorating the national teacher shortage” (p. 25).

The EPI report (Garcia & Weiss, 2019e) shows that nationwide, a broad set of supports for professional learning are occurring. Over 79 percent of first-year teachers are working with a mentor and the vast majority of teachers are attending workshops; training sessions; activities focused on the subjects that teachers teach; collaboration sessions on issues of instruction; and participating in classroom observations. While this bodes well for continuous learning, there are also areas of the report that indicate there is room for improvement.

A summary of the survey responses reflected in the EPI report (Garcia & Weiss, 2019e) highlighted five significant weaknesses to the current professional development programs: (a) limited access to valued university courses, (b) lack of time to attend or prepare for presentations, (c) training not relevant or useful, (d) lack of input on topics, and (e) high-poverty schools have less opportunities. It appears from the research, that professional development opportunities should be as individualized as possible. A “one size fits all” approach does not work, and teachers are asking for more input and more targeted, meaningful, and ready to use resources that include long-term support and continued collaboration (Appova & Arbaugh, 2018;

Educators for Excellence, 2020; Garcia & Weiss, 2019a, b, c, d, e; Patterson et al., 2004; Peters & Passanisi, 2012).

The annual Hawai'i Department of Education School Quality Survey, Statewide Summary (2019) included a statement about professional development. The statement read, "I am satisfied with the professional development opportunities the school provides for me" (p. 30). The responses were on a five-point scale and showed mixed degrees of satisfaction. Out of the 9,657 HIDEOE teacher responses, 22.4% strongly agreed; 43.9% agreed; 20.5% were neutral; 9.8% disagreed; and 3.4% strongly disagreed. While these results show there is room for improvement in professional development opportunities in Hawai'i, 86.5% of Hawai'i's teachers were either neutral or overall satisfied with their professional development opportunities.

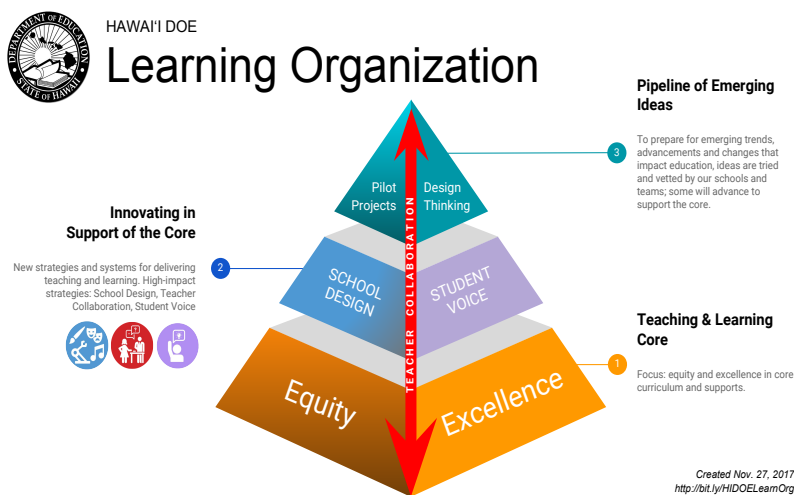
Principal Support to Teacher Learning

Administrators' actions have enormous impacts on teachers' sense of autonomy and competence. "Helping administrators understand their level of influence and guiding them toward building positive working relations with teachers and empowering teachers would enhance teacher retention" (Skaalvik & Skaalvik, 2011). School leaders who provide professional development and learning opportunities that teachers say they want will support teachers' autonomous motivation for competence (or mastery) of skills that will help them be more effective teachers. The research shows that supporting teachers in this way will increase job satisfaction and positively impact teachers' decisions to stay at a school (Farber, 2015; Garcia & Weiss, 2019a, b, c, d, e; Hauserman et al., 2013; Johnson, 2019; Pink, 2009). Other studies have also shown that teachers with high efficacy are more likely to stay in teaching (Burley et al., 1991; Glickman & Tamashiro, 1982).

Senge (1990) describes learning organizations as systems where “people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are natural, where collective aspiration is set free, and where people are continually learning how to see the whole together” (p. 3). Statewide, the HIDOE encourages and fosters environments for continuous learning and innovation. HIDOE is using a school design process to replace practices that do not contribute to student success and is adopting new ways of engaging students to meet their needs and aspirations (HIDOE 2030 Promise Plan, 2020). The Hawai’i Department of Education operates as a Learning Organization, as seen in Figure 10.

Figure 10

Hawai’i Department of Education Learning Organization



Note. This diagram shows HIDOE’s Learning Organization concept which supports the three pillars of school design, teacher collaboration and student voice based on equity, excellence, continuous learning and innovative practices. <http://www.bit.ly/HIDOELearnOrg>

This type of learning organization is possible in each school if the school principal leads in a transformational manner and builds a shared leadership structure where teachers are involved in decision making, and collaboration on curriculum, instruction, and assessment. Within this model, the principal seeks out the ideas, insights and expertise from teachers and shares instructional leadership with them (Marks & Printy, 2003). Using the shared leadership model, the principal provides resources and support so that teachers can collaborate, encourage each other to improve their instructional practices, and learn together with their colleagues (Moller et al., 2005; Moller, 2017). Additional research studies describe how teachers' efficacy improves with years of experience (Kini & Podolsky, 2016), and that principal leadership that includes providing seasoned and beginning teachers opportunities to collaborate helps to support the ability to operate as a learning organization (Podolsky et al., 2019).

Principals also need to build support systems for novice teachers. New teachers experience “fragile” competence and need extra supports during their first year in the classroom. Principals can support new teachers by (a) visiting their classrooms right at the beginning of the school year to check in and provide guidance, (b) intentionally assigning a mentor, (c) reducing isolation, (d) assisting with classroom management, and (e) giving permission to say no (Whitaker et al., 2019). For new mathematics teachers, their professional identities and agency are developed “dialogically within the figured world of teaching mathematics through continued participation with colleagues, students, school principals, and parents” (Losano et al., 2018. p. 295).

Creating a culture of support through mentoring and additional in-class coaches as one study suggested can increase effectiveness and confidence in a new teacher equating to

classroom longevity (Carney et al., 2013). For beginning teachers, time spent providing them extra support during their early years of teaching has shown to be beneficial to their growth and development, their effectiveness as a teacher, and their retention.

Hawai'i has established an induction and mentoring program for beginning teachers in their first two years of teaching. The Hawai'i Department of Education established standards of mentoring practice in 2018 which also included a \$1,000 a year stipend for teacher mentors. The results of the program have been positive based on annual survey results and retention behavior. The beginning teachers have reported improved confidence in their classroom skills including increased abilities to engage with lesson content, differentiate instruction, manage classroom procedures, and address issues of equity (Hawai'i Department of Education Teacher Annual Induction Survey, 2018, 2019). As Figure 11 shows, the beginning teacher retention rate rose from 51% to 55% between school year 2018–19 and school year 2019–2020. It is believed that Hawai'i's strong mentoring program which includes over 650 trained and active mentors, as well as supportive school leaders, helped build the competence, self-efficacy and motivation of over 1400 beginning teachers who have decided to stay in the teaching profession in Hawai'i.

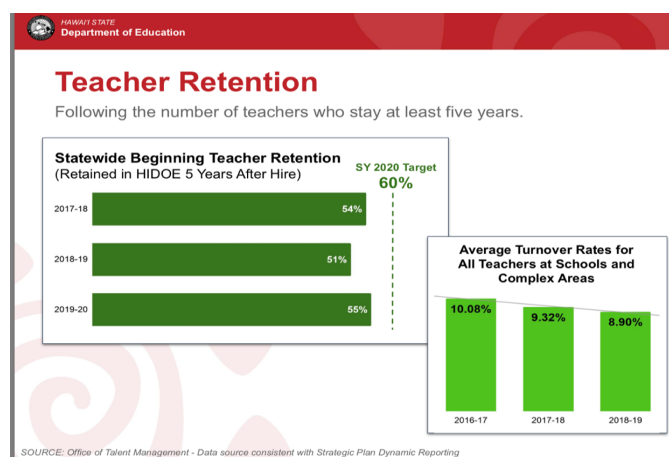
Relatedness

Two of the three innate psychological needs (autonomy and competence) espoused by Deci and Ryan (2002) have been reviewed in this paper. The third need – *relatedness* - “refers to feeling connected to others, to caring for and being cared for” as well as belonging to a community (Deci & Ryan, p. 7). People not only need to feel competent and autonomous, but they also need to feel connected to others. Relatedness and autonomy go together. “As people become more authentic, as they develop greater capacity for autonomous self-regulation, they

also become capable of deeper relatedness to others (Deci & Ryan, 2002, p. 6). The need for relatedness also causes people to “grow to respect their social and physical surroundings” (Deci & Flaste, 1995, p. 205).

Figure 11

Hawai‘i Department of Education Beginning Teacher Retention



Note. This chart shows the beginning teacher five-year retention rate and the overall teacher turnover rate of 8.9% for the 2018–2019 School Year. From Hawai‘i Board of Education November 16, 2019, Data Retreat Public Meeting (www.hawaiiboe.org)

Other researchers also view the need to belong as a fundamental human motivation (Baumeister & Leary, 1995; Dweck & Yeager, 2017; Maslow, 1943; Walton & Brady in Eliot, Dweck & Yeager, 2017; Walton & Cohen, 2007). “Belonging is a kind of relationship with a setting...when people feel they belong, they tend to be more motivated in that setting”(Walton & Brady in Eliot, Dweck & Yeager, 2017, p. 274). Roeser et al. (1996) described a sense of

belonging as a feeling or relatedness and being valued. Similarly, Goodenow and Grady (1993) described a sense of belonging as resulting from a feeling of being accepted, respected and receiving social support from other members of the community.

Pinder (1998, p. 11) provided a definition of work motivation as being “a set of energetic forces that originates both within, as well as beyond an individuals’ being, to initiate work-related behavior, and to determine its form, direction, intensity and duration.” The idea that work motivation is the result of an interaction between a person and his or her environment was also discussed by Roethlisberger and Dickson (1939) who wrote that workers’ attitudes toward objects in the workplace “can be referred to the relation between an organism and its physical environment...” (pp. 261–262).

Likert (1961) stated that a “subordinate’s reaction to the supervisors’ behavior always depends upon the relationship between the supervisory act as perceived by the subordinate and the expectations, values and interpersonal skills of the subordinate” (pp. 94-95). Similar views of work motivation based on a person’s perceptions and values as they relate to the external environment have been expressed by others (Katzell, 1964; Morse 1973; Hudson Rosen & Rosen, 1955; Smith et al., 1969).

Relatedness and Teacher Retention

While the research literature is extensive regarding student motivation as it relates to a sense of belonging at a school or in a classroom (Furrer & Skinner, 2003; Goodenow & Grady, 1993; McNeely, 2005), the research on teachers’ motivation based on their feelings of belonging to the school where they are teaching has not been studied as extensively. There are some studies that show how teachers’ self-reported feelings of belonging, or “fit”, impact their job satisfaction

and motivation (Bogler & Nir, 2012; Curtis, 2012; Grenville-Cleave & Boniwell, 2012; Mertler, 2016; Mason & Matas, 2015; Rowe, 2015; Skaalvik & Skaalvik, 2011, 2016, 2019).

Einar and Sidsel Skaalvik, professors at the Norwegian University of Science and Technology, conducted a number of studies on Norwegian teachers' motivation and retention. Skaalvik and Skaalvik (2011) completed a study of over 2,500 Norwegian teachers in elementary and middle school, and found that teachers' feelings of belonging at the school where they were teaching were associated with higher levels of job satisfaction and lower levels of emotional exhaustion. They also found value consonance (or sharing of similar values) contributed to teachers' increased sense of belonging and work satisfaction.

Teaching is a human endeavor. Teachers frequently work with students, parents, colleagues, community partners and school administrators. The relationship that matters most to teachers throughout the literature is the relationships they have with their students. In their study, Sturman et. al. (2005) reported that over 80 percent of teachers describe the single biggest reward in teaching as the satisfaction of helping children both academically and personally. Mertler (2016) found in his study of over 9,000 Arizona teachers, that among the highest-ranking factors teachers selected as having a positive impact on their motivation, was their interpersonal relationships with students. Mertler also highlighted that on the survey he administered, teachers chose the following three teaching incentives as their top three: (a) having a student thank you for assisting in the understanding of a difficult concept; (b) observing vast improvements in your students' performance since the beginning of the year; and (c) being permitted to purchase additional equipment, technology, and/or supplies for the classroom. Mertler further noted that "teachers everywhere – including Arizona - as evidenced by this study, are motivated

intrinsically, by the joy they experience in helping their students learn, grow, and develop as young children and adults.” (2016, p. 43). Rentner et al. (2016) also found, through a nationwide survey, “large majorities of the nation’s teachers said that making a difference in students’ lives (82%) and seeing students succeed academically (69%) are among the most rewarding aspects of teaching” (p. 3).

Another area where teachers relate to each other is when they have an opportunity to collaborate. Several studies have highlighted the benefits and self-reported desires for teachers to work in teams and to learn from each other (Johnson et al., 2012; Kraft et al., 2015; Johnston & Tsai, 2018; Ladd, 2011; Simon & Johnson, 2015). Schools that provide appropriate, deliberate, and coherent types of teacher support – such as regular opportunities for collaboration – are far more likely to attract, develop, and retain effective teachers, thus ensuring that all students routinely benefit from skilled and committed instruction (Ingersoll & Kralik, 2004). A RAND report by Opper (2019) highlighted the value of teacher collaboration saying that it provides informal mentoring opportunities, sharing of new instructional approaches, and a means to co-construct understanding of policies and improve practices. Jarmolowski (2017) found that while salary is important to teachers, time to plan and collaborate is also valued by teachers. “More planning time, and specifically more collaboration time, is an oft cited reason that countries like Finland and Japan outperform the United States” (Jarmolowski, 2017, p. 4). Additionally, a 2015 survey of a nationally representative sample of public school teachers by the Center of Education Policy, found that “nearly all public school teachers (94%) engage in collaborative activities with other teachers in their school” (Rentner et al., p. 4) and that the majority (over 90%) collaborated

on the same subject and/or grade level and found that this type of collaboration was both helpful and a good use of their time.

A study by Banerjee et al. (2017) examined the relationship of teacher job satisfaction to student achievement and how the role of school culture and teacher collaboration interact with job satisfaction to improve student achievement in math. The study found that while the strength of the relationship between job satisfaction and student achievement varied across elementary schools, “components of school culture, namely teacher professional community and teacher collaboration, moderate the relationship between teacher job satisfaction and student achievement growth in both reading and math.” (p. 231). The study also highlighted that the presence of a vibrant professional community and strong teacher collaboration could minimize the negative consequences of higher levels of dissatisfaction among elementary teachers from affecting their students’ achievement in reading and math.

Because teacher collaboration is highly valued by most teachers, consideration of the barriers to increasing the opportunities and time spent on collaboration is warranted. In some schools there are organizational culture factors where long-standing norms of teacher autonomy and egalitarianism cause some teachers to resist steps to build professional communities (Little, 1990; Moller et al., 2005). In a 2016 survey of over 1,800 teachers from across the United States, only 31% of those teachers reported that they had sufficient time to collaborate with other teachers (Johnston & Tsai, 2018).

Teachers value learning and collaboration. Not only do teachers impact students, but they also impact other teachers and potentially the entire team or organization. Building a collaborative environment helps the development of collective and individual teacher efficacy.

could be improved at their school, five common themes emerged. Teachers wanted (a) more time to collaborate, (b) more effective use of time, (c) differentiated and focused training, (d) training in how to collaborate, and (e) training in how to build trusting relationships (Teacher Voice Gathering Project, 2019).

A growing number of teachers are collaborating via the internet using social media (Forte, Humphreys & Park, 2012; Pace, 2017; Bret Staudt Willet et al., 2017). Social media platforms such as Twitter, are being used by teachers to create, enhance, and share curriculum and knowledge with a broad educational community allowing teachers to connect across a variety of venues and contexts (Bret, Staudt, Willet et al., 2017; Chen & Bryer, 2012; Namdar & Shen, 2018; Schipke, 2018; Schultz, 2013).

During the unprecedented school year 2019–20 COVID-19 pandemic situation, in Hawai‘i, even when school facilities were shut down with teaching being moved to on-line, distance learning, teachers were meeting to learn from each other. Teachers throughout Hawai‘i quickly began to increase their collaboration activities via on-line platforms and social media. Teacher “peer-to-peer power sessions” were created which encouraged and allowed teachers to learn from each other on a wide variety of topics. From April to May 2020, in a four-week period, over 23 teacher-lead professional learning, on-line peer-to-peer power sessions were held with over 628 educators participating from 181 different schools (public, charter and private) throughout Hawai‘i (Brummel, 2020). In addition, teachers in each of Hawai‘i’s schools collaboratively reached out to their students to show how much they missed them and found innovative solutions to stay in contact with each other, their administrators, parents and the community.

A Sense of Belonging in Hawai‘i

Hawai‘i offers unique cultural opportunities for teachers in its public schools. The Hawai‘i Department of Education (Department), uses the framework of Na Hopena A‘o (“HĀ”) which literally means “Breath” to guide its work. Figure 13 illustrates the six outcomes of the HĀ framework. HA is used to support the teaching and development of the Department’s employees and students, using the skills, behaviors and dispositions that are part of Hawai‘i’s unique context and to honor the qualities and values of the indigenous language and culture of Hawai‘i (see Hawai‘i Board of Education Ends Policy 3 or E-3, Na Hopena Ao). HĀ mirrors the distinct culture of Hawai‘i and as such, holds value in multiple spaces of learning.

Figure 13

Na Hopena A‘o (HĀ) Framework



Note. Six outcomes of HĀ: Belonging, Responsibility, Excellence, Aloha, Total Well-Being, Hawai‘i (BREATH). Hawai‘i Department of Education, Office of Hawaiian Education (2015).

In addition to the unique values of “Aloha” and HĀ, Hawai‘i is also the only state that has a single school district headed by a superintendent. The Hawai‘i Department of Education serves simultaneously as the state educational agency (SEA) and as the local educational agency (LEA). Serving over 179,000 students in 256 schools, HIDOE is the ninth largest school district in the United States. The HIDOE is organized as a tri-level system led by a state superintendent, a deputy Superintendent, seven state level assistant superintendents and 15 geographically dispersed complex areas each headed by a complex area superintendent. Having one school district for the entire state has the advantage of giving the state superintendent the ability to provide equity in the distribution of resources to schools.

Recruiting and retaining teachers in Hawai‘i is perhaps more challenging than other states due to the geographic distance from the continental United States as well as the remoteness of many of the schools found on seven different islands. Goodpaster et al. (2012) studied rural STEM teacher retention in Indiana and found community interactions, professional development and rural school structures influenced the teachers’ job satisfaction and retention decisions in both positive and negative ways. In small, rural communities throughout Hawai‘i, there may be less privacy than in urban areas and teachers may find their relationships intersecting outside of work and thus need to understand the norms and dynamics of their small communities.

With ongoing teacher shortages in Hawai‘i, and the state not producing enough teachers to fill the need for approximately 1,000 new teachers a year, the Hawai‘i Department of Education (HIDOE) must rely on hiring teachers from the mainland of the United States to fill its teacher vacancies. The trend over the past five years has been that teachers are leaving the state in increasingly higher rates. Of the 1,116 teachers who separated from the HIDOE in 2017–18,

423 left for the mainland, a 70% increase from five prior years (HIDOE employment report, 2018). Due to its remote location and high cost of living, Hawai‘i poses unique challenges for teachers who are not from Hawai‘i.

One partnership group that successfully supports the recruiting, development and retention of teachers in Hawai‘i is a collaboration of the teacher preparation programs in Hawai‘i known as the Teacher Education Coordinating Committee (TECC). The TECC is co-chaired by HIDOE and the Dean of the College of Education of the University of Hawai‘i at Mānoa and consists of members from the 15 teacher education preparation programs in Hawai‘i as well as the Hawai‘i Teachers Standards Board and the Hawai‘i State Teachers Association. This group meets quarterly and discusses issues of common interest, works together to solve teacher shortages, and collaborates on issues to improve the teaching profession and the public perception of teaching as a professional career.

Conceptual Framework

Problem Statement

The Hawai‘i Department of Education is experiencing a secondary mathematics teacher shortage. Understanding math teachers perceptions of why they choose to stay will provide a better understanding of factors associated with job satisfaction and retention.

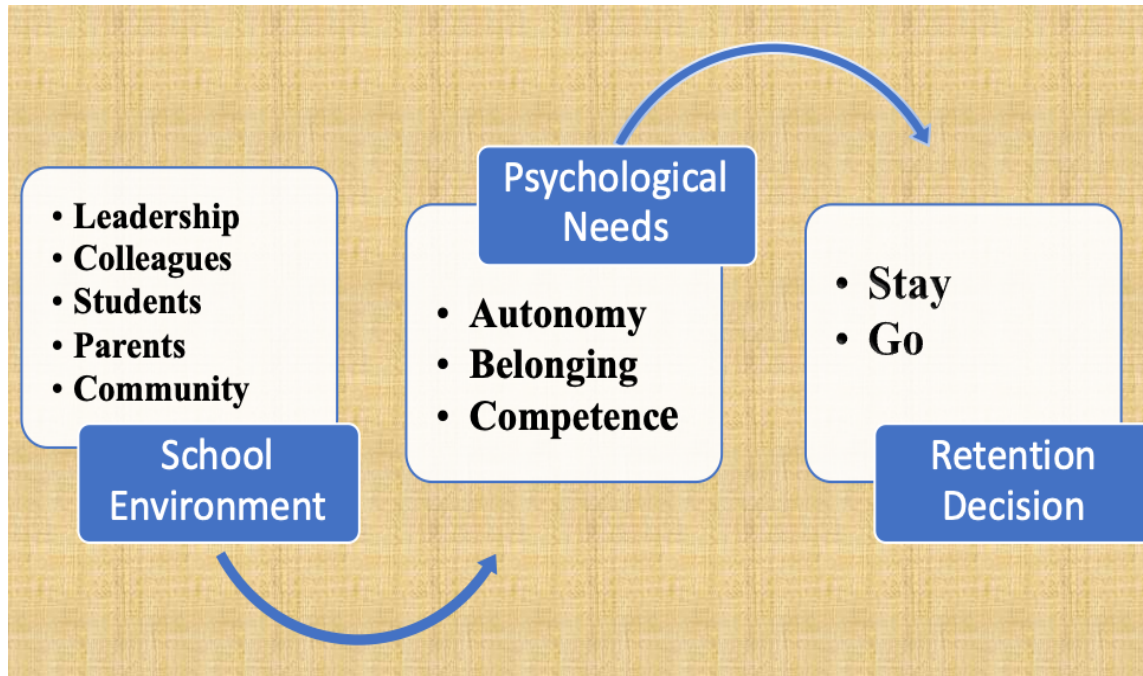
Concept

Based on Ryan and Deci’s (2000) self-determination theory of motivation, when the school environment supports teachers’ psychological needs for autonomy, competence and belonging, teachers are more likely to experience positive retention perceptions. See Figure 14

which shows the relationship between a teacher's school environment; psychological needs; and the potential to impact their retention decisions.

Figure 14

Conceptual Framework and Teacher Retention



Note. This conceptual framework shows how the school environment impacts teachers' psychological needs which may ultimately influence their retention decisions.

Summary

A review of the teacher motivation literature reveals the complexity associated with trying to understand what motivates teachers to act in the ways they do. Using Deci and Ryan's (2000) self-determination theory, the three innate psychological factors that influence human motivation and sense of well-being were reviewed. The three factors: autonomy, competence,

and a sense of well-being, or relatedness, were reviewed in the context of teachers' work environments. School culture, school leadership, and other factors such as teacher pay and compensation, were used to review the literature on teacher motivation.

While there has been extensive research and empirical studies focusing on student motivation and how teachers influence student motivation and learning, there are fewer studies on what motivates teachers to teach. Eccles et al. (1983) expectancy-value theory and the development of the Fit-Choice model (Watt & Richardson, 2007) were reviewed to understand connections between teachers' actions and efforts versus what they may expect as an outcome from their efforts. The achievement-goal theory (Butler, 2007) was also examined in relation to how teachers are motivated to learn either by their desire to master tasks that are important to them or whether they choose to avoid certain tasks due to concern about not being good enough, or by viewing the task as not being worth their time and energy.

The literature review concluded with a conceptual framework depicting how school environmental factors (culture, leadership, and relationships) impact teachers' three basic psychological needs (autonomy, competence and relatedness) thereby influencing teachers' job motivation, satisfaction and ultimately, retention decisions. The next chapter will describe the methodology and research design used for this mixed methods study.

Chapter 3. Methodology

Overview

The purpose of this mixed methods study was to understand the factors that secondary mathematics teachers report as having impacted their decisions to remain teaching in Hawai'i's public schools. From the review of literature, some opening assumptions were that teachers who expressed feelings of autonomy, competence and a sense of belonging, would be more inclined to report higher levels of job satisfaction and motivation to stay in the classroom. A survey (Mertler, 2016) was adapted and focus groups interviews were designed to collect data to examine those assumptions and help to explore the research questions raised in the study.

This chapter provides a description of the study's mixed methods research design and theoretical framework followed by a description of the study's implementation and procedures, study participants, data collection and plan for data analysis. Additionally, design issues, such as the reliability, validity and limitations of the study will be discussed as well as the ethical considerations and the role of the researcher.

Research Design

This study was based on a mixed methods approach, in which the inferences and interpretations of data emanating from both quantitative and qualitative phases of the study were used together to conduct the analysis and findings (Tashakkori & Teddlie, 2010). Two distinct phases of data collection and analysis were incorporated in an explanatory sequential research design. The mixed methods approach was chosen over other designs so that trends and follow-up questions could first emerge from the quantitative data with the opportunity to explore the reasons behind those trends in the qualitative data collection (Creswell & Plano Clark, 2001).

Phase one involved quantitative data collection in the form of an online survey. Phase two consisted of qualitative data collection in the form of document analysis, observations, personal interviews and semi-structured interviews (focus groups). The following sections detail the purpose of each research tradition and how each (quantitative and qualitative) informed the process of this research study.

Quantitative Research

Quantitative research has been defined as a method of research that relies on “measuring variables using a numerical system, analyzing these measurements using a variety of statistical methods” (Zedeck, 2014, p. 284). Researchers focus on quantity (how much, how many) with the goal of the investigation being “prediction, control, description, confirmation, or hypothesis testing” (Merriam & Tisdell, 2016, p. 20). The design characteristics for quantitative research are predetermined and structured with random or representative samples. Data collection is usually via instruments such as tests, surveys or questionnaires.

A strength of quantitative research is that it includes scientific objectivity. Quantitative data can be interpreted with statistical analysis, and because statistics are based on the principles of mathematics, the quantitative approach is viewed as scientifically objective, and rational (Carr, 1994). Quantitative data can also be rapidly analyzed with sophisticated software and replicated or checked by others as the numerical data are less open to ambiguities of interpretation. (Antonius, 2003). A significant limitation of quantitative research is that it often does not take place in a natural setting and therefore does not always allow participants to fully explain their answers or choices and thus the understanding of why they answered in a particular way may not be known to the researcher.

Quantitative methodology was selected for this study because the research questions were oriented toward description, an explanation could be collected using a quantitative survey tool. A survey tool was used for data collection because it provided an opportunity to gather information from a large number of secondary mathematics teachers and measure the factors aligned with the theoretical framework.

Qualitative Research

Zedeck (2014) describes qualitative research as a method that produces “descriptive (non-numerical) data, such as observations of behavior or personal accounts of experiences” (p. 282). Words rather than numbers are used in qualitative research where the researcher is seeking to understand rather than quantify. Merriam (2009) explains that in qualitative research “the focus is on understanding the meaning of experience, the researcher is the primary instrument in data collection and analysis, the process is inductive, and rich description characterizes the end product” (p. 19). Bloomberg and Volpe (2008) describe how qualitative research is “grounded in an essentially constructivist philosophical position, in the sense that it is concerned with how the complexities of the sociocultural world are experienced, interpreted, and understood in a particular context” (p. 80).

A strength of the qualitative approach is that “because of close researcher involvement, the researcher gains an insider’s view of the field. This allows the researcher to find issues that are often missed (such as subtleties and complexities) by the scientific, more positivist inquiries” (McLeod, 2017, p.5). In qualitative research, narrative descriptions can play a role in suggesting possible relationships, causes, effects and dynamic processes. In addition, qualitative analysis

allows for ambiguities and contradictions in the data, which are a reflection of social reality (Denscombe, 2010).

Limitations of qualitative research include small sample sizes and because of the nature of subjectivity, it is difficult to apply conventional standards of reliability and validity. The personal nature of qualitative research is such that the inherent subjectivity and biases of both participants and researchers are acknowledged (Ary, Jacobs, Irvine, & Walker, 2013). Additionally, often in qualitative research, the conditions cannot be replicated so making generalizations to a wider context may not be possible.

A qualitative approach was selected for phase two of this study to deepen the understanding of the participants' responses to the survey and to better understand their personal experiences. A mixed methods approach that combined qualitative and quantitative research methods to examine this study's research questions resulted.

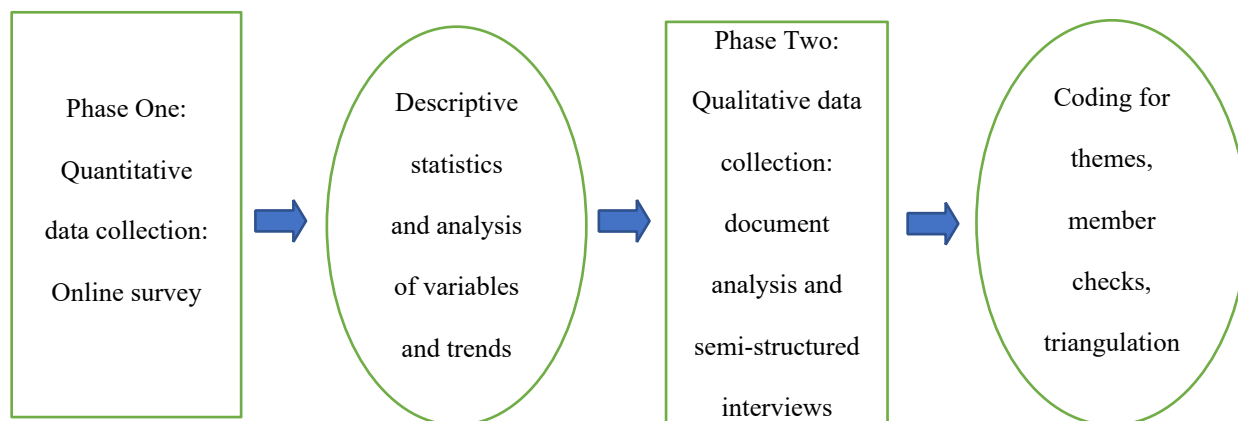
Mixed Methods Research

“*Mixed methods research* is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks” (Creswell & Creswell, 2018, p.4). Mixed method designs can be used in a variety of disciplines to more fully answer research questions than relying solely on either a quantitative or qualitative approach (Tashakkori & Teddlie, 2010). As noted by Creswell and Plano Clark (2018), sometimes the results of a single qualitative or quantitative study may provide an incomplete understanding of a research problem and therefore there is a need for further explanation and understanding of the study results. Tashakkori and Teddlie (2010), describe how using a mixed methods approach helps put the

human back in human research methodology. They discuss how a “fundamental assumption about mixed methods research in the social, behavioral, and health sciences is that it might potentially provide a better (broader, more credible) understanding of the phenomena under investigation than a dichotomous qualitative/quantitative approach” (p. 272).

While descriptions and terms associated with mixed methods designs have morphed over the years, Creswell and Plano Clark (2018) describe three core mixed methods designs. The three types of designs include: (a) a *convergent design* where the researcher combines quantitative and qualitative data in a single phase; (b) an *explanatory sequential design* where the researcher uses two phases of data collection – quantitative data are collected in phase one followed by qualitative data collection in phase two; and (c) an *exploratory sequential design* where the researcher collects qualitative data in phase one, followed by quantitative data collection in phase two (Creswell & Plano Clark, 2018; Creswell & Creswell, 2018).

This research study used the explanatory, sequential, mixed methods research design to support the understanding of the experiences and perceptions of a select group of secondary math teachers. This type of mixed methods approach was most suited for this dissertation as the combination of quantitative and qualitative data provided a more complete picture of the factors influencing math teachers’ reasons for staying and leaving teacher positions in Hawai‘i. The quantitative data were collected and analyzed first, followed by in-depth qualitative data collection and analysis to enhance answers to the research questions. See Figure 15 for a visualization of the research design.

Figure 15*Explanatory Sequential Design*

The use of the mixed methods approach was influenced by the researcher's underlying worldview. Drawing from its roots in qualitative and quantitative methods, mixed methods research is mostly associated with the *pragmatism* worldview, however there are also other worldviews associated with the different types of mixed methods designs (Creswell & Plano Clark, 2018). Using the explanatory, sequential design, the researcher used a *postpositivist* worldview in the quantitative phase one of the study to investigate cause and effect and relationships between the variables. In the qualitative phase two of the study, the researcher used a *constructivist* worldview to understand the multiple participant meanings. This dialectic approach allowed use of both objective and subjective knowledge and allowed the researcher to draw on many ideas, including empirical data collection techniques and social construction of knowledge to address the research questions using diverse approaches (Creswell & Plano Clark, 2018). The researcher positionality will be further discussed later in this chapter. Table 1

provides a summary of the key features of qualitative, quantitative and mixed methods study approaches.

Table 1

Features of Qualitative, Quantitative and Mixed-Method Research

Research feature	Qualitative	Quantitative	Mixed Method
Research approach	Constructivist, transformative	Postpositivist	Pragmatic
Researcher	Researcher serves as the primary instrument for data collection	Researcher uses tools such as surveys to collect numerical data	Researcher serves as data gatherer and uses data collection tools
Data collection methods	Interview, document, audiovisual, observation	Survey, performance data, demographic, attitude, observation	Multiple forms both qualitative and quantitative
Data	Text, images, objects	Statistical, numbers	Statistical, numbers, text and objects

Research feature	Qualitative	Quantitative	Mixed Method
Data interpretation	Themes, patterns	Statistics	Integrated, statistical and themes, patterns
Researcher practices	Establishes positionality Collects participant meanings Studies context and setting Interprets data Collaborates with participants Employs text analysis procedures	Tests or verifies theory Identifies variables to study Relates variables to hypothesis Uses standards of validity and reliability Observes and measures numerically Employs statistical approaches	Collects quantitative and qualitative data Develops a rationale for integrating data Integrates data at different stages of the study Presents narrative and numerical outcomes Employs qualitative and quantitative research practices

Note. Adapted from: Miles & Huberman (1994), Creswell & Creswell (2018), Maxwell (2013).

Theoretical Framework

Ryan and Deci's self-determination theory (SDT) of motivation (2000) was used as the theoretical framework for this study. SDT's macro theory of human motivation distinguishes three basic human psychological needs which are deemed essential to optimal functioning and well-being (Ryan & Moller, 2017). These include a basic need for competence, autonomy and relatedness (Deci & Ryan, 1985). Within SDT there are three subcategories of motivation: autonomous, controlled and amotivation. *Autonomous motivation* is associated with free will and positive emotion as the person is self-directed; *controlled motivation* tends to be associated with more negative emotions and is associated with a person taking action because they believe they must, rather than by choice; *amotivation* is when a person is unwilling or unable to engage in an action and is therefore neither intrinsically nor extrinsically motivated. (Ryan & Moller, 2017). The SDT framework served as the foundation for shaping this study's research questions and research design.

Study Description

To ensure study procedures, as well as materials provided to study participants, contained appropriate protections (Creswell, 2008), a research application was submitted and subsequently approved by the University of Hawai'i's Institutional Review Board (IRB) on April 22, 2019 (Appendix A). Additionally, because the study participants were teachers in the Hawai'i Department of Education, an application to conduct research within the HIDOE was submitted to the HIDOE's Data Governance Activity and approval was received on May 31, 2019 (Appendix B).

In phase one of the study, a 15-minute on-line survey was sent to all secondary (grade 6 to 12) public school principals in the Hawai'i Department of Education asking them to forward the survey to all of their school's mathematics teachers. The survey was sent to collect data on secondary mathematics teachers' perceptions of factors that impact their decisions to stay as teachers, and also to collect demographic and background data on each teacher. Descriptive statistics provided the initial explorations to the research questions and helped the researcher to refine the questions for phase two. The quantitative results were also used to identify a purposive sample for participation in the qualitative phase.

The qualitative data collection in phase two was strengthened by using a variety of techniques: focus group interviews, observations, field notes, and document review (Ayr et al., 2013). The researcher began the second phase of data collection by completing a document review and analysis of publicly available school surveys, statewide academic achievement assessment results, and statewide teacher vacancy and turnover rates. The qualitative data collection and analysis provided an opportunity for the researcher to better understand teachers' experiences and perceptions around job satisfaction and motivations to stay in the classroom. Member checks were conducted to ensure the accuracy of the data collected. Data were coded for themes, and triangulation of multiple data points supported interpretation by the researcher. (Ary et al., 2013).

Participants

Secondary mathematics teachers were selected as the focus population because of the ongoing shortage of secondary mathematics teachers in Hawai'i. There were approximately 1030 secondary mathematics teachers in Hawai'i's public schools as of August 2019 with an estimated

vacancy of 52 teachers, or 5%, of positions unfilled with a qualified mathematics teacher. (ESSA Highly Qualified Report, 2019). While the HODOE efforts to recruit math teachers are ongoing, retention of the current math teacher workforce is critical to closing the math teacher vacancy gap. Elementary school math teachers were excluded from the study as there is not currently a shortage in elementary school math teachers.

Phase One Participants

One hundred and one teachers completed the phase one survey, which represents approximately 10% of the 1030 Hawai'i secondary math teachers. Because survey invitations were sent via a secondary mechanism to teachers through school principals, it is unknown if all secondary mathematics teachers received the invitation. Because quantitative data collection and analysis were intended to allow the researcher to describe broad results in the population, the researcher sought to invite all of Hawai'i's public school secondary mathematics teachers to participate in an on-line survey. Email addresses for the 86 HODOE middle and high school principals were obtained through publicly available websites for each school. An email was sent to each secondary school principal (Appendix C) explaining the purpose of the study, the potential benefit, the confidentiality of responses and the voluntary nature of participating in the study. The email to the principals asked them to forward the email to all of their mathematics teachers. The email included a survey flyer (Appendix D) and consent form (Appendix E). Two follow-up emails were sent to principals asking them to send the informational email to teachers (Appendix F).

Phase Two Participants

A purposive sampling as well as a convenience sample were used to invite teachers to participate in the qualitative data collection of phase two. The purposive sample was developed using the survey responses and the sample was targeted to interview a mix of middle and high school public school math teachers. In considering the appropriate sample, the researcher weighed the need for clarifying the data collected in the survey and the need for additional data around what factors most influenced teachers' decisions to stay teaching in Hawai'i.

The convenience sample was taken from the participants who stated they were willing to participate in a follow-on interview or focus group and who provided their private email address on the survey. The respondents' email addresses were separated from the survey responses to maintain confidentiality.

Instrumentation and Procedures

Phase One Instrumentation

The instrument administered in phase one was a survey, which was developed by Craig Mertler (Appendix G) who granted permission to adapt the survey for this study. The survey was constructed using Mertler's (2016) *Teacher Motivation, Job Satisfaction, and Retention Survey* which consisted of a predominantly forced-choice instrument, comprised of 24 questions including 59 content-based, forced-choice items, three open-ended items, and 10 demographic items. The content-based items were categorized under three sub-headings: *job satisfaction*, *motivation*, and *perceptions of retention*. "An analysis of the entire set of responses in the Mertler survey ($N = 9,053$), resulted in an acceptable overall level of reliability of the instrument ($\alpha = .74$)" (Mertler, 2016, p.37).

The researcher added three additional variables to the original 59 content-based, forced-choice items under job motivation (a sense of belonging, a sense of competence, and school design) and added one additional open-ended question at the end of the survey to ask if there was anything else the participants would like to add about ways to improve secondary mathematics teacher job satisfaction in Hawai'i's public schools. Following an analysis of the entire set of responses in the adapted survey ($N = 101$), the resulting level of reliability of the instrument was acceptable (Cronbach's $\alpha = .88$).

The survey section on job satisfaction had two forced-choice questions related to job satisfaction: level of satisfaction with their current position as a teacher, and approximations of the numbers of teachers with whom they worked that they believed were satisfied with their jobs. The majority to the survey items related to job motivation were based on the Motivator-Hygiene Theory developed by Frederick Herzberg (1959). Participants were asked to indicate, on a five-point Likert-type scale, the extent to which they believed that certain aspects of the job of teaching served as "motivating" or "unmotivating" factors for them. In this study (similar to Mertler's study), the motivating factor of "interpersonal relations" was intentionally divided into three distinct and separate factors (i.e., relationships with students, colleagues, and administrators).

The survey section on perceptions of teacher retention first asked participants the dichotomous question of whether or not each had ever seriously considered leaving the teaching profession. Participants were asked to indicate whether or not 14 specific aspects or situations of teaching would cause them to seriously consider leaving the profession, and then to respond to whether or not eight incentives would entice them to stay in their roles as teachers. These

retention items were adapted from the Ohio Department of Education's Teacher Exit Survey (TEaS) [Ohio Department of Education , 2011].

Phase Two Instrumentation

The tools used to collect data in phase two included document analysis and focus groups.

Document Analysis. The HIDEOE's annual employment report (2019) as well as the HIDEOE annual School Quality Surveys (2019), and annual HIDEOE Every Student Succeeds Act report (HIDEOE ESSA, 2019) were reviewed. In addition, each teacher survey that was returned was meticulously reviewed and analyzed to gather information for the focus groups and to provide context (via a review of the answers to the open-ended survey questions) prior to holding the focus group interviews. Other documents analyzed included nationwide teacher satisfaction surveys (Rentner et al., 2016; Sutchter et al., 2016) as well as an international teacher satisfaction survey (OECD, 2020).

Focus Groups. The phase two participants were asked questions developed and approved by IRB as well as offered the opportunity to provide additional desired input at the end of the focus group interviews.

Interviews. Three focus group participants could not attend on the day of the focus group meetings so personal interviews were conducted using the focus group questions approved by the by the Institutional Review Board.

Field Notes. The researcher made notes from observations of mathematics teachers in various contexts including during professional development opportunities such as the annual mathematics teacher conference, presentations by mathematics teachers to the public and in occasional, unplanned school settings.

Data Collection

Data were collected in two distinct phases. Rigorous quantitative sampling in the first phase was followed by purposeful and convenience sampling in the qualitative second phase. An existing valid and reliable survey instrument was modified and sent out via email to 86 secondary school principals in Hawai'i who were asked to forward the survey to their secondary mathematics teachers. Participants were asked to sign a consent form and participation was completely voluntary.

Upon completion of the survey, semi-structured interview questions were reviewed for relevance to determine if any questions needed to be changed or added. The thirty participants who indicated they were willing to participate in interviews or focus groups were invited to participate in their choice of an in-person focus group or an on-line focus group. Three participants were initially invited to the focus group sessions but could not be present in person for the focus groups so one-on-one virtual interviews were conducted with two of the participants and a mail-in interview was completed with one of the participants.

Phase One Quantitative Data Collection

The surveys (Appendix H) were distributed via email through the high school principals. Additionally, the researcher was invited to do a presentation at the Hawai'i's annual mathematics teacher conference on Oahu and passed out surveys with consent forms during the mathematics teacher conference. An approved modification to the study was received by the Institution Review Board (Appendix I) before the mathematics teacher conference so that the researcher could attend and distribute surveys.

Phase Two Qualitative Data Collection

One focus group was held at UH Mānoa and a second focus group was held at a high school. The first focus group had four participants. The second focus group had eight participants. Two on-line interviews were conducted via zoom. One interview was conducted via a written response to the interview questions which was submitted by a participant who was unable to attend the on-line session. All participants were asked IRB approved semi-structured, focus group interview questions (Appendix J) and were also asked to share their perceptions of factors that they believed supported their desire to remain in the teaching profession.

Data Analysis

Using an explanatory sequential design method, the quantitative and qualitative data were analyzed separately and then later integrated or “mixed” by connecting the themes and patterns.

Phase One Quantitative Data Analysis

The quantitative results were put in a database and used to develop descriptive statistics (e.g. frequency distribution, mean, and standard deviation). Descriptive statistics were used as a means to tabulate and graphically present the demographic profile of the teachers who participated in the survey and to observe whether the a priori hypotheses were on the right track regarding the relationships between the study variables.

While there is controversy over appropriate statistical analyses of various types of rating scales, including Likert and Likert-type scales, there have been studies that found both non-parametric and parametric analyses may be appropriate for Likert-type scales which consist of a set of items that are summed or averaged, with equally spaced integers, and are presented with labels that are approximately of equal spacing (Harpe, 2015; Uebersax, 2015). Because Likert

surveys typically have ordinal data, nonparametric statistical tests were considered appropriate while parametric were reserved for interval or ratio data. “Parametric tests were those that assumed the data followed normal distribution (e.g., *t* test or analysis of variance), while nonparametric approaches were those tests that did not assume a normal distribution (e.g., Mann-Whitney or Kruskal-Wallis test)” (Harpe, 2015, p. 839). There is a continuing debate between the ordinalists (claiming only nonparametric analysis is appropriate for ordinal data) and the intervalists (arguing for parametric analysis). In a 2010 study comparing five-point Likert items using a *t*-test versus a Mann-Whitney-Wilcoxon (MWW) test, it was found that the *t*-test and MWW generally had equivalent power (de Winter & Dodou, 2010). In this study, the researcher chose to use both types of analysis as it has been determined that parametric means are usually fine for Likert “scales” (i.e. the mean of multiple Likert items) while non-parametric counts are often the correct level of analysis for Likert “items” (Lindelov, 2018).

A non-parametric Pearson’s chi-square test of independence (Plackett, 1983) was used to determine associations between the categorical variables of job satisfaction and seven categories which included gender, ethnicity, level of education, age, years teaching at school, school level (middle school or high school), and school setting.

A parametric, independent *t*-test was conducted to compare mean differences based on gender for motivation derived from autonomy, competence, belonging and relationships with teachers, administrators and students. To determine whether years of teaching in the current school had any effect on motivation derived from autonomy, competence, belonging or relationships with teachers, administrators, or students, a parametric, one-way analysis of variance (ANOVA) was conducted. Finally, a parametric Pearson correlation analysis was used

to measure the strength and direction of the relationships between job satisfaction and the variables of a sense-of-belonging, relationship with students; relationship with colleagues; and relationship with administrators. The four survey questions that consisted of open-ended components were thematically analyzed.

Phase Two Qualitative Data Analysis

The results of the interviews and focus groups were coded, and themes developed (Saldaña, 2016). Inductive analysis was used to study the details and specifics of the qualitative data to discover patterns, themes and inter-relationships. The analysis was a recursive process, with immersion in the data to extract sufficient information and meaning from the data.

Methods for Reliability and Validity

The quantitative survey was found to be reliable ($\alpha = .88$) and valid (the results mirrored the results of similar studies using the same survey items). The concepts of reliability and validity are no less significant for the qualitative portion of this study which can be described as establishing the trustworthiness of the study in terms of credibility, dependability and transferability (Bloomberg & Volpe, 2016).

Credibility. Validity is described as how well the research findings match reality (Merriam & Tisdale, 2016). Validity also has to do with the notion of credibility. In other words, given the data presented, the readers should be able to find the research to be credible (Lincoln & Gabe, 1985). To address the validity and credibility of this study, member checks (for respondent validation), triangulation, and data saturation were applied.

Member checks. Focus group summary notes were provided to the four participants in the first focus group. All four participants reviewed the notes and responded that the notes

accurately reflected the conversation and participant responses from the focus group. The focus group summary notes were also provided to the eight participants of the second focus group with acknowledgement received by the researcher that the notes accurately captured the responses of the participants. The three individuals interviewed also concurred with the responses captured from their individual interviews.

Triangulation. For both phase one and phase two of the study, triangulation of different data sources was conducted by examining the evidence from the sources which was used to build a coherent justification for developing the themes (Creswell, J. W., & Creswell, J. D., 2018). Data were triangulated through the analysis of documents, interviews and focus group discussions on teacher motivation, job satisfaction and retention, and a review of the results of similar studies and surveys.

Field Notes and Observations. In addition to member checks and triangulation, the researcher kept field notes from observations in the field via school visits (two visits to high school math classes and one visit to a middle school), attendance at events where math teachers were present such as the annual Hawai‘i Council of Teachers of Math (HCTM), and participating in discussions on the progress of the HDOE Math Task Force which was formed in 2019 to build math teacher capacity by equipping teachers with inclusive, collaborative structures and protocols with the goal of enabling student-driven problem solving and transferable mathematical skills for students to be prepared to thrive in college, career, and community.

An examination of the researcher field notes and “peer debriefing” discussions helped the researcher reflect on biases and subjective perspectives to better understand the context and the meaning of the data collected.

Dependability. Dependability, similar to reliability generally refers to the extent to which research findings can be replicated (Merriam & Tisdale, 2016). A researcher ensures reliability by “explaining the assumptions and theory underlying the study, by triangulating data, and by leaving an audit trail, that is by describing in detail how the study was conducted and how findings were derived from the data” (Merriam & Tisdale, 2016, p. 265). “Dependability refers to whether one can track the processes and procedures used to collect and interpret the data” (Bloomberg and Volpe, 2016, p. 163).

Audit trail. To ensure the dependability of this study, the researcher described how the data were collected and analyzed. The researcher checked that codes and themes were consistent with the data and that the data were protected. The researcher asked a colleague to code the first focus group interviews, thereby establishing inter-rater reliability.

Transferability. The degree to which this study may work in other settings or communities depends on how well the processes in this study would fit into another context. The richness of the descriptions of the qualitative data may support the transferability of the study to other geographic areas or to studies of teachers in other content areas. Much of the data collected was mirrored in other studies of teachers from outside of Hawai‘i.

Study Limitations

This study was limited by the bounded scope and time limits of the study as well as the researcher’s delimiting choices. The study relied heavily on the perceptions of the teachers themselves, operating on the assumption that participants answered survey and interview questions factually. Because the study was focused on the teachers’ self-reported perceptions, their answers may not have entirely reflected reality. Some differences may exist between the

perceptions of participants and their recollections of their own and others' actions as opposed to the actual actions in an everyday setting. This is compounded by the fact that the survey had limited response categories, thereby limiting the range of responses even with additional opportunities for them to express themselves in open-ended questions.

Because this survey focused on secondary mathematics teachers and participants represented approximately 10% of Hawai'i's secondary (grades 6 to 12) math teacher population (101 participants out of approximately 1030 secondary math teachers), the results may not be generalizable to Hawai'i's entire math teacher population or to the teacher population at large. A sample size of 280 was sought for a confidence level of 95%. This study was also limited by a variety of parameters in the study design, most notably the limited geographic scope, bound to the state of Hawai'i, thus it may be less generalizable to other geographical locations as well as to Hawai'i's elementary, private and public charter schools.

The study was also time-bound by collecting data over a six-month period, which limited the breadth and extensity of data collection. People with perceived time constraints and other stressors may have been less likely to respond to surveys, and people who are less comfortable with technology may not have been inclined to take surveys online, thus limiting the pool of participants for both phase one and phase two.

Role of the Researcher

Several factors impacted the researcher's role in the study. As a mixed methods design, the researcher required knowledge in both quantitative and qualitative research methods. In addition, the researcher influenced the study in various ways including the level of participation, the amount of time spent in each setting, and the extent to which the participants were informed

about the study (Marshall & Rossman, 2006). In the qualitative data collection process, the researcher took the observer-as-participant stance in order to establish rapport without becoming involved in influencing the answers of participants (Ary, Jacobs, Irvine, & Walker, 2013). In this role, the researcher's activities were known to the group, and the level of information revealed was controlled by those investigated (Merriam & Tisdell, 2016). The researcher asked semi-structured questions to elicit targeted information but to also allow for open discussion. It is known that when people know they are being observed and their answers documented, they may answer or behave in ways different from their normal behavior because the researcher destroys some of the naturalness of the setting just by being present (Ary et al., 2013).

Positionality

The researcher served as the Assistant Superintendent in the Office of Talent Management for the Hawai'i Department of Education, and this research directly supported a problem of practice within the Office of Talent Management. As a leader in the Hawai'i Department of Education, the researcher's ability to collect authentic feedback from participants was impacted. The issue of "social desirability" may have influenced some participants to answer questions in a manner that was meant to make them look good to other participants or to the researcher due to the researcher's position as a key leader in the HIDEOE.

Participants were approached in a manner that allowed them to provide meaningful and honest input and were reminded that their responses would be "masked" and that responses would not be reported by individual names or work locations. The researcher was mindful not to cross any ethical lines regarding data mining and collection of non-disclosed data from the researcher's work environment.

The researcher was careful to ensure the research and student roles did not conflict with the researcher's official role and duties. As a senior representative of the Hawai'i Department of Education, the researcher was careful to conduct the study so as not to have a conflict of interest or preconceived answers to the research questions.

Delimitations

Because the math teacher shortages in Hawai'i are most acute at the middle and high school levels, the researcher did not include elementary school mathematics teachers in this study. The study scope was narrowed to focus on the elements of the self-determination theory and thus did not discuss in depth the unique cultural issues associated with math teachers in Hawai'i such as the possibility of alternative assessments to gauge student learning and the opportunity for math teachers to teach creatively using ethnomathematics as a methodology for teaching math. While the surveys were sent to math teachers statewide, the researcher limited the focus group meetings to the island of Oahu due to time and travel limitations.

The survey used by the researcher asked how many years the teacher had been teaching at a particular school but did not include a question asking participants to select their total years of teaching. This data point would have been helpful to be able to compare the study variables with actual years of teaching. The researcher was able to make connections between years of teaching at a particular school and job satisfaction as well as to compare the teachers age groups with job satisfaction.

Assumptions

This study was based on a number of assumptions. It was assumed that teachers who remained at their schools did so by choice. It was also assumed that teachers who felt

autonomous, competent and connected would be more likely to be job satisfied and thus indicate their intention to stay in the profession. It was also assumed that teachers formed social bonds and relationships with staff, faculty members and students which also motivated them to stay. Another assumption was that teachers were honest in their survey responses and interviews and that the researcher was objective throughout the study.

Ethical Considerations

The researcher took care to ensure that no research participants were harmed in this study. Full consent was obtained from all study participants and participants' privacy was carefully protected. All participants were voluntary, and participants were notified they could withdraw from the study at any time. The aims of the research study were made clear to participants and communication about the research was transparent and honest.

The confidentiality of the data was maintained, and data were protected and stored in a secure location.

Summary

This mixed method study was designed to explore the perceptions of secondary math teachers regarding the factors that influence them to remain as teachers in Hawai'i. The methodology chosen for this study was based on the mixed methods approach so that data could be collected both quantitatively and qualitatively and then "mixed" to provide a broader understanding of the data. Two phases of data collection were used as part of a sequential explanatory design. The study provided a deeper understanding of what teachers perceived as factors that positively influenced math teacher job satisfaction, motivation and retention. The next chapter contains the findings.

Chapter 4. Results

The purpose of this mixed methods study was to better understand the factors that secondary mathematics teachers reported as having impacted their decisions to remain as teachers teaching in Hawai'i's public schools. The theoretical framework for the study was based on the tenets of Ryan and Deci's (2000) self-determination theory, which asserts human motivation is influenced by three innate psychological needs including feelings of autonomy, belonging, and competence. In this study, teachers' self-reported perceptions surrounding factors impacting their job satisfaction and motivation were collected and analyzed to better understand the teachers' decisions to remain in the classroom. It was anticipated a priori that teachers who expressed strong feelings of autonomy, competence and a sense of belonging, as well as other factors, would tend toward higher levels of job satisfaction and motivation to stay in the classroom.

This chapter provides the results of the data analysis conducted using the data collected from the survey, focus groups, and personal interviews. The quantitative results presented in this chapter are based on survey data collected from 101 secondary public mathematics school teachers teaching students between grades 6 through 12 in Hawai'i. The qualitative results are based on the data collected from 15 secondary mathematics teachers via two focus groups and three individual interviews. In accordance with the explanatory sequential research design proposed for this study, the results based on the analysis of quantitative data are presented first, followed by the results based on the analysis of qualitative data.

The quantitative and qualitative results will be discussed using the lens of the self-determination theory, and at the same time, in the context of the three research questions:

RQ1: What do secondary mathematics teachers identify as reasons for remaining teaching in Hawai'i?

RQ2: In what ways do factors associated with professional identity such as a sense of autonomy differ in beginning and seasoned teachers?

RQ3: In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?

Phase One: Quantitative Results

The data for the quantitative phase of the study were analyzed using IBM Statistical Product and Service Solutions (SPSS Statistics, version 26). Descriptive statistics (e.g. frequency distribution, mean, and standard deviation) were used as a means to tabulate and graphically present the demographic profile of the teachers who participated in the survey and to observe whether the a priori hypotheses regarding the relationships between the study variables. The four survey questions that consisted of open-ended components were thematically analyzed.

A Pearson's chi-square test of independence was used to determine associations between the categorical variables of job satisfaction and seven categories, which included gender, ethnicity, level of education, age, years teaching at school, school level (middle school or high school), and school setting. An independent *t*-test was conducted to compare mean differences based on gender for motivation derived from autonomy, competence, belonging and relationships with teachers, administrators and students. To determine whether years of teaching in the current school had any relationship to motivation derived from autonomy, competence, belonging or relationships with teachers, administrators, or students, a parametric, one-way analysis of variance (ANOVA) was conducted. Finally, a Pearson correlation analysis was used

to measure the strength and direction of the relationships between job satisfaction and the variables of a sense of belonging; relationship with students; relationship with colleagues; and relationship with administrators. The four survey questions that consisted of open-ended components were thematically analyzed. What follows is a description of the sample utilized in the study as well as the relevant demographic information of the study participants.

Phase One Participants

Demographics of Participants. There was a total of 101 participants in the study, of which 64 (63.4%) were female and the majority (56.5%) were between 26 and 45 years of age, as seen in Tables 2 and 3. Demographics of the 101 survey participants (age, highest level of education, school setting, and school level) are available in the Appendix L.

Table 2

Frequencies of Participant Gender from Phase One Survey

Gender	<i>f</i>	Rel <i>f</i>	<i>cf</i>	Percentile
Female	64	0.63	101	100.00
Male	37	0.37	37	36.63

Note: N = 101

Table 3*Frequencies of Participant Age Group from Phase One Survey*

Age group	<i>f</i>	Rel <i>f</i>	<i>cf</i>	Percentile
56 or older	14	0.14	101	100.00
51–55	13	0.13	87	86.14
46–50	8	0.08	74	73.27
41–45	10	0.10	66	65.35
36–40	19	0.19	56	55.45
31–35	15	0.15	37	36.63
26–30	13	0.13	22	21.78
21–25	9	0.09	9	8.91

Note: N = 101

In terms of the ethnicity, the sample consisted predominantly of Caucasians (31.7%) as seen in Table 4. This was followed by Asian (30.7%); two or three more races (17.0%); Native Hawaiian or other Pacific Islander (12.9%); American Indian (1.0%); and African American (1.0%). Six participants (5.7%) did not provide a response.

Table 4*Ethnicity of Participants from Phase One Survey*

Ethnicity	<i>N</i>	%
White or Caucasian, non-Hispanic	32	31.7
Asian	31	30.7
Two or more races	17	16.8
Native Hawaiian or Other Pacific Islander	13	12.9
American Indian or Alaskan Native	1	1.0
Black or African American	1	1.0
Missing	6	5.9

Note: N = 101

As shown in Table 5, about 52% of participants had a M.A. or M.S. degree and 33% possessed a B.A. or B.S degree. Two percent possessed a doctorate and another 2% possessed some other degree. Two participants did not provide a response.

Table 5*Education of Participants from Phase One Survey*

Education	<i>N</i>	%
B.A. or B.S.	19	18.8
M.A./M.S. + 30 hours	22	21.8
B.A./B.S. + 30 hours	20	19.8
M.A. or M.S.	20	19.8
M.A./M.S. + 15 hours	10	9.9
B.A./B.S. + 15 hours	4	4.0
Ed.D. or Ph.D.	2	2.0
Other	2	2.0
Missing	2	2.0

Note: N = 101

As seen in Table 6, most of the participants reported that they taught high school (57.4%). This figure was followed by those who taught middle school (35.6%). Two participants (2.0%) taught another level other than middle or high school, and five participants (5.0%) did not provide a response. Additionally, half of the participants (50.5%) worked 1–5 years at their school. Another 19.8% worked 6–10 years at their school, and 14.9% for 11–15 years at their school as seen in Table 7.

Table 6

School Level of Participants from Phase One Survey

School Level	<i>N</i>	%
High School	58	57.4
Middle School	36	35.6
Other	2	2.0
Missing	5	5.0

Note: N = 101

Table 7*Years at School of Participants from Phase One Survey*

Years at School	<i>N</i>	%
1–5	51	50.5
6–10	20	19.8
11–15	15	14.9
16–20	8	7.9
26–30	3	3.0
21–25	1	1.0
31–35	1	1.0
Missing	2	2.0

Note: *N* = 101

Phase One: Data Analysis. The data in phase one were primarily analyzed using descriptive statistics. Because four survey questions (2, 9, 12, 22) included write-in clarifying comments, a qualitative, thematic analysis was integrated into the phase one data analysis.

A chi-square analysis was conducted to determine the associations (if any) between job satisfaction and seven characteristics participants reported: gender, age, ethnicity, level of education, years at a particular school, school level (middle or high school) and school type (urban, rural, suburban with high/low poverty or high/moderate income). The proportion of subjects who reported job satisfaction did not differ by gender, $X^2(3, N = 101) = 1.771, p = .621$; age, $X^2(24, N=101) = 25.663, p = .370$; level of education, $X^2(21, N=101) = 14.990, p = .823$; or years at a particular school, $X^2(18, N=101) = 24.626, p = .136$. There was a significant

relationship between job satisfaction and ethnicity, $X^2(1, N = 101) = 37.67, p = .006$, school level $X^2(1, N = 101) = 21.47, p = .002$, and school type $X^2(1, N = 101) = 41.47, p = .007$.

In the category of ethnicity, job satisfaction levels (*satisfied* and *very satisfied*) were reported by White 23(71.9%), Asian 21(70.0%), two or more ethnicities 13(76.5%), and Native Hawaiian/Other Pacific Islander 12(92.3%). In the category of *very satisfied*, White participants reported the highest percentage (25%), followed by Asian (6.7%), two or more ethnicities (11.8%), and Native Hawaiian/Other Pacific Islander (7.7%) (see Table 8).

Based on school level (middle school or high school), high school teachers reported higher levels of job satisfaction than middle school teachers. About three-quarters of high school teachers and 64.8% of middle school teachers reported being *satisfied* or *very satisfied*. In contrast, 24.3% of middle school teachers reported being *dissatisfied* with their teaching jobs compared to 1.7% of high school teachers.

The type of school setting also reflected differences in overall job satisfaction. When combining *satisfied* with *very satisfied* categories, teachers serving in suburban high to very high income areas reported the highest level of job satisfaction 3(100%) followed by rural, high poverty schools 35(97.2%), urban, very high poverty 3(75%), rural, low poverty 8(61.5%), suburban, moderate to high income 20(56.6%) and urban, high poverty 2(33.3%). Appendix M shows the crosstabs for each of the variables.

Table 8

Satisfaction levels by Ethnicity, School Type, and School Level from Phase One Survey

	Very satisfied	Satisfied	Neutral	Dissatisfied
Ethnicity				
American Indian or Alaska Native	0	1	0	1
Native Hawaiian or Other Pacific Islander	1	11	0	1
Asian	2	19	8	1
White	8	15	7	2
Black	0	0	0	1
Two or more	2	11	2	2
None	3	1	0	2
School type				
Rural high poverty	13	22	0	1
Rural low poverty	1	7	2	3
Suburban moderate to high	2	18	12	4
Suburban high to very high	0	3	0	0
Urban high poverty	0	2	3	1
Urban very high poverty	0	3	0	1
Other	0	3	0	0
School level				
Middle	10	14	4	9
High	6	38	13	1
Other	0	2	0	0

Note: None of the participants indicated *very dissatisfied* for any of these three characteristics

Research Question One

RQ1: What do secondary mathematics teachers identify as reasons for remaining teaching in Hawai‘i?

Descriptive Statistics of the Study Variables. In survey question 1, participants were asked: “What is your overall level of satisfaction with your current position as a teacher?” There were five possible responses to choose from: very satisfied, satisfied, neutral, dissatisfied, or very dissatisfied. 74 (73.2%) responded satisfied or very satisfied, 17 (16.8%) responded neutral, 10 (9.9%) responded dissatisfied, and 0 (0%) responded very dissatisfied as seen in Table 9.

Table 9

Frequencies Satisfaction Level for Phase One Survey

Score	<i>f</i>	rel <i>f</i>	<i>cf</i>	Percentile
Satisfied	58	0.57	101	100.00
Neutral	17	0.17	43	42.57
Very Satisfied	16	0.16	26	25.74
Dissatisfied	10	0.10	10	9.90
Very Dissatisfied	0	0.00	0	0.00

Note: N=101

Thematic Analysis of Survey Question 2 (SQ2). SQ2 requested that teachers explain the rationale behind why they responded to survey question 1 in the way they did. Based on the qualitative responses to SQ2, five themes emerged as shown in Table 9. The five themes

identified include three positive themes that contributed to job satisfaction and two themes that detracted. Contributors were (a) enjoy being a teacher, particularly teaching math; (b) making a difference; and (c) support from administrators, coworkers and school staff. Detractors were (a) lack of support from administrators, and (b) students' lack of motivation to learn math.

Theme 1: Enjoy Being a Teacher. Of the 101 survey respondents, 74 (73.2%) responded that they were either *satisfied* or *very satisfied* with their current teaching position. When asked to elaborate on why they chose that particular level of satisfaction, 52 of the 74 (70.2%) stated that they enjoyed being a teacher which contributed to their job satisfaction. Survey respondents who expressed joy in teaching mathematics made comments such as:

Though challenging every day, I love teaching math (P9). I am doing what I love, in a place that I love, with students I love (P45). Another teacher (P80) said it is enjoyable being a high school teacher and especially because math is exciting to me.

P25 claimed to have great personal satisfaction with their job as a math teacher.

Theme 2: Making a Difference. The next theme that was prevalent among the survey respondents' answers to SQ2 was having the ability to make a positive difference in students' growth and development. Of the 101 survey respondents, 29 of the 74 (28.7%) participants who selected they were *satisfied* or *very satisfied* with their jobs identified making a difference in students' lives as a factor that influenced their job satisfaction. Written survey comments from participants discussed how significant their endeavor of helping students was to them. P31 said, "I love being a teacher and I feel my expertise and passion benefits the kids here who may need it more than in some other places I've taught." P24 said, "Being able to interact and develop relationships with students is the best part of my job and providing opportunities for students to

feel successful at math is very heartwarming. Seeing someone who had never felt like they were a ‘math person’ volunteer to present or explain a mathematical concept is one of the highlights of my career.” P42 echoed the sentiments of others by stating, “I feel like I make a difference in the lives of my students. My population can be difficult, and I believe I reach students often deemed bad. Whether it’s in their personal lives or in math, I get to see a growth in my students.”

Theme 3: Supportive Working Environment. Of the 101 survey respondents, 26 of the 74 (25.7%) who stated they were *satisfied* or *very satisfied* with their jobs identified a supportive working environment as a contributor to their job satisfaction. P4, P7, P15, P39, P49 and P92 made comments about how important it is to have the strong support and understanding of their school’s administrators. Being valued as a teacher was expressed by P71 who stated, “Mathematics is regarded by most of the administrators as an important subject. As a teacher of mathematics, my expertise is regarded as important.” P15 appreciated the administrator supported creativity and growth. P15 shared the following:

I feel my administrator allows me the autonomy and flexibility to push myself, think outside the box, and try new things even if they may not work. I have been writing my own curriculum for the past three years and have grown and improved as a teacher in ways I never imagined. I have a voice in the content I am teaching and my physical environment. I feel 100% supported and it makes all the difference.

Several of the other participants (P1, P15, P39, P78 and P92) made mention of how support staff and their teacher colleagues also supported their job satisfaction. Working in an environment where they feel supported, cared for and valued was reported as having a positive impact on their job satisfaction. The next theme that emerged from SQ2 was less positive. The

lack of administrative support or support from the work environment was brought up as a dissatisfier by some of the participants.

Theme 4: Lack of Support. Of the 101 survey participants, 23 of the 27 (85.2%) of the participants who were either *neutral* or *dissatisfied* with their jobs stated that lack of administrative support negatively impacted their job satisfaction. Several participants expressed dissatisfaction with workload and stated they did not have enough time in the day to do everything required of them. P10, P17, P48, P62, P67, P72, P75, P76, P88, P92, P93, and P98 all noted how there is difficulty finding enough time in the day due to large class sizes, extra responsibilities outside of the classroom, too much red tape and school initiatives, and not enough resources and necessary supplies like computers and AV equipment. These self-reported factors all contribute to job-related stress, and less satisfaction as a teacher. Three participants (P46, P57 and P89) also mentioned lack of adequate compensation as a dissatisfier. The comments from P67, P72 and P98 highlight the perceived lack of time and necessary support. P67 stated there is a lack of support and resources while expecting great feats to be covered. P72 said, “I wish I could just teach and not have to do the 10 billion other responsibilities that teachers have...there is just so much to say...our teacher responsibilities (advisory, homeroom, meetings, Department Chair, WASC, Data Teams, IDT teams, EES, maintaining relationships with students, just to name a few) are a lot for a person to handle.” P98 explained the following:

I like working with students, but being a regular education teacher with 160 students ranging from honors to special education is challenging, especially without the proper supports such as adequate personnel and time to plan. Finding the time to differentiate

my lessons, assignments and assessments to meet the needs of my students is extremely challenging.

Overall, the lack of strong support and resources impacts the job satisfaction of these teachers. The final theme resulting from RQ2 focused on what some teachers perceived as a lack of student motivation to learn math.

Theme 5: Lack of Student Motivation Toward Math. Out of the 101 survey respondents, 7 of the 27 (6.9%) participants who stated they were *neutral* or *dissatisfied* with their jobs expressed job dissatisfaction related to students' lack of desire to learn math. The responses in this area also relate to the time and effort it takes to support the varying levels of student grade level abilities. P98 commented and shared the following:

It also seems as if our students are having a much more difficult time with the grade level content and with overall basic math skills, which means that I need to plan for a lot of scaffolding of prerequisite skills...also our students are struggling with work ethic, motivation, and having a growth mindset towards math and learning.

P97 additionally stated, "It is a genuine struggle to teach kids math today. They have a hard time focusing, don't want to do anything challenging, and are addicted to social media/technology which causes them to want instant satisfaction." P29 mentioned that despite teaching the same content over the years, each year it has been a great challenge adjusting and modifying to the lower skills of students. P93 discussed spending a majority of many classes teaching students how to behave in an age appropriate way.

Descriptive Statistics for Variables Associated with Motivation. Survey question 5 requested that teachers rank, on a 5-point scale, 20 aspects of the job of teaching that served as

motivating or unmotivating factors on a five-point scale: 1 = *highly unmotivating*; 2 = *somewhat unmotivating*; 3 = *neither*; 4 = *somewhat motivating*; 5 = *highly motivating*. The results are presented in Table 10 and are ordered in terms of most to least percent of teachers who indicated that the aspect was either *somewhat motivating* or *highly motivating*. The factor with the most teachers (92.1%) indicating that it was somewhat or highly motivating was “interpersonal relationships with students” followed by “sense of achievement” with 90.1%. Sense of autonomy was selected by 88.1% of the responding teachers, and the work itself by 85.2%.

An additional aspect of the motivation section of the survey asked teachers to rate various incentives as to the degree they were either motivating or unmotivating. The respondents were presented with 11 incentives and were asked to rate each incentive on the following five-point scale: 1 = *highly unmotivating*, 2 = *somewhat unmotivating*, 3 = *neither*, 4 = *somewhat motivating*, and 5 = *highly motivating*. The results are presented in Table 11 and rank ordered in terms of the percentages of teachers who indicated that the incentive was either *somewhat motivating* or *highly motivating*.

The two highest-rated incentives of teaching were “observing vast improvements in your students’ performance since the beginning of the year” selected by 99% of respondents and “having a student thank you for helping in the understanding of a difficult concept” selected by 97.1% of respondents. The lowest ranking incentives included “early retirement/contract buy out” selected by 46.1% of respondents and “an instructional professional development workshop offered by the district (you pay)” selected by 18.8% of the respondents.

The third part of the survey asked respondents to self-report on various questions related to the issue of teacher retention. First, teachers were asked to indicate whether or not they had

ever *seriously* considered leaving teaching. Sixty-one teachers (60.4%) responded yes and 40 (39.6%) stated no.

Table 10

Mean Score of Motivating and Unmotivating Aspects of Teaching (1 = Highly Motivating; 5 = Highly Unmotivating) Ranked by Percent Indicating “Somewhat” or “Highly Motivating”

Teaching Job Aspect	Mean	# of Respondents	Percent
Interpersonal relationship with students	4.41	93	92.1
Sense of achievement	4.34	93	92.1
Interpersonal relationships with other teachers	4.39	91	90.1
Work itself (aspects of teaching)	4.12	87	86.1
Sense of belonging/connectedness	4.20	84	83.2
Sense of competence/efficacy	4.12	83	82.2
Recognition (from parents, students, admins)	4.01	81	80.2
Job security	4.01	76	75.3
Autonomy and authority for own work	3.97	75	74.2
Potential for professional growth	3.87	75	74.2
Salary (compensation)	3.68	66	65.3
Interpersonal relationship with administrators	3.74	65	64.3
Supervision by competent administrator	3.70	65	64.4
Working conditions (facilities conditions)	3.60	65	64.4
Sense of accountability	3.66	62	61.3
Factors in personal life	3.71	59	58.4
Potential for advancement	3.67	58	57.5
Status (professional status of teaching)	3.52	57	56.5
Teacher evaluation	2.58	25	24.8
District policies	2.62	24	23.8

Note. $N = 101$. Number and percent values reported indicate the number and percentage of teachers rating each factor as either *somewhat motivating* or *highly motivating*.

Table 11

Mean Score of Motivating and Unmotivating Aspects of Incentives (1 = Highly Motivating; 5 = Highly Unmotivating) Ranked by Percent Indicating “Somewhat” or “Highly Motivating”

Teaching Incentive	Mean	# of Respondents	Percent
Observing vast improvements in your students’ performance since the beginning of the year	4.70	100	99.0
Having a student thank you for assisting in the understanding of a difficult concept	4.64	98	97.1
Being permitted to purchase additional equipment, technology, and/or supplies for your classroom	4.12	85	84.2
One-time monetary award (supplemental to salary)	3.91	77	76.2
Being able to influence school design	3.99	76	75.3
Being supported to engage in your own professional growth through the implementation of classroom-based action research	3.93	73	72.3
Being awarded a plaque by students	3.62	58	57.4
Being given the opportunity to participate in teacher projects (e.g. curriculum development)	3.61	56	55.4
Being selected as Teacher of the Year	3.36	48	47.6
Early retirement/contract buy out	3.55	47	46.1
An instructional professional development workshop offered by the district (you pay)	2.49	19	18.8

Note. $N = 101$. Number and percent values reported indicate the percentage of teachers rating each factor as either *somewhat motivating* or *highly motivating*.

Second, respondents were asked to indicate if any of 13 provided circumstances would serve as a reason for them to consider leaving teaching; they could select more than one choice. Teachers chose seeking a more competitive salary (56.3%), unethical treatment (54.2%), and administrative leadership (53.1%) as their top three reasons that could cause them to consider leaving teaching. Less influential reasons included inadequate training (4%), inadequate training necessary for position (15.6%) and inadequate mentoring (14.6%). Table 12 presents the results and is rank ordered by the number and percentage of teachers who said a particular circumstance would serve as a reason for them to consider leaving teaching.

Thematic Analysis of Survey Question 9 (SQ9). SQ9 requested that participants briefly explain why they chose their responses to the question regarding whether or not they had even *seriously* considered leaving the profession of teaching. About 60% responded yes and 39.6% stated no. Thirty-eight participants responded to SQ9 and wrote in explanations. Three themes emerged from the qualitative data analyzed based on the respondents' write-in answers. Two themes emerged around *why teachers stated they would leave*: 19 of the 38 (50%) reported low pay, and 28 of 38 (73.6%) reported lack of support. One theme emerged around *why teachers said they would consider staying*: Nine of 38 (23.6%) teachers stated that they would stay because they care deeply about the students.

Table 12*Rank Order of Reasons to Leave Teaching*

Reason to consider leaving teaching	<i>N</i>	%
Seek more competitive salary	54	56.3
Unethical treatment	52	54.2
Administrative Leadership	51	53.1
Career change (within education)	48	50
Career change (outside education)	48	50
School culture	48	50
Dissatisfied with current assignment	28	29.2
Lack of autonomy	27	28.1
Lack of opportunities for advancement	22	22.9
Lack of desire/willingness to support various reform efforts	19	19.8
Lack of shared leadership	18	18.8
Inadequate training necessary for position	15	15.6
Inadequate mentoring	14	14.6
Other	5	5.2

Theme 2: Lack of Support. Twenty-eight of the 38 participants who answered this question mentioned the lack of support from school staff and administrators. Four common threads that arose in this category were too heavy of a workload, job-related stress, feeling

undervalued, and a lack of a strong and caring administrator. P16, P35, P37, P45, P59, P67, P77, and P88 made negative comments about a lack of administrative support at their schools. P59 said, “I do not feel supported by administration. If I asked a question, I was made to feel inadequate in my position.” P35 declared, “There was too much work and poor leadership.” P86 stated, “I felt unappreciated, devalued, I kept asking for support but not receiving it then got reprimanded for not being able to do something.”

Theme 3: Care About the Students. Nine of the participants stated that despite thinking of leaving the teaching profession, they chose to persist due to their love of the children, and the desire to make a difference in the students’ learning and lives. P97 stated that they considered leaving teaching but declared, “I stay because the kids need me, and I really care about the future of our community.” P93 also said they stayed in teaching because “of the positive relationships I have been able to build with so many of my students and because they deserve someone who cares about and is committed to them.” P82 stated they chose to stay because of their personal beliefs about the importance of teaching. P69 and P77 both stated they stay to teach math to the keiki because they felt they could help the students.

The final section of the survey that pertained to RQ1 posed a question regarding a set of circumstances that might entice teachers to stay in the profession. The results are presented in Table 13 and are rank ordered in terms of the percentage of teachers who indicated that a particular circumstance would entice them to stay in the profession. A “pay increase” was cited by the highest number of teachers (38%), followed by “more time to plan or prepare (35%) and change in leadership styles (30%).

Table 13*Rank Order of Reasons to Stay Teaching*

	<i>N</i>	%
Might entice you to stay		
Pay increase	79	78.2
More time to plan or prepare	70	69.3
Smaller classes	51	50.5
Change in leadership style(s)	46	46.5
Better facilities	43	42.6
Greater opportunities for collaboration	38	37.6
Different administrator	35	34.7
Greater opportunities for advancement	31	30.7
Other	9	8.9

Research Questions Two and Three

RQ2: In what ways do factors associated with professional identity such as a sense of autonomy differ in beginning and seasoned teachers?

RQ3: In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?

Descriptive Statistics of the Study Variables. To address RQs 2 and 3, descriptive statistics were used to describe the study variables, followed by a one-way analysis of variance (ANOVA). The minimum, maximum, mean (M), and standard deviation for the variables associated with RQs 2 and 3 depicted in Table 14.

Table 14*Descriptive Statistics of Study Variables*

Motivation areas	Min	Max	<i>M</i>	<i>SD</i>
Autonomy	1	5	3.97	.842
Competence	2	5	4.12	.739
Belonging	1	5	4.20	.800
Relationship/Teachers	3	5	4.38	.663
Relationship/Students	3	5	4.41	.635
Relationship/Admin	1	5	3.74	.856

N = 101

Motivation due to autonomy ranged from 1 to 5 ($M = 3.97$, $SD = 0.842$); competency ranged from 2 to 5 ($M = 4.12$, $SD = 0.739$); belonging ranged from 1 to 5 ($M = 4.20$, $SD = .800$); relationship with teachers ranged from 3 to 5 ($M = 4.38$, $SD = .663$); relationship with students ranged from 3 to 5 ($M = 4.41$, $SD = .635$); and relationship with administrators ranged from 1 to 5 ($M = 3.74$, $SD = .856$).

Demographic Variables and Study Variables. In order to determine whether or not there existed mean differences based on gender for motivation derived from autonomy, competency, belonging, and relationships with teachers, administration, and students, a means comparison and independent t-tests were performed. Table 15 reflects the means, standard deviation and standard error results.

Table 15*Group Statistics by Gender*

Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE</i>
Autonomy				
Male	37	4.05	.705	.116
Female	64	3.92	.914	.114
Competence				
Male	37	4.08	.760	.125
Female	64	4.14	.732	.091
Belonging				
Male	37	4.03	.927	.152
Female	64	4.30	.705	.088
Relationship/Teachers				
Male	37	4.30	.661	.109
Female	64	4.44	.644	.083
Relationship/Admin				
Male	37	3.49	1.044	.172
Female	64	3.89	.692	.087
Relationship/Students				
Male	37	4.41	.599	.098
Female	64	4.41	.660	.082

As reflected in Table 15, males and females reported being similarly motivated by relationships with students ($M = 4.41$). Males reported being slightly more motivated ($M = 4.05$, $SD = .71$) than females ($M = 3.92$, $SD = .91$) by having a sense of autonomy, while females reported being slightly more motivated ($M = 4.14$, $SD = .73$) than males ($M = 4.08$, $SD = .76$) by having a sense of competence, relationships with teachers and administrators (females $M = 3.89$, $SD = .69$; males $M = 3.49$, $SD = 1.04$), and a sense of belonging (females $M = 4.30$, $SD = .71$; males $M = 4.03$, $SD = .93$). However, independent t -tests revealed that these differences were not statistically significant ($p > .05$) with exception of the variable “relationship with administrators,” which reflected a significant difference between males and females, as seen in Table 16. Females reported significantly stronger motivations to stay than men in relation to how they perceived their relationship with administrators, $t(99) = -2.34$, $p < .05$.

Table 16

Independent Samples Test

Variable	Levene's Test for Equality of Variances		t -test for Equality of Means			Mean Difference
	F	p	t	df	p	
Autonomy	1.958	.165	.758	99	.450	-.132
Competence	.031	.860	-.389	99	.698	-.059
Belonging	.025	.875	-1.647	99	.103	-.270
Relationship/Teachers	.210	.648	-1.024	99	.308	-.140
Relationship/Admin	7.743	.006**	-2.34	99	.022**	-.404
Relationship/Students	.772	.382	-.006	99	.995	-.001

** $p < 0.05$

To determine whether years of teaching in the current school had any relationship to motivation derived from autonomy, competence, belonging, relationships with teachers, administrators, or students, a one-way analysis of variance (ANOVA) was performed.

Participants were classified into seven groups based on their years of tenure at the same school: 1–5 years; 6–10 years; 11–15 years; 16–20 years; 21–25 years; 26–30 years; and 31–35 years. Results of the ANOVA showed a statistically significant difference for “autonomy” between the groups with different numbers of years of teaching in a school, $F(6, 94) = 3.124, p = .008$. The mean differences were not statistically significant for the remaining factors: competency, $F(6, 94) = .864, p = .524$; belonging, $F(6, 94) = .644, p = .695$; relationships with teachers, $F(6, 94) = .207, p = .974$; relationships with administrators, $F(6, 94) = .404, p = .875$, and relationship with students $F(6, 94) = .734, p = .624$ as seen in Table 17.

Table 17*Analysis of Variance*

		df	F	Sig.
Autonomy	Between Groups	6	3.124	.008**
	Within Groups	94		
	Total	100		
Competence	Between Groups	6	.864	.524
	Within Groups	94		
	Total	100		
Belonging	Between Groups	6	.644	.695
	Within Groups	94		
	Total	100		
Relationship/Teachers	Between Groups	6	.207	.974
	Within Groups	94		
	Total	100		
Relationship/Admin	Between Groups	6	.404	.875
	Within Groups	94		
	Total	100		
Relationship/Students	Between Groups	6	.734	.624
	Within Groups	94		
	Total	100		

**p < .05

A descriptive analysis of the means showed the variable “autonomy” was greatest for those teaching in a position/school from 6 to 10 years ($M = 4.33$, $SD = .658$). The lowest mean was in the 26–30 year group ($M = 2.67$, $SD = .577$). Mean for competence was highest for those teaching in a position/school from 11 to 15 years ($M = 4.33$, $SD = .899$) and lowest for the 26–30 year group ($M = 3.66$, $SD = 1.07$), as seen in Table 18.

Table 18*Descriptive Statistics Based on Years of Teaching*

Variable	Years of Teaching	<i>M</i>	<i>SD</i>
Autonomy	1–5	3.98	.828
	6–10	4.33	.658
	11–15	4.07	.593
	16–20	3.38	1.188
	21–25	4.00	
	26–30	2.67	.577
	31–35	3.00	
	Total	3.97	.842
Competence	1–5	4.15	.725
	6–10	4.05	.669
	11–15	4.33	.899
	16–20	4.00	.756
	21–25	4.00	
	26–30	3.67	.577
	31–35	3.00	
	Total	4.11	.738

To further investigate RQ3, a bivariate Pearson Correlation analysis was conducted to compare the associations between the variables “sense of belonging” and “relationships” with job satisfaction. As shown in Table 19, there was a significant correlation between job

satisfaction and “relationships with administrators” as well as between having a “sense of belonging” and “relationships between teachers, administrators, and students”. Job satisfaction and relationships with administrators were found to be moderately positively correlated, $r(99) = .28, p < .01$. Sense of belonging and relationships between teachers, $r(99) = .57, p < .01$, as well as sense of belonging and relationship to students, $r(99) = .27, p < .01$, and sense of belonging and relationship to administrators were found to be moderately positively correlated, $r(99) = .25, p < .05$. Relationship to teachers and relationship to students were also moderately positively correlated, $r(99) = .29, p < .01$ as well as the relationship to teacher and relationship to administrator, $r(99) = .28, p < .01$.

Table 19

Correlation for Study Variables: Job Satisfaction, Relationship (Teacher), Relationship (Administrator), Relationship (Students) and a Sense of Belonging

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Job satisfaction	101	3.79	0.83	—				
2. Relationship (teacher)	101	4.39	0.66	.093	—			
3. Relationship (administrator)	101	3.74	0.86	.28**	.28**	—		
4. Relationship (student)	101	4.41	0.64	.16	.29**	.10	—	
5. Sense of belonging	101	4.20	0.80	.08	.57**	.25*	.27**	—

* $p < .05$. ** $p < .01$.

Thematic Analysis of Survey Questions 12 and 22. Two additional survey questions (SQ12 and SQ22) resulted in qualitative responses which provide context to the quantitative

answers in the survey. SQ12 and SQ22 were coded based on a thematic analysis. Themes were reviewed within the context of the research questions, and subsequently, the resulting analysis provided context to the participants' quantitative responses to the survey questions. Survey Question 12 asked, Is there anything else you would like us to know about your *personal perspective on teacher retention*? Survey Question 22 asked, Is there anything else you would like to add about ways to *improve secondary mathematics teacher job satisfaction* in Hawai'i's public schools? There were 51 written responses submitted for Q12 and 79 written responses submitted for Q22. Based on a thorough analysis of the responses, three overarching themes clearly emerged: pay, workload and administrative support. Workload was also a theme that surfaced from the analysis of SQ2 and SQ9. Pay was also identified as a theme from SQ9.

Theme 1: Pay. Out of the total of 130 responses to SQs 12 and 22, pay surfaced as a key topic of discussion in 33 of the responses. Common sources of stress associated with pay included the cost of living in Hawai'i, particularly the high cost of housing. P56 discussed the need to work two jobs and said, 'Pay is my number one reason to leave, I have to work a second job on weekends and a few weeknights. Eventually I will get burned out and that would be my decision to move on to another job.'" P78 mentioned that salaries are already at the poverty level and teachers have to supplement their classrooms with supplies. P97 stated, "There is too much work, not enough time, not enough pay, and not enough respect or recognition for our professionalism." P39 commented that "pay and affordable housing are the two main factors that drive teachers away in our area. "

Theme 2: Workload. Common statements about workload included 16 participants highlighting the desire for smaller class sizes (P16, P17, P22, P33, P35, P44, P48, P53, P57, P64,

P73, P76, P77, P87, P95, P97), 12 participants asking for less pressure on testing (P3, P6, P34, P45, P63, P72, P76, P80, P91, P97, P99, P101), and 26 participants seeking more planning time (P6, P14, P15, P18, P19, P24, P28, P30, P38, P41, P45, P46, P50, P52, P56, P58, P67, P71, P76, P78, P79, P81, P82, P86, P90, P92). Several participants mentioned teacher burn out and stress along with heavy workloads. The extra work on teachers who are doing inclusion was highlighted by P98 in the following:

I think inclusion is a good thing for students, but there needs to be proper preparation for it. As a regular education teacher, I am really struggling to differentiate for students ranging from honors to special education and everyone else in between. I feel that if I was able to receive the proper supports for my students, I would be in a much better place with regards to teaching. The lack of support in this area is something that not only regular education math teachers are struggling with, but all of the regular education core teachers at my school. I can't do everything on my own, which is why I am in school 11 hours every day in order to be effective at my job. Teacher burnout is real.

P53 also pointed out that the teacher workload often leads to burnout, stating that "teaching 7 classes with 25 students is still 175 students which requires more time for planning and preparation." P54 claimed that teachers are expected to accommodate everyone else: students, parents, admin, often requiring them to give up lunch and work extra hours to get things done. P52 said to "give teachers more time to prepare so we don't have to work from home all the time." P73 declared that "many teachers want to do well but are bogged down by admin/school/district requirements and work that doesn't help in the classroom. Focusing on the art of teaching and learning would make the job better."

Theme 3: Administrative Support. 11 of the respondents to Q12 and 26 of the respondents to Q22 expressed a need for improved support by administrators to increase teacher retention and job satisfaction. Many of the participants highlighted how a strong administrative support system helps them to become more qualified and satisfied teachers end up staying in the profession. Several respondents also expressed a desire for administrators to be better listeners and leaders. Many participants also pointed to the availability of more time for targeted professional development around improving their skills in teaching mathematics. Other considerations sought by teachers was for administrators to show appreciation and recognition for the hard work they are doing; in other words, to support them with difficult students and to ensure that teachers who are early on in their careers have access to the support systems that they can rely on to help with their professional success and contentment during their first two years. Notably, P58 stated “more training that would help us reach all students and be math specific would be helpful.” P24, P30, P41, P79, P81, P82 and P90 also expressed the potential benefit of more content-specific math professional development and the availability of time and opportunities to collaborate with other math teachers.

In addition to the predominantly quantitative survey which also included four open-ended questions needing qualitative analysis, there were also two focus groups and three interviews that were completed in order to collect data from the teachers, specific to a more personal, face-to-face setting. The next section highlights the results of the data collected from teachers during the qualitative phase of this explanatory sequential mixed-methods study.

Phase Two: Qualitative Results

Data collected during the focus groups and interview sessions were examined through a thematic analysis procedure aimed at producing themes and patterns emergent from the data. These themes were created by first identifying patterns of meaning in the data, then combining the patterns to form the overarching themes responding to the qualitative-focused research questions. While not all participants expressed explicit agreement with the identified themes, these themes were discussed during both focus groups, and arose during all three interviews. These themes were then further examined in order to understand their deeper connection to the research questions, with the ultimate objective being to provide a detailed account of how these themes successfully depicted a comprehensive understanding of the factors that secondary mathematics teachers report as having impacted their decisions to remain teaching in Hawai'i's public schools.

Phase Two Participants

Participants in phase two of the study were recruited through a purposive sampling scheme involving secondary mathematics teachers who responded to the quantitative survey in phase one. Potential phase two participants were selected by examining the survey responses and identifying participants who had been teaching in Hawai'i successfully for at least one year and who indicated they had a sense of autonomy, competence, or belongingness while working at their schools. In deciding the appropriate sample, the researcher considered the need for clarifying the data collected in phase one of the study, in addition to the need for additional data around what factors may have been the most influential in teacher's decisions to stay teaching in Hawai'i. A convenience sample was then taken from the list of potential participants.

Participants who stated that they were willing to participate in an interview or focus group following the survey and who provided their private email address on the survey were contacted by the researcher. A total of 15 participants agreed to partake in the phase two of the study. Four of the participants were in the first focus group, eight were in the second focus group, and another three participated via individual interviews. All participants had at least one year of professional experience teaching secondary school mathematics in public schools in Hawai'i, as demonstrated in Table 20.

Table 20*Teacher Participant Demographics*

Participant	Grade Level/Subject	Years of Experience	Gender	Focus Group(FG)/ Interview(INT)
T1	MS/Sixth	8	M	FG1
T2	MS/Sixth	5	F	FG1
T3	HS/Algebra 1, 2	3	M	FG1
T4	HS/Algebra 1, 2, Geometry	6	M	FG1
T5	HS/Algebra 2	15	F	FG2
T6	HS/Algebra 1	16	F	FG2
T7	HS/Geometry	13	M	FG2
T8	HS/Geometry	1	M	FG2
T9	HS/Trigonometry, Pre-calculus	3	M	FG2
T10	HS/Geometry, Algebra 2, Algebra 3	14	F	FG2
T11	HS/Geometry	15	F	INT1
T12	HS/Trigonometry Pre-calculus	30	F	INT2
T13	HS/Algebra 2,3, Pre-calculus, College Math	14	F	FG2
T14	HS/Algebra 1	1	F	FG2
T15	HS/Algebra 1, 2, Trigonometry	27	F	INT3

Phase Two Data Analysis

The data were coded using a thematic analysis protocol as posited by Braun & Clarke's (2006) six-step process for analyzing qualitative data. After data collection, the researcher listened carefully to the recordings of each focus group and interview prior to beginning each

transcription. Once all the recordings were transcribed, the researcher sent a copy of the de-identified transcript to each participant for member checking. Participants read the transcripts and approved them. No changes were made to the transcript based on participant feedback, since each transcript was approved by the participants. Transcripts were then imported into NVivo, a qualitative coding software program used to collect, organize, analyze, and visualize data. The researcher then read each transcript to become even more familiar with the data (step one). Following, emergent codes were identified in order to classify each participant response according to the questions raised in the focus groups and interviews (step two). These codes were identified by reading through the focus group and interview transcripts and coding passages of meaning. The resulting emergent codes were then sorted, organized and refined through inductive analysis and reasoning. After initial refinement, the emergent codes were examined, and the researcher identified patterns and themes from the codes (step three). The themes were then considered and reviewed within the context of the research questions to understand how they informed the research questions and the purpose of the research (step four). The researcher furthermore defined the themes and completed the refinement of the codes (step five). Finally, the researcher wrote up the findings (step six).

Research Question One

Research question one asked, what do secondary mathematics teachers identify as reasons for remaining teaching in Hawai'i? To answer this question, participants were posed probing questions regarding their motivations for teaching. In response, participants shared factors that influenced their decision to stay in the field, and in doing so, shared their various

challenges as well. Themes identified in the data relating to research question one includes relationship with students, variation and making a difference.

Relationship with Students. The relationship students had with their students was one of the biggest reasons they remained in their field and became motivated to keep teaching. All participants discussed the importance of the teacher-student relationship, and many identified the resulting daily interactions as the primary reason surrounding why they continued teaching, including T1, T2, T3, T7, T10 and T14. T2 provided an example of this when she said,

The relationship with the students is one of the biggest things that keeps me in the classroom because every time someone floats the idea of going to a different position, they [the students] are my biggest motivation, and the relationship with students and getting to see them, because I work in a middle school, so seeing them grow throughout the three years and using the relationship to help them feel safe in the classroom, knowing that I have that skill that I can leverage for their benefit makes me feel good. It's what I want to do in life is interact with students and help them like math and I like math and I like kids so I feel like that's where I should be even if it's exhausting.

This experience as described by T2 was not unique to her. Other participants also expressed that the relationship they had with students was a primary motivator in their desire to keep teaching. T13 elaborated on what T2 said by saying the following:

It's the relationships. Last year I went to the wedding of a student, you get invited to these kinds of things, or when you go to a place of employment sometimes you get a discount because the former student is just so happy that they can show you how far they've come or just things like that. Or even when I see that a former student is a teacher now, I'm

like, "Awwww". That's pretty cool that you get to see people transform into their adult life.

While T2 shared her experience in the first focus group, the same theme notably arose in the second focus group. T5 indicated that she believed that she and many of her colleagues derived the most enjoyment when they were working with students and interacting with them directly. T5 elaborated on the theme, indicating that she often volunteered for extracurricular activities in order to spend more time with her students, and that while she made less money than many of her friends, she believed that she enjoyed her work more than they did. According to T5, following is an example of what she enjoyed.

I think, for me, that would be the same for a lot of them. The extracurricular activities that you choose to be a part of definitely count for me and for my job satisfaction. Being a class advisor was probably one of my four most fun years of teaching. It was a lot of work, but that was super fun. Being class advisor. I think coaching, for me, and I know some people are club advisors. Just anything that helps you to make the connections with the students automatically makes my job more fun. I always joke with them that there's a lot of people that make more money than I do. Actually, all my friends make more money than I do. But nobody has as much fun as I do at school.

When participants contemplated leaving their jobs, the relationship they had with their students was often a factor that kept them working and made the difficulties associated with teaching worth it for them. However, there were other considerations that teachers indicated were important to their job satisfaction.

Making a Difference. Several participants in both focus groups discussed how they derived satisfaction and motivation in their profession from the knowledge that they were making a difference in the lives of their students, including T1, T2, and T4. While this theme was related to the relationship with the students theme, it was different in that when participants discussed making a difference, they clarified that improving their student's lives was their motivation even if that change happened outside of the close relationships that they built with students.

T2 and T4 both noticed the difference they were making as improving not just the lives of their students, but the community as a whole. T2 indicated that by changing the lives of the students she, as a teacher, had to opportunity to create meaningful change in the greater community. T4 expressed this by sharing the following:

Changing the trajectory of lives absolutely. And, creating an opportunity to just uplift communities. That's what we're looking for. Any step in that direction, any forward movement in that way that kind of liberates students in the learning experience and is the most rewarding.

T2 agreed with T4, indicating that she was able to help build a community she was proud to live in and to see positive change by teaching. These privileges were powerful motivators for her and other participants. While connected to the relationship she had with her students, this greater sense of wanting to promote change was different in that it reached beyond individual communities to a larger vision of what T4 wanted to see in the world. T2 explained this in the following way:

Just being able to enact the type of community that I want to live in. With my interactions with students, I believe in respect and humanity and helping people. And, getting to be an adult who shows these kids respect and sees them as whole people hopefully creates uplifting communities and just creating the spaces in the world that I would want to live in. And hopefully something sticks, and sometimes they come back three years later and remember one thing, like they do. It's that opportunity.

This theme indicates that the reason secondary mathematics teachers remain in teaching in Hawai'i is to have the ability to make a difference in the lives of their students and the greater community. While related to the first theme, the relationship teachers have with their student, this theme represents a wider ranging of sentiments. However, both themes represent the participants' desire to impact students positively and to make meaningful contributions to education through their professional work.

Variation. The final theme was variation. Unlike the first two themes, variation relates directly to the working conditions teachers experience and their day-to-day activities. While this theme was not as universally discussed as the relationship teachers had with the students or teacher's ability to make a difference, variation still arose during both focus groups and interviews with T1, T15, T2 and T14. These participants indicated that they appreciated the variety they experienced as teachers and that they did not feel as though they had to perform rote tasks day after day as might be required in a different job.

T5 stated that variation was a major reason she decided to pursue a career in teaching in the first place. T5 did not want to pursue a career where she would be subject to similar, rote

tasks every day, and she felt that teaching was an opportunity to experience a sense of variation in this regard. T5 expressed this by saying the following:

I think that's why I chose this profession, it's because you get to do things differently all the time and it's not the same thing you do every day. Even between my periods, they're not the same from the beginning of the day to the end. It's different.

T15 described an experience with variation that was slightly different than T5. Rather than liking teaching for its day to day variation, T15 indicated that she liked to ability to experience variation by changing grade levels or the subjects she taught. By doing this, T15 indicated that she was able to subvert the “restlessness” she occasionally felt and may not have been able to avoid in another job. T15 shared the following:

I think I always kept trying something different. When I was starting to get a little restless, I guess you can say, I had been teaching the high school. When I was starting to get a little burnt out, I talked to the department head, and she suggested, “Why don't you try teaching middle school for a little while?” I just, I try to change things up every now and then.

Participants described this theme of variation as what they enjoyed, that the feeling that each day presented a different set of events, or in other words, that they had options in terms of what aspects of the job they can focus on. For T5 and T15, they thought the different groups of students they taught or different classes provided significant day to day variation. For T15, variation was offered by being able to switch the grade level taught within in same school. She described this option as providing her the privilege of being able to rejuvenate her energy without experiencing burnout out and looking for a different position.

Research Question Two

Research question two focused on factors associated with professional identity such as a sense of autonomy, and the ways in which the factors differed for beginning and seasoned teachers. While all participants discussed autonomy to some degree, P5 was the only one who directly indicated that they believed autonomy was linked with experience. However, more participants indicated that autonomy was important but not guaranteed with experience, or that autonomy was something specifically built by school administrators, including T1, T2, T3, T4, T5, T6, T7, T8, T10, and T11. T5 indicated she believed that the sense of autonomy did grow over time. However, this participant also indicated that providing autonomy was conscious choice that was made by school administrators. She described the following:

I think it's pretty natural for autonomy to develop over time. Maybe, at this point, now, some teachers in our department have, maybe, a little bit more wiggle room based on their results. I think that's probably true at a lot of high schools. But, from the beginning, all of our principals here have shown great support for what our math department wants to do.

T13 described her understanding when she recounted an instance where the principal found a way to give a teacher autonomy without allowing the teacher to fall out of step with the rest of the faculty:

My understanding of what autonomy is and how it's operationalized has changed, since now I'm teaching in a place that really promotes autonomy. And, looking back as a DOE teacher, I think autonomy was nurtured through leadership. And, so the idea of yes, it's

okay to try new things but you need to share what you're learning and not just be kind of like a road warrior in your own space. And, not try something new.

T13 indicated that autonomy is nurtured through leadership and must increase with experience, and that the school administrators have a large role to play in facilitating that growth process. She also indicated that her new location places an emphasis on autonomy, while her previous school did not.

T13, T5, T6, T7, T8, and T10 also discussed autonomy, and though they did not comment on how autonomy grew or did not grow with experience, they discussed the importance of allowing teachers to be autonomous. T4's experience exemplifies the experience of other participants:

Anytime I saw myself growing frustrated in my teaching practice, it was when there was outsider influence holding me back. When it was somebody holding it back and wanting to have control on what I was doing with my kids. I gave my kids a lot of freedom. I didn't have rules in my classroom that were built on compliance. But, a lot of teachers have foundations of compliance in their classrooms and I wasn't a big fan and it created problems when the kids told other teachers I let them do something that other teachers didn't.

While participants did not definitively agree on whether autonomy increased with experience, they did agree that autonomy in the classroom was important to them. Participants indicated that having a sense of autonomy increased their job satisfaction and, in their opinion, effectiveness. However, T2 did express a caveat to this belief. According to T2, there could be instances in which an individual could have too much autonomy. At times T2 expressed a wish

that she had more oversight in order to get constructive feedback on how she could be managing her class better or implementing more effective strategies:

I think I sometimes have too much autonomy. Like, my leadership at the school, they've watched me teach three times. One time was this year and it was for 20 minutes. And that was because it's been known that that my class has a lot of like behavior issues that just needs support. It's all about me self-reflecting, I have to self-reflect a lot. And those reflections get read and I get listened to but it's kind of all on me to be like, "Is it going okay?" And, yeah. I wish I'd had more monitoring.

In general, participants believed that they were able to better serve their students when they did so with a sense of autonomy, and that there was room for individual autonomy among a larger school staff population if school administrators were thoughtful about how it was implemented. However, participants did not definitively agree whether this sense of autonomy increased with years of professional experience.

Research Question Three

Research question three focused on the ways that having a sense of belonging within the context of personal, professional and institutional relationships influenced teachers' decisions to remain in the profession of teaching. The majority of participants, including T1, T2, T3, T5, T6, T7, T8, T9, T10, T12, T13 and T14 overwhelmingly agreed that the relationships they built with their colleagues and the administration were of vital importance to their decisions to stay in their profession. The only factor that featured more prominently in the interview and focus groups was the relationships teachers had with their students. However, there were participants who indicated that the relationship they had with the colleagues was of equal or greater importance

than the relationship they had with their students. These examples show how vital a sense of belonging is in terms of influencing teachers' decisions to stay in their profession.

T3 attributed his continuation at his school to be at least partly due to the relationship he had with his colleagues. Despite the relatively large size of his department, T3 felt that he had a close relationship with his colleagues, and that relationship was motivating and fortifying. T5 described a similar experience:

One reason why I still stay as a math teacher is because of my math department. And so, I feel pretty supported there. I feel like I have a lot of good relationships. It's a pretty big Department. We have at least 20 plus people maybe. It's a lot of teachers. And so, it's just really nice because I feel like I belong there. But, yeah. The relationship is important to me, personally. And that's why I still stay as a math teacher for now.

Like T5, T1 felt as if he was being supported by his colleagues, and that support helped him traverse across the difficulties of teaching. However, P1 also indicated other factors jointly influenced his decision to stay, including the feeling of making a difference. This response indicates that there is a compendium of factors that work in conjunction to influence a math teacher to stay in their role. As already discussed in research question one, the ability to make a difference was factor that contributed in participant's decision to remain in their roles, as was the close relationships they had with their colleagues. T1 described some those difficulties and supports:

I don't know. I feel like there's always a bunch of reasons why I want to quit. But, I can't really. I feel like it's not until it happens, I won't really know what it is. But I know the support thing. If I didn't feel supported by my Department or the school. If I felt like I

wasn't making any difference or what I was teaching didn't feel useful, all of those things would probably eventually push me over. But I don't know which one in particular would really do it for me.

A few participants also discussed the feelings associated with the sense of not belonging amongst their colleagues. T13 indicated that feeling “not belonging” was one of the biggest reasons they would consider leaving a job. P1 also stated that they had felt like they didn't belong amongst their colleagues before and that it was, “one of the reasons I would really consider leaving.” T7 indicated that her school made sure that every teacher's voice was heard in order to minimize feelings of not belonging:

Every teacher has a voice as to what goes on in the assessments. What goes into the curriculum? So, it's never that someone is ostracized, or is seen as having some random, wacky view. Every idea is taken into account.

The discussions indicate that belonging was an important factor in teacher's decision to stay in their roles as secondary mathematics teachers. Teachers who felt supported by their colleagues reported that they were less likely to leave their positions due to the presence of that support, and teachers who had experienced a sense of alienation or not belonging reported that these were contributing factors leading to their decision to leave their roles. The discussion presented also indicated that the sense of belonging was important to students.

Summary

The purpose of this mixed methods study was to understand the factors that secondary mathematics teachers report as having impacted their decisions to remain teaching in Hawai'i's public schools. The participants in this study included 101 secondary mathematics teachers

working in Hawai'i who responded to a survey and also 15 secondary mathematics teachers who provided qualitative data via two focus groups and three interviews. The analysis in this section included descriptive statistics and thematic analysis based on the survey responses as well as a qualitative thematic analysis of the focus group and interview participants feedback.

Table 21 combines the qualitative themes derived from the four open-ended questions on the survey with the focus group and personal interviews, with the results demonstrating an overlap of the themes.

Table 21*Integrated Key Factors Influencing Job Satisfaction*

Factor	Theme	Influence on Job Satisfaction
Making a Difference	Student achievement and growth were highlighted in both the survey responses and the interviews.	Very strong in both quantitative and qualitative data.
School Leadership	Participants in the survey and interviews expressed the strong significance of this factor.	Very strong. Identified as a motivator or demotivator.
Supportive Workplace	Data associated with pay, workload, stress, leadership, school culture and the ability to be creative in the classroom were found in the survey results and the interviews.	Very strong in both quantitative and qualitative data.
Continuous Learning and Development	Being able to participate in continuous self-selected professional development; decision-making on curriculum and support to students were identified as highly motivating.	Very strong. Identified in survey result and interviews.
Meaningful Relationships	Participants noted relationships with students, administrators and colleagues as key to their sense of well-being and belonging.	Very strong. Identified as a key motivator in quantitative and qualitative data.

The study was guided by three primary research questions. Research question one focused on the reasons that secondary mathematics teachers identified as being reasons for remaining as teachers in Hawai‘i. Themes emergent from the analysis of this research question included the relationship teachers have with their students, their ability to make a difference in the lives of their students and in the community, and the variation they have in their roles. Research question two focused on the ways in which the factors associated with professional identity such as a sense of autonomy differed between early career and seasoned teachers. Participants reported that, while autonomy was very important to their job satisfaction, the sense thereof did not necessarily increase with the duration of teaching experience. Rather, participants reported that autonomy was varied based on the school’s administrative culture, and that the ability to be autonomous was largely controlled by the administration. Research question three focused on the ways that having a sense of belonging within the context of personal, professional and institutional relationships influenced teachers’ decisions to stay in teaching. Participants indicated that a sense of a belonging formed a vital component in their decision to stay in their roles, and furthermore, that a sense of isolation or lack of support would significantly contribute to their decision to leave their position.

This chapter presented a summary of the findings of the current study, including an overview of the participants, the methods of data analysis, and the results based on the data analysis procedures undertaken. Chapter five orients these results with the larger body of literature, and discusses the limitations of the study. Chapter Five also provides recommendations for future research and discusses the implications of this study when extended to practice.

Chapter 5. Discussion

The purpose of this mixed method study was to improve the understanding of factors that Hawai'i secondary mathematics teachers reported as contributing to their decisions to stay and continue as secondary mathematics teachers in Hawai'i's public schools. This chapter includes a discussion of the major findings as related to the literature on teacher retention, job satisfaction and human motivation using the lens of the self-determination theory. A description of the study's limitations as well as theoretical, policy and practical implications will be provided followed by a discussion of areas for future research, and a brief conclusion.

Summary of the Study

About 10% of the Hawai'i's 1,030 secondary mathematics teachers participated in this study through a survey in which 101 teachers participated and interviews in which 15 teachers participated. Using Deci and Ryan's self-determination theory (SDT) of motivation (2000) and using an explanatory sequential design method, the following research questions were addressed in this study:

(RQ1): What do secondary mathematics teacher identify as reasons for remaining in Hawai'i's classrooms as secondary mathematics teachers?

(RQ2): In what ways do factors associated with professional identity such as a sense of autonomy differ in beginning and seasoned teachers?

(RQ3): In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?

Using the self-determination theory as the framework for this study helped the researcher to understand math teachers views on job satisfaction and motivation through the lens of how the

school as a workplace impacted their perceptions around their own sense of autonomy, competence and relatedness at the school level.

The key findings in this study reflected the above sentiment and also suggested how the school environment impacted teachers' psychological needs and ultimately their retention decisions. While there were a variety of individual inputs on various self-reported factors that impact their retention decisions, themes emerged that were common among the majority of the teachers.

Discussion of the Findings

Five key findings that emerged from this study addressed the research question, which was about factors math teachers perceived as influential in their retention decisions. Teachers reported enhanced job motivation and satisfaction based on job factors that fit into one of these five overarching themes: (a) making a difference, (b) school leadership, (c) supportive workplace, (d) continuous learning and development, and (e) meaningful relationships. The teachers in this study were generally satisfied with their current teaching positions and discussed positive factors as well as job-related factors that contributed to dissatisfaction and could potentially cause them to leave the profession. In addition, each of the key findings help deepen the understanding around the three research questions and support the importance of the connection between teachers' feelings of autonomy, competence and a sense of belonging to their overall job satisfaction.

Theme 1: Making a Difference

A notable similarity in this study that mirrored what teachers worldwide report as significant for staying in the profession was the desire to positively impact students' lives (Watt,

Richardson and Wilkins, 2013). As an altruistic profession, student success was clearly a strong motivator to staying in the profession. As noted in a 2013 national survey conducted by the Scholastic and Gates foundation, “100% of Hawai‘i teachers agreed that teaching is more than a profession, it is how they make a difference in the world”

(<http://www.scholastic.com/primarysources/hi-1.htm>). Similarly, the math teachers of Hawai‘i expressed this sentiment repeatedly throughout the study.

Both the quantitative and qualitative data collected in this study highlighted the significance of “making a difference” to Hawai‘i’s participating secondary math teachers. Consistent with Richardson & Watt’s (2006) *Factors Influencing Teacher-Choice* (Fit-Choice) model, teachers who initially entered the profession to make a difference in children’s lives, were also more satisfied after they became teachers as the job was consistent with their stated values. As noted in Brunetti’s (2001) study which examined teacher satisfaction in a group of high school teachers from a large school district in Northern California, Hawai‘i’s math teachers who participated in this study identified the ability to work with students and see their learning and growth was a significant job motivator which influenced their retention decisions.

Participants were passionate about their jobs and expressed a strong commitment to their work. The teachers reported the satisfaction of those “aha” moments and the joy they experienced when a student contacted them years later to share their own success stories. The participating math teachers of Hawai‘i revealed during their interviews and feedback that they were determined, courageous, resilient and cared deeply about their work. They expressed eagerness to meet their students’ needs and found pure joy when their students succeeded. They care and they want to make a difference. They spoke about self-reflection and disappointments

as well as the reward of seeing students succeed and grow and come back to see them years later. Students matter to Hawai'i's math teachers and this was clearly the main reason they stayed. The bonds they form with their students and the relationships that last over time are what makes them stay. Making a difference in students' lives was the number one reason Hawai'i's secondary math teachers expressed they choose to stay in the profession.

Theme 2: School Leadership

Results of this study suggested that participants in the study considered strong school leadership to mathematics teacher retention and turnover as important. Participants valued strong administrative support and positively associated instructional and transformative leadership with job satisfaction. Consistent with the literature, this study found a significant correlation between teachers' job satisfaction and their perceived relationships with their administrators (Birkeland & Johnson-Moore, 2003; Carver, 2003; Castro et al., 2018; Darling-Hammond, 2003; Fuller et al., 2018).

Hawai'i's teacher participants reported they were positively impacted by supportive administrators who listen, advise, lead and foster their growth and development. Teachers highlighted the significance of administrator support both in their focus group discussions and in survey responses. Working in an environment of trust where they felt supported, cared for and valued was reported to have a significantly positive impact on their job satisfaction. Examples of principals providing written notes of appreciation; stopping by their classrooms to check-in; and acknowledging their struggles and successes made a positive impression on the teachers. In addition, newer teachers expressed a desire to get instructional feedback on their performance in the classroom to build their confidence.

Contrastingly, the study also found that a lack of administrative support resulted in job dissatisfaction for several of the participants, with 31% of the respondents revealing they would leave due to administrative leadership. Open-ended survey question responses as well as focus group and interview responses indicated that a lack of leadership and perceived lack of support from administrators had a negative impact on school culture, school operations and teachers' perceptions about staying at a particular school. Many participants expressed that they wanted their administrators to help reduce their stress by reducing their workload and providing more preparation and planning time for them during the school day.

Participants also expressed expectations that their school leaders (a) appropriately handle student discipline, (b) support them with dealing with difficult students and irate parents (c) demonstrate fair and ethical treatment, and (d) provide more time for teacher collaboration. A lack of support from administrators stood out as a significant dissatisfying factor that teachers reported as impacting their motivation and several teachers stated they would consider moving schools or leaving teaching altogether due to a poor administrator.

Theme 3: Supportive Workplace

Participating teachers in this study reported their workplace environment impacted their job satisfaction and retention, which is consistent with the literature (Allensworth et al., 2009; Boyd et al., 2005; Garcia & Weiss, 2019a; Johnson & Birkeland, 2003; Johnson et al., 2012; Loeb et al., 2005; Simon & Johnson, 2015). Garcia & Weiss (2019a) describe how “the environment in which an employee works has a major impact on not just job satisfaction but also on the ability to do the job well and the desire to continue to remain in the job and the

profession” (p.4). Simon and Johnson (2015) found teachers attitudes about their workplace are a salient predictor of their job satisfaction and predicted retention.

Four workplace conditions reported by teachers in this study that significantly impacted their job satisfaction and retention included (a) physical environment, (b) economic factors, (c) workload and supervision, and (d) culture and social elements.

Physical Environment. Participants discussed the impact of the physical environment on their job satisfaction. Physical and psychological safety as well as facility and resource issues were raised. Having aesthetically pleasing and clean, comfortable facilities were discussed as meaningful to teachers. Some teachers expressed dissatisfaction with having to work in extremely old facilities and the lack of air conditioning in many of Hawai‘i’s schools. Teachers complained of overheated classrooms and difficulties concentrating due to the extreme heat, particularly during the summer months.

Other teachers expressed discontent with a lack of resources for classroom supplies and not enough computers and audiovisual equipment.

Economic Factors. Teacher compensation clearly stands out as a key finding of this study and cannot be ignored. Numerous studies have documented the influence of salary on employee and teacher retention (Benner et al., 2018; Choi & Dickson, 2009; Educators for Excellence, 2020; Hinkin & Tracey, 2010; Ingersoll, 2001; Murnane et al., 1991; Murnane & Olsen, 1989; Ondrich et al., 2005; Sturman, 2006). From this study, participants reported that lack of competitive pay is their highest job dissatisfier as Hawai‘i secondary mathematics teachers. Because the cost of living is so high in Hawai‘i, many teachers expressed the need to work more than one job just to pay their rent. One teacher told a story about having to wheel a

cart full of computer chrome books back and forth across the high school campus each day as the chrome books were shared among several students and classes.

When the participants were asked if they had ever seriously considered leaving, 60.4% of the teachers said yes and the number one reason stated for considering leaving was to “change careers”. When asked to explain why they had answered the question the way they did, the majority cited a lack of adequate pay for their educational level and amount of work performed as major dissatisfiers. This response was similar to national data which shows a relationship between low salaries and quitting (Garcia & Weiss, 2019c).

The issue of teacher pay was brought up repeatedly by study participants in both the survey responses to open-ended questions and in the focus groups. The responses were also consistent with the teachers responses in the previously cited Hawai‘i teacher compensation study by Augenblick, Palaich, and Associates (2020), which surveyed 2,100 of Hawai‘i’s public school teachers of which 88% responded that Hawai‘i’s cost of living had a negative impact on recruitment and 87% reported that salaries in relationship to cost of living had a negative impact on retention.

Workload and Supervision. In this study, a large number of teachers reported that they were feeling overworked and had very little time to spend together to build on their collegiality and to learn and grow as a team to achieve greater teacher collective efficacy. Consistent with the literature (Garcia & Weiss, 2019d; Jarmolowski, 2017; Johnston & Tsai, 2018; Rentner et al., 2016), participants shared that the increasing time demands placed on them are overwhelming and that excessive out of classroom demands are causing some to feel extremely overworked, stressed, and approaching burnout. A number of teachers in this study stated they were drowning

trying to keep up with the demands of paperwork, meetings, data analysis, lesson planning, grading, teaching multiple courses and participating in extracurricular activities. Beginning teachers in this study also voiced the need for more time to be given to them during the school day to participate in the HDOE induction and mentoring program.

Another aspect of teaching that impacts workload is the need to differentiate learning within a class based on the characteristics of the student population. Garcia and Weiss (2019d) discuss how teacher shortages are worse in high-poverty schools and note that “these conditions are largely byproducts of larger societal forces such as rising poverty, segregation and insufficient public investments” (p.1). Some participants mentioned that it was difficult to differentiate in the classroom when there was such disparity in the students’ readiness levels, which they perceived as a growing number of students entering their math classes without having the basic math skills needed at their particular grade level. Student disengagement and apathy were also raised as dissatisfiers for some of the participants.

School Culture and Social Elements. The three components of the self-determination theory, which are autonomy, competence, and a sense of belonging, impact Hawai‘i’s teachers via the school environment including the culture of the school and the social relationships therein. Administrators who foster a culture of creativity and autonomy support teachers’ continuous learning and creativity. A culture of learning and collaboration at the school level supports teacher retention. Because of Hawai‘i’s remote geographical location and high cost of living, sometimes teachers hired from outside of Hawai‘i do not remain in the state for a long period of time. The previously mentioned compensation study, APA (2020) noted that the state should encourage more local residents to become teachers as mainland hired teachers are “less

likely to stay in Hawai‘i” (p. 19). Additionally, employers in Hawai‘i, including the HDOE, hire military spouses each year knowing that they will likely rotate out of Hawai‘i within three years. This may make it more difficult for some of these rotational teachers to feel as socially connected to the students and other faculty as some of the other teachers in their schools.

Theme 4: Continuous Learning and Development

Participants in this study described teaching as a nonstop quest to learn and grow and try new approaches. They voiced their desire to vary what and how they teach and how they enjoyed working with different groups of students each year, as well as participating in a variety of tasks inside and outside the classroom. The daily variation in their classroom activities and the ability to create and to learn and to have a sense of purpose, are what emanated from interviews and focus groups. Teachers indicated they did want to be told what to teach and how to teach it; they want to have the freedom to teach and appreciate the support and encouragement they receive from their coworkers and principals. Autonomy and competence are related to teachers learning and development.

Classroom Autonomy. Research question 2 asked how factors associated with professional identity such as autonomy, differ in beginning and seasoned teachers. Participating math teachers reported being happier in the workplace when they have a “choice and a voice.” Classroom autonomy includes teachers having decision making authority to improve classroom performance through being involved in selecting materials and curriculum, planning the daily agenda, exerting classroom discipline, and affecting students’ learning. “A positive form of autonomy represents a teacher’s freedom to construct a personal pedagogy which entails a balance between personality, training, experience and the requirements of the specific

educational context” (Hoyle & John, 1995, p. 92). Participants descriptions strongly indicated they want a voice in factors that impact them and their students. To support student needs, the math teachers expressed a desire for flexibility to adapt their pedagogy to best support student learning.

Survey question 5 asked study participants to rank 20 motivational job factors on a scale of one to five. The majority of survey respondents chose autonomy as the third most important factor. In response to research question 2, there was a statistically significant difference for autonomy between groups with different numbers of years of teaching at a particular school. The importance of autonomy as a motivating factor was greatest for those teaching in a school from 6 to 10 years and lowest for teachers who had been in a school for 31 to 35 years. Interestingly, the mean for teachers from 1 to 5 years of experience was lower than the 6 to 10 year group of teachers. Beginning teachers in this study expressed they prefer less classroom autonomy and more interaction with their administrators during their first three years while seasoned teachers appreciate having the ability to make decisions for their classrooms and for the school. Some of the 1 to 5 year teacher participants also noted that they would like to have more feedback from other teachers and school leaders while seasoned teachers noted the desire to have more autonomy and decision making authority about their choices for curriculum and classroom practices to meet the unique needs of their students.

Competence and Professional Development. One of the key assumptions of the self-determination theory is that the desire to learn drives human behavior. Teachers are by nature, learners. “Teaching and learning are processes that are inseparably linked together” (*The Classroom Blog*, (2007, December, 24). In a study of middle school mathematics teachers in

Ohio, Crawford (2017) used the self-determination theory as a framework to study Ohio secondary mathematics teachers' motivation to learn and found that the mathematics teachers studied were more likely to engage in effective professional development if they were intrinsically motivated to satisfy internal needs of self-improvement involving instructional improvements to ensure success in the classroom in both instruction and assessment.

In this study, participants expressed strong desires for continuous learning, both for their own learning but also to improve their classroom practices to enhance student learning.

Because competence is linked to teacher efficacy, motivation, and job satisfaction, one of the goals of this study was to find out how Hawai'i's math teachers perceived the role of competence as a factor in deciding to remain as teachers in Hawai'i. When asked to rank job motivational factors, four out of five teachers chose having a "sense of competence" as either highly motivating or somewhat motivating. Overall, competence was the 5th most important factor.

Research has shown that teachers' efficacy improves with years of experience (Kini and Podolsky, 2016). Additionally, combining a teacher's self-efficacy with the collective efficacy of the school's faculty has been found to boost student achievement (Hattie, 2016). In a knowledge-based profession like teaching, continuous learning is critical for beginning and experienced teachers alike. As discussed in the literature review, Garcia & Weiss (2019e) found professional development and a culture of learning "not only validates teachers' professional standing and strengthens the teacher workforce, but it also correlates with teacher retention and could contribute to ameliorating the national teacher shortage" (p. 25). Other studies have shown that

teachers with high efficacy are more likely to stay in teaching (Burley et al., 1991; Glickman & Tamashiro, 1982).

Participants in this study expressed that while they place high value on meaningful professional development, there were times when they were required to attend professional development that they did not find useful and state they the time could have been better spent in training that was more pertinent to their content areas. Participants also commented that to make professional development more meaningful to them they would appreciate having the opportunity to self-elect professional development topics and to be able to share their work more broadly with others. Participants also identified “variation” in their jobs as a job motivator and noted that they did not feel like they had to do the same thing day after day as might be required in other jobs.

Theme 5: Meaningful Relationships.

Research question 3 asked: “In what ways does having a sense of belonging within the context of personal, professional and institutional relationships influence teachers' decisions to stay?”

When examining teacher turnover as a function of the school context, it has been found that “the most salient predictors of their [teacher] satisfaction and predicted retention are social in nature – school leadership, collegial relationships, and elements of school culture (Simon & Johnson, 2015, p. 4).” A common theme in teacher retention literature, as well as in the results of this research study, is the critical role of professional relationships in teacher job satisfaction and retention. Not surprisingly, a major finding in this study was that, in addition to relationships

with students, relationships with colleagues and administrators were also reported as having a significant impact of teachers' feelings of job satisfaction.

When viewing the teachers' input from the lens of the self-determination theory, positive connections to job satisfaction and motivation were derived from all three of the psychological factors: autonomy, competence and relationships. Relationships were cited as the most critical of the three factors with autonomy and competence also being noted as key factors in influencing job satisfaction. The importance of having a supportive administrator and a supportive network of colleagues and staff at the school level were reported extensively throughout the study's quantitative and qualitative data.

Participants noted that having a sense of belonging in their schools and a strong relationship with their students, colleagues and administrators, impacted their job satisfaction, motivation and retention decisions. When rank ordering motivational teaching job factors, the majority of participants stated that a sense of belonging was somewhat or highly motivating to them.

Belonging and Teacher Retention. This study's findings were similar to several previous studies that showed how teachers' self-reported feelings of belonging, or "fit," impacted their job satisfaction and motivation (Bogler & Nir, 2012; Curtis, 2012; Grenville-Cleave & Boniwell, 2012; Mason & Matas, 2015; Mertler, 2016; Rowe, 2015; Skaalvik & Skaalvik, 2011). Participants in this study reported that when their administrators helped balance their workload, they viewed that as support from their administrator which contributed to their overall job satisfaction.

Teachers frequently work with students, parents, colleagues, community partners and school administrators. The relationship that matters most to teachers throughout the literature and also evident in this study, was the relationships they have with their students. The vast majority of participants ranked “interpersonal relationships with students” as the number one motivational teaching factor out of 20 factors. In a study of over 9,000 Arizona teachers, Mertler (2016) also found that interpersonal relationships with students was among the highest-ranking factors teachers selected as having a positive impact on their motivation.

This study also found statistically significant associations between the variables of “job satisfaction” and “relationships with administrators” as well as an association between having a self-reported “sense of belonging” and a “relationship with students”, “relationship with teachers”, and a “relationship with administrators.” The study’s finding that relationships with administrators, colleagues and students positively influenced the teachers’ self-reported sense of belonging supports the notion that relatedness is a fundamental human need (Deci & Ryan, 2000). In addition, qualitative feedback from teachers in focus groups and interviews highlighted the same sentiments. The participants reported they are the most highly motivated and achieve the highest job satisfaction from their students. It is why they teach. It is why making a difference is so important to them.

In addition to their relationship with students, the study also highlighted the importance teachers place on their sense of belonging at a school in terms of their collaborative relationships with their colleagues. Participants reported they placed a high value on opportunities to learn from each other, to collaborate and take part in decisions that impacted their abilities to improve student success. Consistent with the literature, participants reported that job satisfaction is shaped

by their connectedness to a team working toward a common shared purpose (Johnson et al., 2012; Skaalvik and Skaalvik, 2001). Some of the participants in this study stated they would definitely leave rather than work for a non-supportive school leader. A few also reported having already changed schools due to poor relationships with their administrators. Participants also described how important two-way communication, planning and having a voice in administrative decisions that impact them were to their well-being and sense of belonging.

The result of this study resonates with the following quote by a previous President of the National Council of Teachers of Mathematics:

Our love of mathematics, for students, and for our communities is a common thread that binds teachers of mathematics together. It explains the willingness of teachers to engage in activities supportive of building community; to engage in professional networks, observing and providing feedback to one another, deepening knowledge of mathematics content and pedagogy, and taking time to learn about our students and their communities; and to engage in critical conversations on issues impacting mathematics teaching and learning (Berry, 2020).

Limitations of the Study

This study is only a small step in understanding the factors that participants reported as influential in their decision making as Hawai'i's secondary mathematics teachers regarding staying in the Hawai'i Department of Education's schools to teach. The study can be improved in many ways. As stated in Chapter 3, the time allotted to complete the study and the geographic limitations may make this study less generalizable to teachers outside of Hawai'i.

Choices made by the researcher regarding selection and modification of the survey may have limited the study findings by leaving out questions that could have provided additional insights into teachers perceptions of job motivating factors. By choosing to use the mixed methods approach, the researcher had to limit the number of focus group interviewees and face-to-face interviews to stay on tight timelines for study completion. Oftentimes mixed methods studies are conducted with more than one researcher due to the complexity and time required for both quantitative and qualitative data collection.

In deciding to study math teacher retention as a problem of practice, where students need a solid foundation in math to succeed in STEM careers and fields that contribute to a vibrant innovation and knowledge society, the researcher was aware that the topic was directly related to the researcher's job duties. Thus, the gathering of data, participants' responses and interpretation of the findings may have been influenced by the researchers' positionality. Because the survey was emailed to participants by their principals at their schools, there was no direct interaction with the researcher when the surveys were completed. For the focus groups and interviews, the researcher took extra time to explain that the data being collected was confidential and that there would be no sharing of names or identities. However, the fact that the researcher served in a key leadership position as the head of the Department's human resource office, some data may have been skewed by participants who may have wanted to influence the outcome of the study or to be seen as favorable input to the researcher. The researcher made every effort to elicit honest input from all the study participants.

The study was also time-bound by collecting data over a six-month period, which limited the breadth and extensity of data collection. People with perceived time constraints and other

stressors may have been less likely to respond to surveys, and people who are less comfortable with technology may not have been inclined to take surveys online, thus limiting the pool of participants for both phase one and phase two.

Implications

Theoretical Implications

This study was focused on investigating self-reported reasons secondary mathematics teachers in Hawai‘i choose to stay as teachers. Ryan and Deci’s (2000a,b) self-determination theory (SDT) was used as the study’s theoretical framework. The study may have implications for the SDT as the study findings supported the theory’s assertion that there are three innate human psychological needs (autonomy, competence and a sense of belonging) are important to humans’ well-being and growth. In this study, participants rated feelings of autonomy, competence and belonging as contributing factors to their motivation as teachers and ultimately to their overall job satisfaction.

This study also found when teachers experienced autonomy-supportive behavior from their administrators and co-teachers, they were more inclined to offer choices and to display autonomy-supportive behaviors toward their students. Teachers who were given a “voice and a choice” at their schools stated they were more likely to give their students a “voice and a choice.”

A third implication to the SDT is that this study supported the idea that SDT can be applied across cultures. Secondary mathematics teachers (and their students) in Hawai‘i are from diverse backgrounds and cultures and reported experiencing autonomous motivation. Even though the study participants expressed the positive value they place on peer collaboration, they

also expressed the desire to be able to choose the curriculum and pedagogy that would best meet their students' needs. As noted by Ryan and Deci (2017), SDT seeks to "reflect the voices and choices of the individual and groups to which it is applied" (p. 589).

Policy Implications

While this study resulted in several potential policy implications, three stand out in significance: (a) teacher compensation, (b) review of current policies and collective bargaining agreements, and (3) tri-level empowerment

Teacher Compensation. The first policy issue calls out the need for a sustained effort by HIDOE and the Hawai'i Board of Education to seek increased levels of funding from the state and the legislators to raise teacher salaries to be competitive. As expected, teachers in this study identified teacher compensation as important, supported by data from the U.S. Department of Education (NCES, 2018), which showed that teachers who are satisfied with their salaries are more likely to be satisfied with their job. This implication is made more critical when considering the findings of Augenblick, Palaich and Associates (APA, 2020) about cost of living and Hawai'i teachers needing to take on additional jobs. Recruiting and retaining qualified secondary mathematics teachers may be enhanced by a more competitive salary.

Review of Policies. The second policy implication relates to teacher pay and teacher time. This study found teacher pay and the desire for more time to prepare, plan and collaborate as strong factors influencing teacher retention decisions. As such, any changes in these areas will require the HIDOE and the Hawai'i Board of Education to negotiate or consult with the unions on any desired changes to the contract and legislative funding for any additional cost items added or modified in the contract. A review of existing laws, rules, regulations, policies and collective

bargaining agreements may be needed pertaining to teacher retention, teacher wages, and other conditions of employment.

Tri-level Empowerment. The third policy implication relates to the study finding that teachers expressed a strong desire to continue learning and to have the support and ability to be creative and innovative in their practice. Encouraging and fostering empowerment at all three organizational levels in the HIDOE (state, complex, and school levels) may help to strengthen autonomy-supportive practices and behaviors throughout the organization.

Practical Implications

There are three practical implications that emerged from this study: (a) a need for improved workforce forecasting and data analysis capability, (b) a need for continued teacher and administrator professional and leadership development, and (c) continuous communication with internal and external partners on the promise and power of public education.

Workforce Forecasting and Data Analysis Capability. A robust workforce forecasting and data analysis capability may help to improve the HIDOE's capacity to share current and projected workforce needs with key stakeholders. Readily available data might contribute to the planning and filling of critical vacancies. Additionally, a new data system could help track teachers from pre-service, to hiring and placement, and throughout their careers at HIDOE. Teachers described various retention decision points throughout their careers and the importance of having a connection to colleagues and to the school. The tracking tool could also include a teacher profile to link job performance, competencies and assignments to career paths, perhaps enabling a better understanding of the relationship between student outcomes and teacher performance, turnover and longevity.

Continued Teacher and Administrator Professional and Leadership Development.

Teachers in the study reported wanting more time with their administrators to share their thoughts and to participate in decision making, suggesting that attention be given to fostering leadership and professional development of its educators. The Hawai'i Department of Education trains and certifies its school leaders through a pipeline development program for school principals and an annual teacher leader academy program. Continuing to foster the leadership and professional development of its educators not only helps to build their skills, but also fosters networking and collaboration among teachers and administrators throughout the state. Continuing to support both of these programs helps to build well-educated administrators and teachers whose success and growth supports student achievement and also supports increased competence and a sense of belonging.

Building trust between school leaders and teachers takes time. Participants of this study identified the critical importance of having a trusting relationship between administrators and teachers. Using federal and state funding to increase meaningful and impactful professional and leadership development opportunities for teachers and principals has practical implications for the State's leadership triad (state, complex and school levels). Continuing HIDOE-sponsored events such as an annual conference where teachers and administrators can interact and coaching and developing new principals are critical and practical ways to support the growth and development of teachers and administrators as they seek to nurture their relationships with students, parents, the community, and each other.

For beginning teachers, it is also important to continue to provide them the extra support they need to be successful. Induction programs, instructional mentoring, and collaborative

relationships support the development of pedagogical practices and relationships that may enhance beginning teachers decisions to stay. As pointed out by Losano et al. (2018), new mathematics teachers grow and develop through continued participation with their colleagues, administrators, students, and parents. Additionally, as noted by participants, creating time for beginning teachers to have opportunities to learn from their colleagues helps build their skills and effectiveness as teachers and supports their feelings of efficacy and competence.

Lastly, as distance learning and teacher on-line collaboration grows, there are practical implications for adapting to new technology, and improving digital literacy and digital leadership skills. Study participants expressed that they valued teachers teaching teachers through collaborative activities such as face-to-face gatherings as well as on-line collaboration opportunities. It is anticipated that on-line tools will continue to be valued and used by educators and students such that practices and policies will need to be updated to support continued collaboration and learning.

Continuous Communication and Interaction with Internal and External Partners.

The findings in this study point to the highest importance teachers place on begin able to know that what they do truly makes a difference in students' lives. Using internal partners such as principals, complex area and state leaders, as well as colleagues and the internal communications team to highlight teacher and student successes may be beneficial in supporting and sharing teacher accomplishments with a wider audience. Using internal and external partners to continue to publicly recognize teachers through honoring them in numerous ways such as the annual Teacher of the Year gathering; celebrating and compensating teachers for earning the

coveted National Board Certification for Teachers; and holding public ceremonies to honor their accomplishments all contribute to showing respect for the teachers and for the profession.

Additionally, for partners external to the HIDOE, continued communications and relationship building is critical to share both the successes and needs of the HIDOE. Community and business leaders, non-profit organizations, and other educational partners from throughout the state should be made aware of areas that the HIDOE considers important for Hawai'i's children so that they grow to be able to support the long-term health, sustainability and economic prosperity of the state of Hawai'i. By building this awareness, those external partners can better identify ways in which they can contribute their expertise and perhaps even resources. As mentioned by study participants, external partners who have supported their schools financially and with material resources were also helping the schools' supporting staff, teachers and principals to build strong relationships with their students and their communities.

Another suggestion is to continue successful partnerships such as the Teacher Education Coordinating Committee (TECC), described previously. The TECC is made up of members from the 15 teacher education preparation programs in Hawai'i as well as the Hawai'i Teachers Standards Board and the Hawai'i State Teachers Association. The TECC's efforts such as the annual "It's Great to be a Teacher" event and its "Be a Hero, Be a Teacher" campaign aim to elevate the teacher profession. Continued collaboration efforts with TECC and other educational and human capital partners will assist in sharing retention practices that support teachers staying in Hawai'i. Additionally, specifically for math teachers, organizations such as the Hawai'i Council of Teachers of Mathematics, and the National Council of Teachers of Mathematics need

to continue to be engaged so that math teachers can continue to collaborate and learn from one another.

Recommendations

Future Research

Several areas are suggested for future research. While this study provided insight into understanding about 100 Hawai'i's secondary mathematic teachers perceptions of positive factors that impact their retention decisions, additional research on how the self-determination theory (SDT) factors of autonomy, efficacy and relationships influence teacher retention and turnover are needed. For example, it appears a strong school culture reduces teacher turnover. However, knowing more about what factors positively impact school culture and how they relate to the SDT's basic psychological needs may help improve teacher job satisfaction and retention.

Another area for additional research is around gaining a deeper understanding of how administrators' autonomy-supportive behavior influences teachers' autonomy-supportive behavior which would support an enhanced understanding of how to encourage teachers to use autonomy-supportive practices in their classrooms thus supporting student choice and voice in their own education. Additionally, a study of factors that influence principals' autonomy-supportive behaviors, such as district or state policies and practices, could provide additional ideas about how to increase autonomy-supportive behaviors throughout the tri-level organizations (school, district, state) within the HIDOE.

The role of the school leader has been studied extensively but additional research on the role of the principal and teacher as it relates to digital leadership and distance learning seems

useful given the current and potential future situations which may require more work-from-home, learn-from-home scenarios.

An additional area for future research has to do with this study's outcome relating to how teachers who reported higher feelings of being connected to others and having a sense of belonging appeared to be better able to handle stress and job burnout.

Finally, the study of teacher turnover in high and low performing schools has also been studied in terms of principal leadership and teacher turnover. However, for Hawai'i, the dynamics of teacher turnover in rural and low poverty areas needs more study. When teachers do not leave the profession, but leave the school, further understanding of what drives them to leave a particular school would be helpful in learning about the dynamics of a particular school and how that positively or negatively impacts retention.

Conclusion

This study's purpose was to examine what self-reported factors influenced Hawai'i's secondary mathematics teachers to remain teaching in Hawai'i. To make a difference in students' academic and personal growth and success is the primary finding from this study as to why secondary mathematics teachers in Hawai'i teach. While teachers highlighted other factors that impact their retention decisions, the ability to impact students stood out far above any of the other factors.

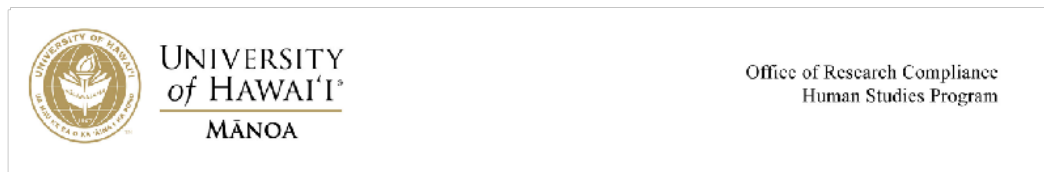
Overall, the study sought to better understand why Hawai'i's mathematics teachers stay. Hawai'i's teachers reported five factors as being significant influences on their decisions to remain in the profession: (a) making a difference for students, (b) school leadership, (c) supportive workplace, (d) continuous learning and development, and (e) meaningful

relationships. The teachers in this study were generally satisfied with their current teaching positions and shared insights that contributed to dissatisfaction and that could potentially cause them to leave the profession. Dissatisfiers that emerged from this study included (a) low pay; (b) weak school leadership; (c) workload, stress, job burnout; (d) student discipline and apathy; and (e) desire for recognition and respect as professional.

To address the elements that support teachers positive retention behavior, the Hawai'i Department of Education may want to consider taking the following actions: (a) increase teacher compensation; (b) update policies to enhance teacher and administrator professional development and leadership opportunities; and (c) continue to empower leaders at all three levels of the organization: state, complex area and school.

On the path towards the HIDOE's vision of all Hawai'i students being "educated, healthy, and joyful lifelong learners who contribute positively to their community and global society" as stated on the HIDOE website, a passionate, caring, and qualified math teacher in each math classroom is an important part of that vision. The words of one of the mathematics teacher study participants perhaps best sums up the study. "Besides seeing student growth as the most rewarding thing about teaching, it is definitely the relationships with your faculty and your students. That is why I stay."

Appendix A Institutional Review Board Approval



DATE: April 22, 2019

TO: Nguyen, Thanh Truc, EdD, University of Hawaii at Manoa. Curriculum Research & Development Group
Covell, Cynthia, MA Ed/MA National Security, College of Education, University of Hawaii at Manoa

FROM: Rivera, Victoria, Dir, Ofc of Rsch Compliance, Social&Behav Exempt

PROTOCOL TITLE: Understanding teacher retention through the lens of secondary mathematics teachers in Hawai'i

FUNDING SOURCE:

PROTOCOL NUMBER: 2019-00174

APPROVAL DATE: April 22, 2019

NOTICE OF APPROVAL FOR HUMAN RESEARCH

This letter is your record of the Human Studies Program approval of this study as exempt.

On April 22, 2019, the University of Hawaii (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 46 CFR 46.101(b) 2.

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at the OHRP Website www.hhs.gov/ohrp/humansubjects/guidance/belmont.html.

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via the UH eProtocol application. The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

UH Human Studies Program, Office of Research Compliance
Office of the Vice President for Research and Innovation, University of Hawaii, System
2425 Campus Road, Sinclair 10, Honolulu HI 96822
Phone: 808.956.5007 • Email: uhirb@hawaii.edu
https://www.hawaii.edu/researchcompliance/human_studies
An Equal Opportunity & Affirmative Action Institution



Appendix B Hawai'i Department of Education Approval to Conduct Research



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF STRATEGY, INNOVATION AND PERFORMANCE

May 31, 2019

Cynthia Covell

Re: Research Application Decision

Dear Ms. Covell:

I am pleased to approve your Hawaii State Department of Education (HIDOE) research application for the study "Understanding teacher retention through the lens of secondary mathematics teachers in Hawai'i" (Application RES2019016).

This approval will expire on July 31, 2021. If you require additional time to complete your study, you must submit a request for an extension or another application before this approval expires. If you intend to make changes to your project you must submit the change request to the Data Governance and Analysis Branch prior to implementing the change. These changes include but are not limited to (1) any changes that require approval from your Institutional Review Board and (2) any changes that are in conflict with or not included in this approval letter. Significant changes may need to be reviewed by the Research Review Committee at their next scheduled meeting. If changes are approved, a modified approval letter will be issued to the researcher, the targeted schools, and affiliated state district office staff.

As described in your application, the objective of your study is:

- To better understand teacher retention through the lens of secondary mathematics teachers in Hawai'i.

You have indicated that you will be inviting teachers from all HIDOE middle and high schools to participate in your project. Please remember that participation in your project must be done outside of work and/or school hours.

You must present this letter to the appropriate HIDOE administrator(s) upon invitation to participate in your research.

You have also indicated that you will be inviting the following individuals at these targeted schools to participate in your study:

- Secondary mathematics teachers

The number of participants is contingent upon how many schools agree to participate in your project.

Ms. Covell
May 31, 2019
Page 2

Teachers who participate in your study will be involved in the following activities:

1. One online survey;
2. One hour focus group interviews (with participant interest and consent)

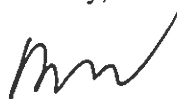
As you proceed with your study, please be aware of the following:

- The participation of HIDOE schools, offices, students, and personnel in your study is strictly voluntary.
- All study activities must take place at dates, times, and locations agreed upon by the administrators of the participating HIDOE schools and offices.
- Any compensation provided to HIDOE personnel for participation in your study must be for activities completed outside of instructional and work hours and must be in compliance with the Hawaii State Ethics Code. Any questions about this topic should be referred to the Data Governance and Analysis Branch.
- You are required to conduct your study in accordance with both the conditions of approval described in this letter and the document "Affirmation and Acknowledgement of the Processes, Procedures, and Conditions for Conducting Research in the Hawaii State Department of Education" (the "Affirmation Form for Researchers").
- You are responsible for ensuring that all individuals involved in this study both those affiliated with your organization and those contracted by your organization and affiliated with external entities or vendors adhere to all of the conditions of my approval, including those detailed in this letter and those stipulated by the Affirmation Form for Researchers.

Should you have any questions about the above, please contact Ke'ala Fukuda, HIDOE Data Governance and Analysis Branch, at DOEResearch@notes.k12.hi.us or (808) 784-6061.

Best wishes for a successful study. We look forward to receiving your findings and recommendations.

Sincerely,



Rodney Luke
Assistant Superintendent

RL:kf

c: Data Governance and Analysis Branch

Appendix C Initial Email Invitation to Participate in Phase One Survey

Dear Principal [Principal's name],

My name is Cindy Covell. I am a doctoral student at the University of Hawai'i, Mānoa's College of Education in the EdD Professional Practice Program. I am kindly requesting you send the attached recruitment email to your school's mathematics teachers. Completion of this survey by your math teachers will support my doctoral research study titled: "Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers."

The purpose of this study is to understand the perceptions of mathematics teachers regarding what influences their decision to stay in Hawai'i as secondary mathematics teachers.

Participation in the survey is completely voluntary and a consent form is included prior to the survey. The survey is anonymous and does not require teachers to provide their names or any other identifying information. If the teacher chooses to participate in a follow-on focus group interview, they will be asked to provide a non-DOE email address.

The final research dissertation will be shared with the Department of Education to provide feedback on retention practices that teachers perceive to be beneficial to providing job satisfaction.

This study has been approved by the UH IRB office (####) on [date] and the HIDOE Data Governance and Analysis Branch (#####) on [date].

Thank you for your time and for emailing this recruitment to your math teachers.

Please feel free to contact me with any questions at cacovell@hawaii.edu or my advisor, Dr. Thanh Truc Nguyen at nguyen@hawaii.edu

Sincerely,

Cindy Covell, Ed.D. Student, University of Hawai'i, Mānoa

Appendix D Survey Flyer

The University of Hawai'i at Mānoa is conducting a study:

Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers

Are you a grade 6 to grade 12 math teacher in a Hawai'i public school? If the answer is **YES...**

Cynthia Covell, a doctoral student under the advisement of Dr. Thanh Truc Nguyen, would like to invite you to participate in a research study.

The purpose of the study is to understand the perceptions of mathematics teachers regarding what influences their decision to stay in Hawai'i as secondary mathematics teachers.

- Phase 1 will be an online survey; all HIDOE secondary mathematics teachers are invited to participate. The survey will take about 10 minutes.
- Phase 2 will be a focus group interview; 6-12 teachers will be invited from those who volunteer. The group interview will take about 45-60 minutes.
- You do not need to complete both phases.
- Participation is completely voluntary, and all information will be kept confidential.
- A summary of the results will be available publicly via the University of Hawai'i system after the study completion. A summary report will also be made available to the HIDOE.

To learn more about the study, please contact Cynthia Covell at cacovell@hawaii.edu

To participate and take the Phase 1 online survey, please go to:

Link to survey: [Secondary Mathematics Teacher Retention Survey](#)

Thank you in advance for sharing your time and valued input

UH IRB approval #2019-00174 04, 22, 2019; HIDOE DGA approval #RES2019016 05, 31, 2019.

Appendix E Consent Form to Participate in Survey



University of Hawai'i

Consent to Participate in a Research Project: Survey Thanh Truc Nguyen, Principal Investigator
Cynthia Covell, Student Investigator

Project title: Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers

My name is Cynthia Covell and you are invited to take part in a research study. I am a doctoral student at the University of Hawai'i at Mānoa in the College of Education. As part of the requirements for earning my doctoral degree, I am doing a research project about math teacher retention.

What am I being asked to do?

If you participate in Phase 1 of this project, you will be asked to fill out a survey about teacher job satisfaction.

Taking part in this study is your choice.

Your participation in this project is completely voluntary. You may stop participating at any time. If you stop being in the study, there will be no penalty or loss to you. Your choice to participate or not participate will not affect your rights as a Hawai'i public school teacher.

Why is this study being done?

The purpose of my study is to understand math teacher retention through the lens of Hawai'i's public school, secondary mathematics teachers. I am asking you to participate because you are currently a grade 6 to grade 12 mathematics teacher in Hawai'i .

What will happen if I decide to take part in this study?

The survey will consist of 15 multiple choice and open-ended questions. It will take 20 minutes. The survey questions will include questions like, "What is your overall level of satisfaction with your current position as a teacher?" "If you had the opportunity to start over in a new career, would you choose to become a teacher?" "Which of the following would be reasons that you would seriously consider leaving teaching?" The survey is accessed on a website to which I will provide you a link.

What are the risks and benefits of taking part in this study?

I believe there is little risk to you for participating in this research project. You may become stressed or uncomfortable answering any of the survey questions. If you do become stressed or uncomfortable, you can skip the question or take a break. You can also stop taking the survey or you can withdraw from the project altogether.

There will be no direct benefit to you for participating in this survey. The results of this project may help the Hawai'i Department of Education improve teacher retention.

Confidentiality and Privacy:

I will not ask you for any personal information, such as your name or address. Please do not include any personal information in your survey responses. I will keep all study data secure in a locked filing cabinet in a locked office and encrypted on a password protected computer. Only my University of Hawai'i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study.

Compensation:

You will not receive compensation for participating in this research project survey.

Future Research Studies:

Identifiers will be removed from your identifiable private information and after removal of identifiers, the data may be used for future research studies or distributed to another investigator for future research studies and we will not seek further approval from you for these future studies.

Questions: If you have any questions about this study, please call or email me at 808-***-**** or cacovell@hawaii.edu You may also contact my faculty advisor, Dr. Thanh Truc Nguyen, at 808-956-6507 & nguyen@hawaii.edu. You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions, obtain information, or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <http://go.hawaii.edu/jRd> for more information on your rights as a research participant.

To Access the Survey: Please go to the following web page: You should find a link and instructions for completing the survey. Going to the first page of the survey implies your consent to participate in this study. <https://tinyurl.com/yy6lqd95>

Please print or save a copy of this page for your reference. Mahalo!

Appendix F Reminder Email to Participate in Survey

Dear Principal [Principal's name]

I am writing again to humbly request your support. I previously sent an email on [date] seeking your support in sending the attached recruitment email to your mathematics teachers. Thank you for your support in my first request. I have received AAAA responses to date. If you have a moment, please consider sending the recruitment email once more.

Sincerely, Cindy Covell

Appendix G Permission to Use Survey Instrument

From: Dr. Craig Mertler craig.mertler@gmail.com

Subject: Re: New message via your website, from c*****@gmail.com

Date: February 18, 2019 at 7:25 AM

To: Cindy Covell

Hi Cindy,

Hi Rebecca,

Yes, you can certainly have permission to use the survey. It sounded like you found an older, original version, but I've attached the newest version (from 2015; the 'original' was produced in the mid-'90s). It was originally administered via Qualtrics, so the conversion to a PDF isn't great, but you can at least see all of the items.

You might also be interested in the article I published in 2016. Here is the link:

<http://www.sciencedupress.com/journal/index.php/irhe/article/view/9215>

Best of luck!!!

Craig A. Mertler, PhD

Associate Professor & Director, Arizona State University

craig.mertler@gmail.com | <http://www.craigmertler.com> |

Appendix H Secondary Mathematics Teacher Retention Survey

**Secondary Mathematics Teacher Retention
Survey**

Please read before continuing

* Required

Consent Form

Aloha! My name is Cynthia Covell and you are invited to take part in a research study. I am a doctoral student at the University of Hawai'i at Mānoa in the College of Education. As part of the requirements for earning my doctoral degree, I am doing a research project about math teacher retention.

What am I being asked to do?

If you participate in this project, you will be asked to fill out a survey.

Taking part in this study is your choice.

Your participation in this project is completely voluntary. You may stop participating at any time. If you stop being in the study, there will be no penalty or loss to you. Your choice to participate or not participate will not affect your rights to services at the UH Campus Recreational Facilities.

Why is this study being done?

The purpose of my project is to understand math teacher retention through the lens of Hawai'i's secondary mathematics teachers. I am asking you to participate because you are currently serving as a secondary mathematics teacher in Hawai'i.

What will happen if I decide to take part in this study?

The survey will consist of 15 multiple choice and open-ended questions. It will take 20 minutes. The survey questions will include questions like, "Did you enjoy using the campus recreational facilities? If so, why? If not, why not?" "What aspect of the recreational facilities do you use the most?" "What would you like to see changed?" The survey is accessed on a website to which I will provide you a link.

What are the risks and benefits of taking part in this study?

I believe there is little risk to you for participating in this research project. You may become stressed or uncomfortable answering any of the survey questions. If you do become stressed or uncomfortable, you can skip the question or take a break. You can also stop taking the survey or you can withdraw from the project altogether.

There will be no direct benefit to you for participating in this survey. The results of this project may help improve the Career Development and Counseling program to benefit future students.

Confidentiality and Privacy:

I will not ask you for any personal information, such as your name or address. Please do not include any personal information in your survey responses. I will keep all study data secure in a locked filing cabinet in a locked office/encrypted on a password protected computer. Only my University of Hawai'i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study.

Compensation:

You will not receive compensation for participating in this research project survey.

Future Research Studies:

Identifiers will be removed from your identifiable private information and after removal of identifiers, the data may be used for future research studies or distributed to another investigator for future research studies and we will not seek further approval from you for these future studies.

Questions: If you have any questions about this study, please call or email me at _____ or [c_____@gmail.com](mailto:_____@gmail.com). You may also contact my faculty advisor, Dr. Thanh Truc Nguyen, at 808-956-6507 & nguyen@hawaii.edu. You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions, obtain information, or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <http://go.hawaii.edu/jRd> for more information on your rights as a research participant.

Going to the first page of the survey implies your consent to participate in this study.

Please print or save a copy of this page for your reference.

Mahalo!

1. What is your overall level of satisfaction with your current position as a teacher? *

Mark only one oval.

- Very dissatisfied
 Dissatisfied
 Neutral
 Satisfied
 Very Satisfied

2. Please briefly explain why you answered the previous question as you did.

3. Generally speaking, do you believe that the teachers with whom you work are satisfied with their jobs? *

Mark only one oval.

- Not at all
 A few are
 A majority are
 They all are!

4. Generally speaking, do you believe that the teachers with whom you work are motivated to perform at their highest level? *

Mark only one oval.

- Not at all
- A few are
- A majority are
- They all are!

5. On the following 5-point scale, indicate the degree to which each of the following aspects of the job of teaching serve as a motivating factor or an unmotivating factor for teachers. *

Mark only one oval per row.

	Highly unmotivating	Somewhat unmotivating	Neither	Somewhat motivating	Highly Motivating
Recognition (from parents, students, admins)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential for professional growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supervision by a competent administrator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpersonal relationships with other teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salary (compensation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job security	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Status (professional status of teaching)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpersonal relationship with administrators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of achievement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working conditions (facilities conditions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
District policies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autonomy and authority for own work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potential for advancement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Work itself (aspects of teaching)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Factors in personal life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpersonal relationship with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of accountability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of belonging/connectedness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of competence/efficacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Untitled Section

6. On the following 5-point scale, indicate the degree to which each of the following incentives serve as a motivating factor or an unmotivating factor. *

Mark only one oval per row.

	Highly unmotivating	Somewhat unmotivating	Neither	Somewhat motivating	Highly motivating
One time monetary award (supplemental to salary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being selected as Teacher of the Year	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An instructional professional development workshop offered by the district (you pay)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a student thank you for assisting in the understanding of a difficult concept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being given the opportunity to participate in teacher projects (e.g. curriculum development)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Early retirement/Contract Buy out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Observing vast improvements in your students' performance since the beginning of the year	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being awarded a plaque by students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being permitted to purchase additional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

equipment, technology, and/or supplies for your classroom					
Being supported to engage in your own professional growth through the implementation of classroom-based action research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being able to influence school design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. How many teachers that you know or work with would you classify as "unmotivated?"

Mark only one oval.

- 1-2
 3-4
 5-6
 7-8
 9-10
 More than 10

8. Have you ever seriously considered leaving teaching? *

Check all that apply.

- Yes
 No

9. If you answered "Yes" to the previous question, please briefly explain why you considered leaving and why you chose to stay.

10. Which of the following would be reasons that you would seriously consider leaving teaching? (Please check all that apply)

Check all that apply.

- Career Change (within education)
- Career Change (outside education)
- Seek more competitive salary
- Dissatisfied with current assignment
- Lack of desire/willingness to support various reform efforts
- Lack of opportunities for advancement
- Inadequate mentoring
- Inadequate training necessary for position
- School culture
- Administrative leadership
- Lack of autonomy
- Lack of shared leadership
- Unethical treatment
- Other (please list in space below)

11. If you were hypothetically considering leaving teaching, which of the following might entice you to stay? (Please check all that apply) *

Check all that apply.

- Pay increase
- Different administrator
- Change in leadership style(s)
- Smaller classes
- More time to plan or prepare
- Greater opportunities for collaboration with colleagues
- Better facilities
- Greater opportunities for advancement
- Other (please list in the space below)

12. Is there anything else you would like for us to know about your personal perspective on teacher retention?

13. What is your gender?

Mark only one oval.

- Female
- Male

14. What is your ethnicity?

Mark only one oval.

- American Indian or Alaskan Native
- Native Hawai'ian or Other Pacific Islander
- Asian
- Hispanic or Latino of any race
- White or Caucasian, non-Hispanic
- Black or African American
- Two or more races

15. Which category best represents your age? *

Mark only one oval.

- 21-25
- 26-30
- 31-35
- 36-40
- 41-45
- 46-50
- 51-55
- 56 or older

16. Which of the following best represents your highest level of education?

Mark only one oval.

- B.A. or B.S.
- B.A./B.S. + 15 hours
- B.A./B.S. + 30 hours
- M.A. or M.S.
- M.A./M.S. + 15 hours
- M.A./M.S. + 30 hours
- Ed.D. or Ph.D.
- Other

17. Which best describes your current school setting?

Mark only one oval.

- Rural, high poverty
- Rural, low poverty
- Suburban, moderate to high income
- Suburban, high to very high income
- Urban, high poverty
- Urban, very high poverty

18. Which best describes your current school level?

Mark only one oval.

- Middle School
- High School
- PK-12
- Other

19. How many years have you been in your current position/school

Mark only one oval.

- 1-5
 6-10
 11-15
 16-20
 21-25
 26-30
 31-35

20. How many different positions have you held and/or how many different schools have you worked in over your career as a teacher? *

Mark only one oval.

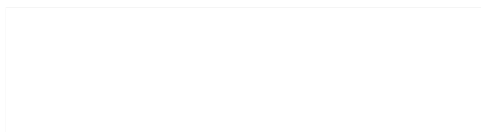
- 1-2
 3-4
 5-6
 7 or more

21. Please provide a brief explanation regarding your response to previous question.

22. Is there anything else you would like to add about ways to improve secondary mathematics teacher job satisfaction in Hawai'i's public schools? *

23. If you are willing to participate in a focus group or individual interview, please provide your non-DOE email address below.

UHApproval ID: 2019-00174
HIDOE DGA Approval: RES2019016



Appendix I IRB Modification Approval



UNIVERSITY
of HAWAII®
MĀNOA

Office of Research Compliance
Human Studies Program

DATE: September 09, 2019
TO: Nguyen, Thanh Truc, EdD, University of Hawaii at Manoa, Curriculum Research & Development Group
 Covell, Cynthia, MA Ed/MA National Security, College of Education, University of Hawaii at Manoa
FROM: Rivera, Victoria, Dir, Ofc of Rsch Compliance, Social&Behav Exempt
PROTOCOL TITLE: Understanding teacher retention through the lens of secondary mathematics teachers in Hawai'i
FUNDING SOURCE:
PROTOCOL NUMBER: 2019-00174
 Approval Date: September 09, 2019 Expiration Date: December 31, 2999

NOTICE OF APPROVAL FOR HUMAN RESEARCH

This letter is your record of the Human Studies Program approval of this study as exempt.

On September 09, 2019, the request for IRB approval of changes to your exempt project noted above has been reviewed and approved. The proposed amendments will be added into your current project file. The proposed changes do not alter the exempt status of your project. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45 CFR 46.101(b) 2.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

If you have any questions relating to the protection of human research participants, please contact the Human Studies Program by phone at 956-5007 or email uhirb@hawaii.edu. We wish you success in carrying out your research project.

UH Human Studies Program, Office of Research Compliance
 Office of the Vice President for Research and Innovation, University of Hawai'i, System
 2425 Campus Road, Sinclair 10, Honolulu HI 96822
 Phone: 808.956.5007 • Email: uhirb@hawaii.edu
<https://www.hawaii.edu/researchcompliance/human-studies>
 An Equal Opportunity & Affirmative Action Institution



Appendix J Consent to Participate in a Research Project: Focus Group



Consent to Participate in a Research Project: Focus Group

Thanh Truc Nguyen, Principal Investigator Cynthia Covell, Student Investigator

Project title: Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers

My name is Cynthia Covell and you are invited to take part in a research study. I am a doctoral student at the University of Hawai'i at Mānoa in the College of Education. As part of the requirements for earning my doctoral degree, I am doing a research project about math teacher retention.

What am I being asked to do?

If you participate in Phase 2 of this study, you will join about six other people in a group interview to talk about why you chose to become and remain as a mathematics teacher in Hawai'i. I will ask to meet with the group at the University of Hawai'i at Manoa or University of Hawai'i West Oahu and time convenient for the group.

Taking part in this study is your choice.

Your participation in this study is completely voluntary. You may stop participating at any time. If you stop being in the study, there will be no penalty or loss to you.

Why is this study being done?

The purpose of my study is to understand the Hawai'i's teacher retention through the lens of public school secondary mathematics teachers. I am inviting you to participate in my study because you are a public school grade 6 to grade 12 mathematics teacher and indicated you would be willing to participate in an interview.

What will happen if I decide to take part in this study?

The group interview session discussion will be guided by 10 open-ended questions. The session will take about 45 minutes to an hour. The group interview session questions will include questions like, "What are the chief reasons you chose to stay in the classroom as a

secondary mathematics teacher?” and “What recommendations would you like to share to improve retention of mathematics teachers in Hawai’i’s secondary classrooms?”

With your permission, I will audio-record the group interview session so that I can later transcribe the session and analyze the responses.

What are the risks and benefits of taking part in this study?

I believe there is little risk to you in participating in this research project. You may become stressed or uncomfortable answering any of the questions or discussing topics during the focus group. If you do become stressed or uncomfortable, you can skip the question or take a break. You can also stop participating at any time or you can withdraw from the project altogether.

There will be no direct benefit to you for participating in this group interview session. The results of this project may help the Hawai’i Department of Education improve teacher retention.

Privacy and Confidentiality: I will keep all study data secure in a locked filing cabinet in a locked office and encrypted on a password protected computer. Only my University of Hawai’i advisor and I will have access to the information. Other agencies that have legal permission

have the right to review research records. The University of Hawai’i Human Studies Program has the right to review research records for this study.

After I transcribe the group interview session, I will erase or destroy the audio-recording. When I report the results of my research project, I will not use your name. I will not use any other personal identifying information that can identify you. I will use pseudonyms (not your real names) and report my findings in a way that protects your privacy and confidentiality to the extent allowed by law.

Compensation:

You will not receive compensation for participating in this research project group interview session, but your participation is highly valued.

Questions:

If you have any questions about this study, please call or email me at 808-***-**** or cacovell@hawaii.edu may also contact my advisor, Dr. Thanh Truc Nguyen, at 808-956-6507 or nguyen@hawaii.edu. You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions; obtain

information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <http://go.hawaii.edu/jRd> for more information on your rights as a research participant.

Keep a copy of the informed consent for your records and reference.

Signature(s) for Consent:

I give permission to join Phase 2 of the research project entitled, "*Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers.*"

Please initial next to either "Yes" or "No" to the following:

___ Yes ___ No I consent to be audio-recorded for the interview portion of this research.

Name of Participant (Print): _____

Participant's Signature: _____

Signature of the Person Obtaining Consent: _____

Date: _____

Although we ask everyone in the group interview session to respect everyone's privacy and confidentiality, and not to identify anyone in the group or repeat what is said during the group discussion, please remember that other participants in the group may accidentally disclose what was said. Avoid sharing personal information that you may not wish to be known

Appendix K Semi-Structured Interview Protocol

Principal Investigator: Thanh Truc Nguyen

Student Investigator: Cynthia Covell

Project Title: Understanding teacher retention through the lens of Hawai'i's secondary mathematics teachers

Semi-Structured Interview Protocol and Questions for Phase 2: Focus Groups

Hi. My name is Cindy Covell. As you've already read previously, I am a graduate student at UH-Manoa, and I'm looking into reasons teachers stay in Hawai'i at math teachers. Thank you so much for coming today for Phase 2 of my research study. I've passed out the informed consent form and hope you've had a chance to read it. Has everyone had that chance? If not, I'll give you a few moments.

In general, this group interview will take about 45-60 minutes. If you feel uncomfortable, you can stop at any time. There is no compensation for this participating in this study, but I greatly value your participation.

There are 10 general questions I will be asking. I will do my best to keep your identity confidential. Also, I ask that you not repeat what is here to others out of respect. Does anyone have any questions before we begin?

Retention Factors

1. From the survey, it seems that relationships with students, families and other staff members, and knowing you have made a difference are strong factors that keep teachers teaching in [community]. What do you think about these factors?
2. Support from administration and the ability to make decisions - having a voice- and feeling that your work is validated were considered important in the survey. How important is teacher voice and autonomy to you as mathematics teachers?
3. How important is compensation to you when you are thinking about staying or leaving?
4. What are some reasons you would seriously leave teaching?

Job Satisfaction

5. Generally speaking, do you believe the teachers with whom you work are satisfied with their jobs? Why or why not?
6. Please share what you think might make being a mathematics teacher more satisfying.

Job Motivation

7. What aspects of teaching serve as motivating factors to you?
8. Would you recommend teaching in your school to a friend? Why or why not?
9. Would you recommend teaching in the Hawai'i Department of Education to a friend?
10. What makes teaching math rewarding? What makes teaching math in Hawai'i rewarding?

Appendix L Survey Participants

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
1	41-45	B.A. or B.S.	Rural, low poverty	Middle School	16-20
2	51-55	M.A. or M.S.	Rural, low poverty	Middle School	16-20
3	31-35	B.A. or B.S.	Rural, low poverty	Middle School	1-5
4	51-55	M.A. or M.S.	Suburban, moderate to high income	Middle School	1-5
5	56 or older	M.A./M.S. + 30 hours	Urban, high poverty	High School	31-35
6	51-55	M.A./M.S. + 15 hours	Suburban, moderate to high income	Middle School	1-5
7	41-45	M.A./M.S. + 30 hours	Suburban, moderate to high income	Middle School	1-5
8	21-25				
9	56 or older	M.A. or M.S.	Suburban, moderate to high income	Middle School	1-5
10	46-50	M.A. or M.S.	Urban, very high poverty	Middle School	11-15
11	36-40	M.A./M.S. + 30 hours	Rural, low poverty	Middle School	6-10
12	21-25	B.A. or B.S.	Suburban, moderate to high income	Middle School	1-5
13	51-55	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	11-15

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
14	56 or older	M.A. or M.S.	Rural, high poverty	High School	26-30
15	41-45	M.A./M.S. + 30 hours	Urban, high poverty	High School	6-10
16	31-35	M.A./M.S. + 15 hours	Rural, high poverty	High School	1-5
17	31-35	B.A. or B.S.	Suburban, moderate to high income	High School	1-5
18	46-50	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	1-5
19	31-35	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	1-5
20	21-25	B.A. or B.S.	Suburban, moderate to high income	High School	1-5
21	56 or older	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	26-30
22	21-25	B.A. or B.S.	Urban, high poverty	Middle School	1-5
23	31-35	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	1-5
24	36-40	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	11-15

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
25	41-45		Suburban, moderate to high income	High School	11-15
26	26-30	M.A./M.S. + 15 hours	Suburban, moderate to high income	Middle School	6-10
27	51-55	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	11-15
28	46-50	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	21-25
29	56 or older	B.A. or B.S.	Rural, low poverty	High School	16-20
30	26-30	M.A. or M.S.	Urban, high poverty	Middle School	1-5
31	56 or older	B.A./B.S. + 15 hours	Rural, high poverty	Middle School	6-10
32	56 or older	M.A./M.S. + 30 hours	Rural, high poverty	High School	6-10
33	36-40	B.A./B.S. + 15 hours	Rural, high poverty	Middle School	1-5
34	46-50	B.A./B.S. + 30 hours	Suburban, moderate to high income	Middle School	1-5
35	36-40	M.A./M.S. + 15 hours	Suburban, moderate to high income	Middle School	1-5
36	56 or older	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	1-5

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
37	31-35	M.A./M.S. + 15 hours	Rural, high poverty	High School	6-10
38	31-35	M.A./M.S. + 30 hours	Urban, very high poverty	Middle School	1-5
39	21-25	B.A. or B.S.	Rural, high poverty	Middle School	1-5
40	56 or older	M.A./M.S. + 30 hours	Suburban, moderate to high income	Other	16-20
41	26-30	M.A. or M.S.	Urban, high poverty	Other	1-5
42	26-30	M.A./M.S. + 15 hours	Suburban, high to very high income	Middle School	1-5
43	36-40	B.A. or B.S.	Rural, high poverty	High School	11-15
44	36-40	B.A./B.S. + 15 hours	Rural, high poverty	High School	6-10
45	36-40	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	11-15
46	31-35	M.A. or M.S.	Suburban, moderate to high income	High School	11-15
47	51-55	B.A./B.S. + 30 hours	Rural, low poverty	High School	11-15
48	31-35	M.A. or M.S.	Suburban, moderate to high income	High School	1-5

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
49	36-40	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	6-10
50	21-25	B.A. or B.S.		High School	1-5
51	36-40	B.A./B.S. + 30 hours	Rural, high poverty	High School	6-10
52	26-30	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	1-5
53	51-55	M.A. or M.S.	Suburban, moderate to high income	Middle School	1-5
54	36-40	B.A./B.S. + 30 hours	Rural, high poverty	High School	6-10
55	36-40	B.A. or B.S.	Rural, high poverty	Middle School	1-5
56	26-30	B.A./B.S. + 30 hours	Rural, high poverty	High School	1-5
57	36-40	B.A./B.S. + 15 hours	Rural, low poverty	High School	6-10
58	36-40	B.A./B.S. + 30 hours	Rural, high poverty	High School	11-15
59	26-30	M.A. or M.S.	Suburban, moderate to high income	Middle School	1-5
60	21-25	B.A. or B.S.			1-5
61	56 or older	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	6-10

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
62	26-30	M.A. or M.S.	Suburban, moderate to high income	High School	1-5
63	41-45	B.A./B.S. + 30 hours	Suburban, moderate to high income	High School	16-20
64	56 or older	B.A./B.S. + 30 hours		High School	26-30
65	51-55	M.A. or M.S.	Suburban, moderate to high income	High School	16-20
66	51-55	M.A./M.S. + 30 hours	Urban, high poverty		16-20
67	21-25	M.A. or M.S.	Suburban, moderate to high income	High School	1-5
68	56 or older	M.A./M.S. + 30 hours	Suburban, moderate to high income	High School	6-10
69	26-30	M.A. or M.S.	Suburban, high to very high income	Middle School	1-5
70	51-55	M.A./M.S. + 30 hours	Rural, high poverty	High School	16-20
71	36-40	M.A./M.S. + 15 hours	Rural, high poverty	High School	1-5
72	31-35	M.A. or M.S.	Rural, high poverty	High School	6-10
73	36-40	M.A./M.S. + 30 hours	Rural, high poverty	High School	11-15

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
74	51-55	Ed.D. or Ph.D.	Suburban, high to very high income	Middle School	6-10
75	31-35	B.A./B.S. + 30 hours	Rural, high poverty	High School	11-15
76	51-55	Other			
77	46-50	B.A. or B.S.	Rural, high poverty	High School	1-5
78	56 or older	Ed.D. or Ph.D.	Rural, high poverty	High School	1-5
79	36-40	M.A. or M.S.	Rural, high poverty	High School	6-10
80	31-35	B.A./B.S. + 30 hours	Rural, high poverty	High School	1-5
81	46-50	M.A./M.S. + 30 hours	Urban, very high poverty	High School	1-5
82	46-50	M.A./M.S. + 30 hours	Rural, high poverty	High School	1-5
83	26-30	M.A./M.S. + 15 hours	Rural, high poverty	High School	1-5
84	41-45	B.A. or B.S.	Rural, low poverty		1-5
85	36-40	M.A./M.S. + 15 hours	Rural, low poverty	Middle School	1-5
86	21-25	B.A. or B.S.	Rural, high poverty	High School	1-5
87	36-40	Other	Rural, high poverty	High School	6-10
88	31-35	B.A. or B.S.	Rural, high poverty	Middle School	1-5
89	31-35	M.A./M.S. + 30 hours	Rural, high poverty	High School	6-10

Participant	Age	Highest Level of Education	School Setting	School Level	How many years have you been in your current position/school
90	56 or older	M.A./M.S. + 30 hours	Rural, high poverty	Middle School	1-5
91	36-40	B.A./B.S. + 30 hours	Rural, low poverty	High School	11-15
92	41-45	M.A. or M.S.	Rural, high poverty	Middle School	1-5
93	26-30	B.A. or B.S.	Rural, high poverty	High School	1-5
94	41-45	B.A./B.S. + 30 hours	Rural, high poverty	Middle School	6-10
95	26-30	M.A./M.S. + 15 hours	Rural, high poverty	High School	1-5
96	51-55	B.A. or B.S.	Suburban, moderate to high income	Middle School	1-5
97	46-50	M.A./M.S. + 30 hours	Rural, high poverty	Middle School	11-15
98	41-45	B.A./B.S. + 30 hours	Suburban, moderate to high income	Middle School	11-15
99	26-30	B.A. or B.S.	Rural, high poverty	Middle School	6-10
100	41-45	M.A. or M.S.	Rural, low poverty	Middle School	1-5
101	31-35	M.A. or M.S.	Rural, high poverty	Middle School	1-5

Appendix M Chi Square Crosstabs

Chi Square Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
jobsat * gender	101	100.0%	0	0.0%	101	100.0%
jobsat * yrsatsch	101	100.0%	0	0.0%	101	100.0%
jobsat * ethn	101	100.0%	0	0.0%	101	100.0%
jobsat * edu	101	100.0%	0	0.0%	101	100.0%
jobsat * typesch	101	100.0%	0	0.0%	101	100.0%
jobsat * scllvl	97	96.0%	4	4.0%	101	100.0%
jobsat * age	101	100.0%	0	0.0%	101	100.0%

jobsat * gender

Crosstab

		gender		Total	
		male	female		
jobsat	very	Count	5	11	16
		Expected	5.9	10.1	16.0
	satisfied	Count			
		Count			
	satisfied	Count	23	35	58
		Expected	21.2	36.8	58.0
		Count			
		Count			
	neutral	Count	7	10	17
		Expected	6.2	10.8	17.0
		Count			
		Count			
	dissatisfied	Count	2	8	10
		Expected	3.7	6.3	10.0
		Count			
		Count			
Total		Count	37	64	101
		Expected	37.0	64.0	101.0
		Count			
		Count			

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	1.771 ^a	3	.621
Likelihood Ratio	1.887	3	.596
Linear-by-Linear Association	.178	1	.673
N of Valid Cases	101		

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.66.

Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.132	.621
Nominal	Cramer's V	.132	.621
N of Valid Cases		101	

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	24.626 ^a	18	.136
Likelihood Ratio	23.408	18	.175
Linear-by-Linear Association	2.669	1	.102
N of Valid Cases	101		

a. 22 cells (78.6%) have expected count less than 5. The minimum expected count is .10.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.494	.136
	Cramer's V	.285	.136
N of Valid Cases		101	

jobsat * ethn

Crosstab

			ethn							
			American Indian or Alaska Native	NatHi or API	Asian	white	black	two or more	none	Total
jobs at	very	Count	0	1	2	8	0	2	3	16
	satisfied	Expected	.3	2.1	4.8	5.1	.2	2.7	1.0	16.0
		Count								
	satisfied	Count	1	11	19	15	0	11	1	58
		Expected	1.1	7.5	17.2	18.4	.6	9.8	3.4	58.0
	neutral	Count	0	0	8	7	0	2	0	17
		Expected	.3	2.2	5.0	5.4	.2	2.9	1.0	17.0
	dissatisfie d	Count	1	1	1	2	1	2	2	10
		Expected	.2	1.3	3.0	3.2	.1	1.7	.6	10.0
	Total	Count	2	13	30	32	1	17	6	101
		Expected	2.0	13.0	30.0	32.0	1.0	17.0	6.0	101.0
			Count							

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	36.674 ^a	18	.006
Likelihood Ratio	32.618	18	.019
Linear-by-Linear Association	.031	1	.861
N of Valid Cases	101		

a. 21 cells (75.0%) have expected count less than 5. The minimum expected count is .10.

Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.603	.006
Nominal	Cramer's V	.348	.006
N of Valid Cases		101	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.990 ^a	21	.823
Likelihood Ratio	18.961	21	.588
Linear-by-Linear Association	.865	1	.352
N of Valid Cases	101		

a. 27 cells (84.4%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.385	.823
Nominal	Cramer's V	.222	.823
N of Valid Cases		101	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	41.471 ^a	18	.001
Likelihood Ratio	47.644	18	.000
Linear-by-Linear Association	8.400	1	.004
N of Valid Cases	101		

a. 21 cells (75.0%) have expected count less than 5. The minimum expected count is .30.

Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.641	.001
Nominal	Cramer's V	.370	.001
N of Valid Cases		101	

jobsat * scllvl

Crosstab

		scllvl			Total	
		ms	hs	oth		
jobsat	very	Count	10	6	0	16
		Expected	6.1	9.6	.3	16.0
	satisfied	Count				
		Expected				
	satisfied	Count	14	38	2	54
		Expected	20.6	32.3	1.1	54.0
	neutral	Count	4	13	0	17
		Expected	6.5	10.2	.4	17.0
	dissatisfied	Count	9	1	0	10
		Expected	3.8	6.0	.2	10.0
Total		Count	37	58	2	97
		Expected	37.0	58.0	2.0	97.0
		Count				

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.473 ^a	6	.002
Likelihood Ratio	22.593	6	.001
Linear-by-Linear Association	.979	1	.322
N of Valid Cases	97		

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is .21.

Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.471	.002
Nominal	Cramer's V	.333	.002
N of Valid Cases		97	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	25.663 ^a	24	.370
Likelihood Ratio	26.532	24	.327
Linear-by-Linear Association	3.019	1	.082
N of Valid Cases	101		

a. 30 cells (83.3%) have expected count less than 5. The minimum expected count is .10.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.504	.370
	Cramer's V	.291	.370
N of Valid Cases		101	

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Total Editing Time: 0 Minutes
Last Printed On: 8/4/20 6:58:00 AM
As of Last Complete Printing
Number of Pages: 266
Number of Words: 54,626 (approx.)
Number of Characters: 311,373 (approx.)