

AN EXAMINATION OF THE INTERSECTION OF OUTDOOR ADVENTURE
EDUCATION AND TEACHER EDUCATION

by

Lincoln Ingraham Davie

A dissertation submitted in partial fulfillment
of the requirement for the degree

of

Doctor of Philosophy

in

Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

May 2016

©Copyright

by

Lincoln Ingraham Davie

2016

All Rights Reserved

ACKNOWLEDGEMENTS

I would like to thank all who have aided in the process of completing this degree. I would like to thank, first and foremost, my family and friends for supporting me in this endeavor, through the highs and the lows. Completing this degree would not have been possible without the support of a variety of mentors. Dr. Laurence Soroka, I am forever grateful for all your insight, guidance, and willingness to allow me to participate in your Expeditionary Studies Program. Your mentorship has been invaluable to me as a teacher, adventurer, and researcher. I would like to thank Dr. Sweeney Windchief for your wisdom and guidance in both the classroom and during my “hall walking” endeavors. I would like to sincerely thank Dr. Tena Versland and Dr. Nick Lux for your guidance and support in navigating the comprehensive exam and dissertation process. I would like to express my sincere and deep appreciation for the amazing Dr. Art Bangert. I feel privileged to have spent the past four years working closely with you. Finally, I would like to express my deepest appreciation for my chair and mentor Dr. Jayne Downey. I will forever appreciate all you have done for me in supporting, guiding, and inspiring me throughout this process.

TABLE OF CONTENTS

| | |
|---|----|
| 1. INTRODUCTION | 1 |
| Background of the Study | 1 |
| The Nature and Role of Individuals' Beliefs | 1 |
| The Role of Beliefs in Teaching | 1 |
| The Role of Beliefs in Preservice Teacher Preparation..... | 2 |
| The Role of Outdoor Adventure Education (OAE) | 3 |
| Personal Improvement | 4 |
| Academic Improvement..... | 4 |
| Teaching Improvement | 5 |
| Theoretical Framework..... | 5 |
| Conceptual Framework..... | 8 |
| The Need for the Study | 11 |
| Problem | 11 |
| Purpose..... | 12 |
| Research Questions | 13 |
| Overview of the Study | 15 |
| Methodology..... | 15 |
| Significance of the Study | 15 |
| Limitations and Delimitations..... | 17 |
| Terms Used | 18 |
| 2. LITERATURE REVIEW | 19 |
| Introduction..... | 19 |
| Environmental Characteristics | 19 |
| Intersection of OAE and Teacher Education | 20 |
| Historical Perspectives..... | 21 |
| Experiential Education..... | 25 |
| Current Outdoor Context | 26 |
| Behavioral Characteristics | 27 |
| Belief Structures..... | 27 |
| Self-Efficacy | 28 |
| Teacher Self-Efficacy | 29 |
| Roots in Social Cognitive Theory..... | 30 |
| Importance of Self-regulation | 30 |
| How Self-efficacy Affects the Four Psychological Processes Cognition | 31 |
| Motivation..... | 31 |
| Affect | 32 |

TABLE OF CONTENTS-CONTINUED

| | |
|---|--------|
| Selection..... | 32 |
| The Promotion of Efficacy..... | 32 |
| Mastery Experiences | 33 |
| Vicarious Experiences | 34 |
| Social Persuasion | 34 |
| Physiological and Emotional Status..... | 35 |
| The Intersection of OAE and Self-Efficacy..... | 36 |
| Personal Characteristics | 37 |
| Personality Traits | 37 |
| Grit | 39 |
| Grit and Teacher Education | 41 |
| Grit and Outdoor Adventure Education..... | 42 |
| The Intersection of Teacher Education and OAE | 43 |
| Preparing Pre-Service Teachers | 44 |
| Role of Professional Reflection | 46 |
| Pedagogical Content Knowledge..... | 49 |
| Adventure Coaching | 52 |
| Chapter Summary | 53 |
| 3. METHODOLOGY | 55 |
| Introduction..... | 55 |
| Purpose..... | 56 |
| Sample Size..... | 62 |
| Sampling Procedure | 63 |
| Variables | 64 |
| Instruments..... | 65 |
| Data Collection | 69 |
| Data Analysis | 71 |
| Methodology Summary | 72 |
| 4. RESULTS | 73 |
| Introduction..... | 73 |
| Preliminary Analysis..... | 75 |
| Exploratory Factor Analysis | 81 |
| Structural Equation Model..... | 87 |
| Measurement Model Analysis | 89 |
| Structural Model Analysis | 92 |
| Summary..... | 96 |

TABLE OF CONTENTS-CONTINUED

| | |
|---|-----|
| 5. DISCUSSION | 98 |
| Introduction..... | 98 |
| Design of the Study..... | 98 |
| Summary and Interpretation of the Findings | 100 |
| Overview..... | 100 |
| Relationship Between OAE and Perceptions of Preparedness to Teach..... | 100 |
| Relationship Between OAE and Teacher Efficacy..... | 103 |
| Relationship between OAE and Grit..... | 104 |
| Relationship Between Teacher Efficacy and Grit..... | 105 |
| Implications for Theory | 106 |
| Contributions to Social Cognitive Theory | 106 |
| Contributions to Teacher Efficacy Theory | 108 |
| Contributions to Theory of Grit | 110 |
| Contribution to Understanding of Outdoor Adventure Engagement | 114 |
| Implications for Practice | 116 |
| Physical Education and Fitness..... | 118 |
| Preparing and Retaining Teachers | 121 |
| Recommendations for Further Research..... | 123 |
| Conclusion | 125 |
| REFERENCES CITED..... | 128 |
| APPENDICES | 147 |
| APPENDIX A: Demographic Questions | 148 |
| APPENDIX B: Teacher Self Efficacy Scale (TSES-12)..... | 151 |
| APPENDIX C: The Short Grit Scale (GRIT-S) | 153 |

LIST OF TABLES

| Table | Page |
|---|------|
| 1. Paths Analyzed..... | 62 |
| 2. InTASC Standards (CCSSO, 2011)..... | 67 |
| 3. Preparedness to Teach InTASC Standards Psychometrics..... | 68 |
| 4. Adventure distributions..... | 76 |
| 5. Means, Standard Deviations, Skewness, and Kurtosis of OAE..... | 77 |
| 6. Tests of Normality for OAE. | 77 |
| 7. Means, Standard Deviations, Skewness, and Kurtosis of TE, Grit, & Prep. | 78 |
| 8. Tests of Normality for TE, Grit, and Prep. | 79 |
| 9. Descriptive Statistics for Demographic Data..... | 80 |
| 10. Original Factor Loadings Based on InTASC Standards. | 82 |
| 11. Factor Loadings of Preparedness to Teach. | 84 |
| 12. Factor Loadings of Teacher Efficacy..... | 85 |
| 13. Factor Loadings for Grit. | 86 |
| 14. Description of Labels..... | 88 |
| 15. Outer Loadings..... | 89 |
| 16. Reliability and Validity..... | 90 |
| 17. Cross Loadings..... | 91 |
| 18. Fornell-Larker Criterion..... | 92 |
| 19. Bootstrap Statistical Output. Note. * $p < 0.05$ | 94 |
| 20. Correlations, R^2 , and Adjusted R^2 Results..... | 95 |

LIST OF TABLES-CONTINUED

| Table | Page |
|----------------------|------|
| 21. Effect Size..... | 95 |

LIST OF FIGURES

| Figure | Page |
|--|------|
| 1. Reciprocal Causation: Relationship to Teacher Preparedness..... | 6 |
| 2. Reciprocal Causation: Possible Predictors of Teacher Preparedness. | 9 |
| 3. Reciprocal Causation Structural Equation Model..... | 13 |
| 4. Path Analysis. | 93 |

ABSTRACT

Scant research exists investigating the intersection of outdoor adventure education and teacher education. The purpose of the current study is to explore the relationship of outdoor adventure engagement and pre-service teachers' perceptions of preparedness to teach. A sample of 209 undergraduate students enrolled in education classes completed a survey consisting of: demographic questions pertaining to outdoor adventure engagement, The 12-item *Teacher Sense of Efficacy Scale* (TSES) (Tschannen-Moran & Hoy, 2001), The *Short Grit Scale* (Grit-S) (Duckworth & Quinn, 2009), and survey questions regarding preparedness to teach derived from the InTASC standards (CCSSO, 2013). A partial least squares structural equation model (PLS-SEM) was used to investigate this relationship and was mediated by teacher efficacy beliefs and the personality trait of grit. The results of the current study demonstrate the unique nature of outdoor adventure engagement in relation to pre-service teachers. The current study did not find significant relationships between outdoor adventure engagement and perceptions of preparedness to teach. This may be the result of a homogenous population that reported a higher than expected level of experience with outdoor adventure activities. Results from the path analysis did find significant direct effects of teacher efficacy and grit on preparedness to teach. However, the direct effect of grit on preparedness was significantly mediated by teacher efficacy. The research supports the need for more investigation of outdoor adventure education and teacher education. Additionally, the study supports the need for more investigation of healthy manifestations of grit, which may be informed through outdoor adventure education.

CHAPTER 1

INTRODUCTION

Background of the StudyThe Nature and Role of Individuals' Beliefs

The study of the nature and role of individuals' beliefs has a long and well-established history (Ajzen, 1985; Deci & Ryan, 1985; Seligman, 1991; Weiner, 1974). This body of literature has defined individual beliefs as “mental constructions of experience – often condensed and integrated into schemata or concepts” (Sigel, 1985, p. 351). Findings suggest that individuals' beliefs play a key role in how life tasks and experiences are interpreted, as well what and how people learn from those tasks and experiences (Nespor, 1987). Thus, individuals' beliefs serve a vital role in the interpretation of experiences as they aid the individual in the action of integrating and condensing experiences. Consequently, an increasing body of research has investigated the relationship between beliefs and actions. As emphasized by Bandura (1989) “expectations, beliefs, self-perceptions, goals, and intentions give shape and direction to behavior. What people think, believe, and feel, affects how they behave” (p. 3).

The Role of Beliefs in Teaching

Grounded in the knowledge of the connection between individuals' beliefs and actions in everyday life, educational researchers have carefully explored the relationship between K-12 teachers' beliefs and actions in classroom settings. Studies have found that teachers' beliefs are closely related to their goal-setting, aspirations, and instructional

decision-making in the classroom (Kuzborska, 2011). Research has also explored how teachers' beliefs and their consequent actions impact student learning. As highlighted by Sanders and Horn (1998), "the teacher effects on student achievement have found to be both additive and cumulative with little evidence that subsequent effective teachers can offset the effects of ineffective one" (p. 254). In light of the substantial impact of teacher beliefs on student learning, this area of investigation continues to be an important construct in educational research.

The Role of Beliefs in Preservice Teacher Preparation

An important area of consideration within teacher preparation programs is the role of preservice teachers' (PT) beliefs about teaching and learning. Research suggests that PTs enter their teacher education program with explicit and tacit beliefs of what constitutes good teaching (Pajares, 1992; Pintrich & De Groot, 1990). These beliefs have been formed as a result of observing teaching for 12 years in K-12 classrooms (Lortie, 1975). However, the "apprenticeship of observation" (Lortie, 1975, p. 61) can result in serious misconceptions about the work of teaching and learning. For example, one study revealed an alarming underestimation of the amount of effort required for effective instruction. Lortie (2002) reported that 90% of in-service teachers found teaching to be more difficult than they expected. Consequently, scholars such as Larabee (2002) have deemed this misconception about teaching and learning as "endemic among teacher candidates" (p. 231).

Research has established that PTs' existing beliefs about teaching and learning (in domains such as student motivation, pedagogy, or content), can influence what PTs learn

in their preparation programs (Kagan, 1992; Tiezzi & Cross, 1997). Research has also found that PTs' explicit and tacit beliefs can support and/or impair their knowledge acquisition, interpretation, and subsequent teaching practice (Strutchens, 2000; Wentworth & Pinnegar, 1996). Given the serious consequences that a teacher's beliefs can have for students' academic success (Strutchens, 2000), researchers have investigated various approaches to helping PTs' develop constructive beliefs about the teaching and learning process (Nilson, 1998).

Previous research has found that engaging PTs in authentic learning experiences can provide the space for PTs to recognize and critically examine their underlying beliefs (Nilson, 1998). As highlighted by Standerfer (2003), authentic learning experiences can be created through actively engaging the aspiring teacher on a personal level in a relevant activity that offers: a significant degree of social interaction, a level of real or perceived risk, and multiple avenues for reflection through oral or written discourse.

These types of authentic learning experiences can provide the needed space to reveal and address misconceptions in relation to the teaching and learning process. Moreover, authentic learning supports a personalized, experiential approach for PTs to evaluate and improve the accuracy of both their explicit and tacit beliefs.

The Role of Outdoor Adventure Education (OAE)

Outdoor adventure education (OAE) is emerging as a field of research that may provide a valuable approach to engaging PTs in authentic learning situations (Carlson &

McKenna, 2000; Kanters, Brisol, & Attarian, 2002; Timken & McNamee, 2012;

Fagerstam, 2014). OAE is defined as,

a variety of teaching and learning activities and experiences usually involving a close interaction with an outdoor natural setting and containing elements of real or perceived danger or risk in which the outcome, although uncertain, can be influenced by the actions of the participants and circumstances (Ewert & Sibthorp, 2014, p. 5).

Typically, the goal of this type of experience is the development of intrapersonal and interpersonal skills in recreational, educational, developmental, and therapeutic contexts (Priest & Gass, 2005).

Personal Improvement

Previous research suggests that outdoor utilization, the use of the natural environment, and adventure programs can serve to promote self-regulation (Sibthorp et al., 2015), personal wellness, stress reduction (Marselle, Irvine, & Warber, 2014), increased resilience (Ewert & Yoshino, 2011; Beightol, Jeverson, Carter, Gray, & Gass, 2012), and reduced racial prejudice (Wright & Tolan, 2009). Research also suggests that OAE programs can support significant increases in self-efficacy with increases persisting a year after the OAE program ends (Probst & Koesler, 1998).

Academic Improvement

Previous research found the use of the outdoors as a teaching/learning space resulted in improved performance on standardized tests, fewer classroom disruptions, increased student engagement and excitement for learning (Lieberman & Hoody, 1998), and increased academic achievement motivation (Athman & Monroe, 2004). These findings are also supported by neurological research, which found that neurologically, the

multisensory experience of the outdoors supported the development of robust long-term episodic memories (Jordet, 2010).

Teaching Improvement

Research on pre-service teacher engagement in adventure has found an increased appreciation of supportive environments for students (Carlson & McKenna, 2000) and a reduction of stress (Kanters, Bristol, & Attarian, 2002). Timken and McNamee (2012) found that outdoor adventure experiences increase positive beliefs pertaining to pre-service physical education teachers and their future relating to students.

Research has also examined teachers' perceptions of the value of including the outdoors in their K-12 teaching and found increased student motivation, communication, and participation (Fagerstam, 2014). Udall and Rugen (1997) argue that,

when teachers have lived an educational experience and reflected on their own growth as learners, they are better able to grasp the educational value of the experience and to reap its rewards in their own classrooms (p. 404).

However, scant research has investigated the role of outdoor adventure education and its impact on teacher beliefs of what constitutes effective instruction.

Theoretical Framework

The preparation of PTs is a complex process and a variety of factors contribute to their readiness to enter their first teaching position. Every PT preparation program must facilitate PTs' development of the knowledge, skills, and beliefs necessary to enter the profession as a highly effective educator. One approach to understanding the complexity of this work is through the lens of social cognitive theory. As Bandura (1989) stated,

Human behavior has often been explained in terms of one-sided determinism. In such modes of unidirectional causation, behavior is depicted as being shaped and controlled either by environmental influences or by internal dispositions. Social cognitive theory favors a model of causation involving triadic reciprocal determinism. In this model reciprocal causation, behavior, cognition and other personal factors, and environmental influences all operate as interacting determinants that influence each other bidirectionally (p. 2).

This framework demonstrates how teachers' beliefs can be shaped by both their personal actions and their environmental experience. Thus, the process of preparing pre-service teachers to enter their first teaching position requires teacher educators to pay attention to the triadic reciprocal determinism, i.e., the bidirectional interaction of the environmental, behavioral, and personal components (Figure 1).

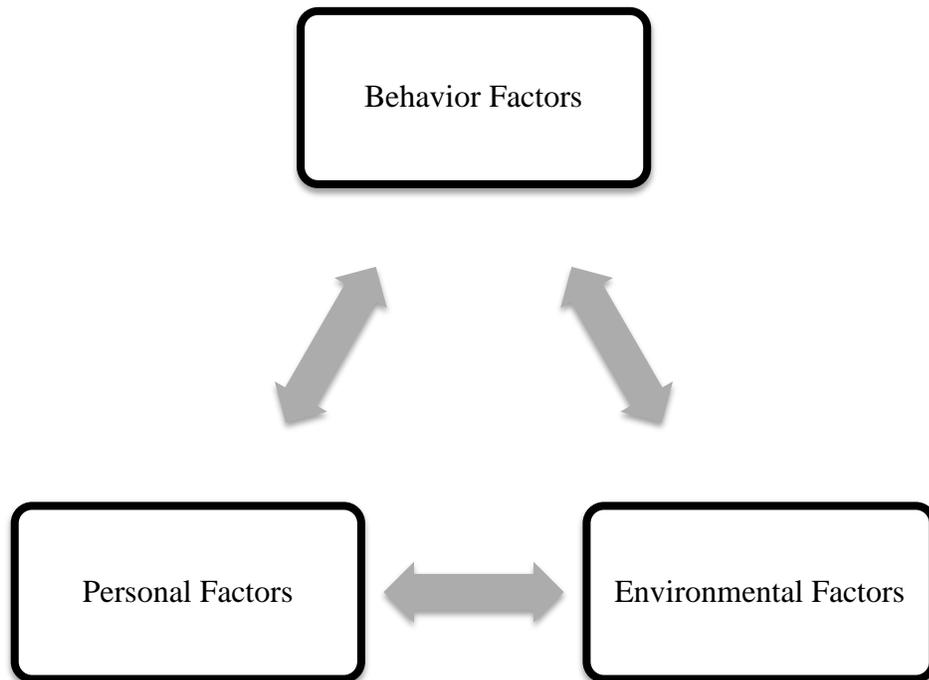


Figure 1. Reciprocal Causation: Relationship to Teacher Preparedness.

In this light, OAE offers a unique opportunity to investigate the role of experience to inform the beliefs and actions needed to be fully prepared to teach. While the current study is grounded theoretically by this triadic structure, the emphasis of the study is to investigate the intersection of OAE and teacher education from a holistic perspective and examine the relationship of OAE to personal and behavioral factors. This investigation is aligned with Bandura's (1989) theory reciprocal causation. As stated by Bandura (1989), "Reciprocal causation does not mean that the different sources of influence are equal of strength. Some may be stronger than others" (p. 2). As a result, the current study focuses specifically on the relationship of the environmental factor to the other factors in the triadic structure. However, in order to fully investigate this environmental factor, both the behavioral and personal factors need to be included in the study. Consequently, aspects of each leg of the reciprocal causation model will be examined.

The first relationship in the model is the connection between environmental and personal factors. This relationship is depicted as:

Human expectations, beliefs, emotional bents and cognitive competencies are developed and modified by social influences that convey information and activate emotional reactions through modeling, instruction and social persuasion (Bandura, 1989, p. 3).

Thus, an individual's environment can be influenced by a variety of personal factors such as age, race, size, sex, physical attractiveness, or social status (Bandura, 1989) and these factors can act in a reciprocal manner to influence the individual's beliefs. For example, the social experiences within OAE may serve to support and strengthen the personal belief structures of the PT.

The second relationship in the model is the connection between environmental and behavioral factors. This relationship is described as,

In the transactions of everyday life, behavior alters environmental conditions and is, in turn, altered by the very conditions it creates. The environment is not a fixed entity that inevitably impinges upon individuals. When mobility is constrained, some aspects of the physical and social environment may encroach on individuals whether they like it or not. But most aspects of the environment do not operate as an influence until they are activated by appropriate behavior (Bandura, 1989, p. 4).

Action is required to influence environmental factors. Bandura (1989) stresses that people are the products and the producers of their environment, and that this process operates bidirectionally. In this study, the context of OAE may serve to support and strengthen the personal actions and behaviors of the PT.

The third relationship in the model is the connection between the personal and behavioral factors. This relationship is defined as, “the interaction between thought, affect and action. Expectations, beliefs, self-perceptions, goals, and intentions give shape and direction to behavior. What people think, believe, and feel, affects how they behave” (p. 3). However, as Bandura (1989) highlights, these two factors function bidirectionally in the causation model. Thus, in this study, a teacher with an adventurous personality may be more willing to push their pedagogical approaches by trying new methods. Additionally, the rewards associated with this action may reinforce the personality of the adventurous individual and teacher.

Conceptual Framework

The overarching goal of teacher education programs is to produce well-prepared teachers. The current study seeks to examine the relationship between three factors that

may be related to PTs' preparedness to teach: teacher efficacy (Behavioral), grit (Personal), and outdoor adventure engagement (Environmental) (Figure 2).

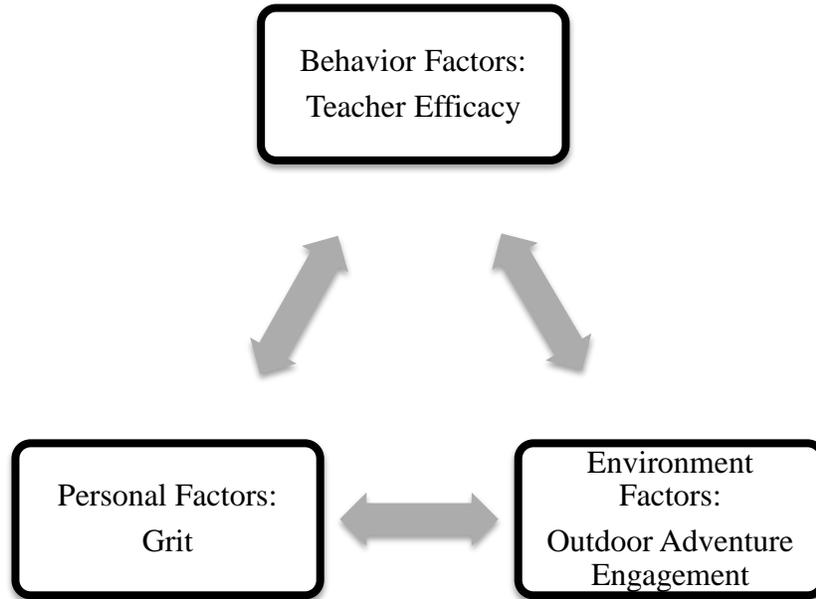


Figure 2. Reciprocal Causation: Possible Predictors of Teacher Preparedness.

In this study, teacher efficacy is defined as a teacher's belief in his or her ability to bring about desired outcomes in student learning (Tschannen-Moran & Hoy, 2001). Grit as defined by Duckworth, Peterson, Matthews, and Kelly (2007), is "perseverance and passion for long-term goals" (p. 1087). Both of these constructs are considered as positive attributes of teachers. OAE is defined as an active learning process utilizing adventurous activities and, usually, natural environments. Typically, the focus of this type of education is the development of intrapersonal and interpersonal skills and has some semblance of risk, whether real or perceived (Priest & Gass, 2005). The role of beliefs, such as efficacy, and personality traits, such as grit, are linked within this

framework. The inclusion of OAE, as an environmental factor, completes the reciprocal causation model in investigating the preparation of pre-service teachers.

Each individual PT brings forth a lifetime of experience in both the adventure and education realms. This experience is fostered through social processes such as mentorships from other adventurers and educators. The social nature of the adventure process lends itself well to the promotion of efficacy to teach. Self-efficacy, a social cognition, is unique for each individual. Motivation for engagement in outdoor adventure is equally unique for each individual. Adventure education offers an individualized context for the promotion and development of efficacy. As posited by Sibthorp (2003) “adventure experiences [are] ideal for self-efficacy development” (p. 88).

Social cognitive theory is a unique lens to view grit. While grit has been traditionally studied as a personality theory, it can also contribute to our understanding of the social elements of the learning process. This is particularly the case with the self-regulation that is required for persistence and stamina needed to meet long-term goals. Self-efficacy involves the four psychological processes of cognition, motivation, affect, and selection. These processes aid the PT in his or her efforts to meet teaching goals. Furthermore, effective teaching requires thought, motivation, emotional control, and selection of healthy goals. Grit similarly requires the regulation of these processes. Previous research has examined the relationship between grit and self-control (Duckworth & Gross, 2014). These two domains differ; however, there are components that highlight the relevance of a personality trait, like grit, within social cognitive theory. As postulated by Duckworth and Gross (2014),

grit entails having a dominant superordinate goal (e.g., producing useful new insights into the psychological determinants of success) and tenaciously working toward it in the face of obstacles and setbacks, often for years or decades (p. 321).

Further, as emphasized by Duckworth and Gross (2014),

Very generally, we assume that commitment to a superordinate goal is a function of that goal's feasibility and desirability, and thus that the diverse psychological antecedents to such valuations (e.g., growth mindset, optimism, attributional style, locus of control, counterfactual style, core self-evaluation, intrinsic motivation, interest, approaches to happiness) are logical targets for intervention and inquiry (p. 323).

Social cognitive theory, and examining the relationship to self-efficacy offers a new lens of investigation of grit. Likewise, the current research aids social cognitive theory by examining the relationship of outdoor adventure engagement and preparedness to teach within a reciprocal causation model. The study uses the theoretical underpinnings of reciprocal causation, but as Bandura (1989) emphasizes, not all legs of the model are equal. Consequently, this exploratory study is particularly interested in the role of OAE (environmental factor) within the triadic structure.

The Need for the Study

Problem

Previous research has showcased that teacher efficacy is the most important in-school influence on student outcomes (Rivkin, Hanushek, & Kain, 2005; Robertson-Kraft & Duckworth, 2014; Rockoff, 2004; Sanders & Rivers, 1996). Highly efficacious teachers are seen to be more effective with teaching to diverse students (Burton & Pace, 2009; Peebles & Mendaglio, 2014), employ higher quality classroom management strategies (Woolfork, Rosoff, & Hoy, 1990), enjoy higher job satisfaction (Caprara,

Barbaranelli, Borgogni, & Steca, 2003), commitment (Coladarci, 1992), and report a lower perception of job-related stress (Skaalvik & Skaalvik, 2007). Furthermore, highly efficacious teachers improve student outcomes such as motivation and achievement (Gibson & Dembo, 1984; Ashton & Webb, 1986; Goddard, Hoy, & Hoy, 2000; Tschannen-Moran & Hoy, 2007). Previous research has also examined strategies to strengthen efficacy with PTs (Pendergast, Garvis, & Keogh, 2011; Zach, Harari, & Harari, 2012). Likewise, teaching efficacy has been investigated in the outdoor education realm (Schumann & Sibthorp, 2014) with efforts to strengthen its belief with these educators as well (Schumann, 2013). The problem is that scant research has investigated the relationship between teaching efficacy in the context of OAE and various forms of efficacy in the context of the K-12 classroom.

Previous research demonstrated grit promotes retention in a career (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014), teaching effectiveness (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014), and promotes individuals to work harder to reach goals (Robertson-Kraft & Duckworth, 2014). Anecdotal evidence exists of the possible relationship of grit and outdoor adventure (Antin & Gregory, 2015; Micucci, 2015). However, to date, no empirical studies analyze this relationship. Additionally, as grit is still a newer construct, more research into possible relationships with other predictive variables, such as teacher efficacy, is needed (Duckworth & Gross, 2014).

Purpose

The purpose of the current study is to explore the relationship of OAE and PTs' perceptions of preparedness to teach mediated by teacher efficacy beliefs and the

personality trait of grit. The current study uses the theoretical framework of reciprocal causation model, but is specifically interested in the effects of the environmental factor of OAE within the triadic structure (Figure 3).

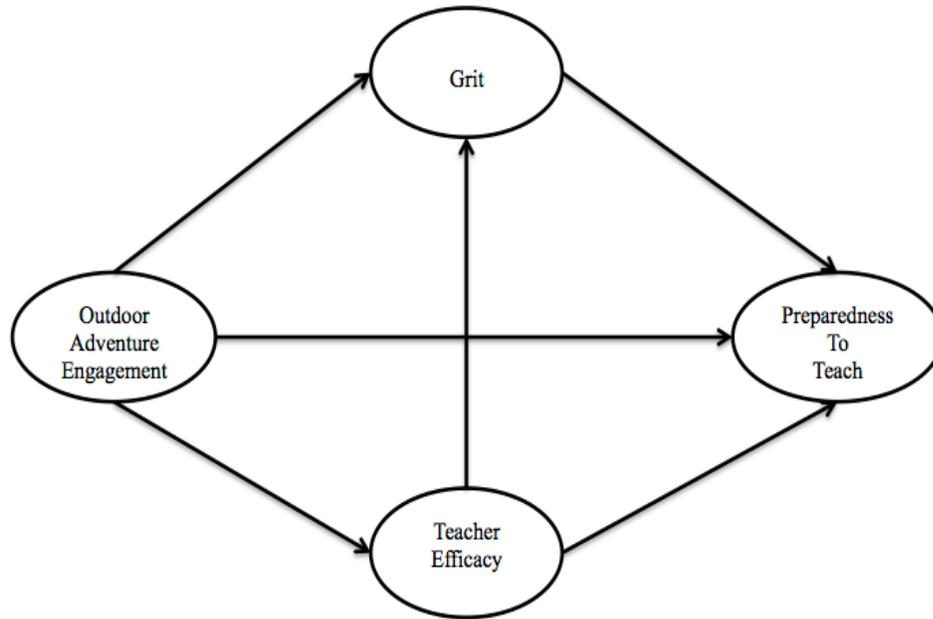


Figure 3. Reciprocal Causation Structural Equation Model.

The study seeks to add to the literature in informing the intersectionality of teacher education programs and OAE. Notably, the study examines the role of belief structures in relation to long-term, hierarchical goal as emphasized by grit.

Research Questions

This study of undergraduate teacher education majors at Montana State University was guided by the following research questions and hypotheses:

1. Is there a relationship between outdoor adventure engagement and student perception of preparedness to teach?

H₀: There is a relationship between outdoor adventure engagement and student perception of preparedness to teach.

H₁: There is not a relationship between outdoor adventure engagement and student perception of preparedness to teach.

2. Is there a relationship between outdoor adventure engagement and teacher efficacy?

H₀: There is a relationship between outdoor adventure engagement and teacher efficacy.

H₁: There is not a relationship between outdoor adventure engagement and teacher efficacy.

3. Is there a relationship between outdoor adventure engagement and grit?

H₀: There is a relationship between outdoor adventure engagement and grit.

H₁: There is not a relationship between outdoor adventure engagement and grit.

4. Is there a relationship between teacher efficacy and grit?

H₀: There is a relationship between teacher efficacy and grit.

H₁: There is not a relationship between teacher efficacy and grit.

5. Does teacher efficacy mediate the effect of grit on student perceptions of preparedness to teach?

H₀: Teacher efficacy mediates the effects of grit on student perceptions of preparedness to teach.

H₁: Teacher efficacy does not mediate the effects of grit on student perceptions of preparedness to teach.

Overview of the Study

Methodology

Structural equation modeling (SEM) was used to investigate the relationship of the reciprocal causation model and its impact on student preparedness to teach. More specifically, the study investigated the relationship of OAE and preparedness to teach, mediated through teacher efficacy and grit.

The sample for the current study consisted of 209 undergraduate students enrolled in education classes at Montana State University. Data for this study were collected using four instruments. Two of the instruments are well-established educational instruments. The 12-item *Teacher Sense of Efficacy Scale* (TSES) (Tschannen-Moran & Hoy, 2001) was selected due to its focus on instruction. The *Short Grit Scale* (Grit-S) (Duckworth & Quinn, 2009) was selected for the study, as the eight-item version is psychometrically stronger than the original 12-item original grit scale. The third instrument consisted of survey questions regarding preparedness to teach derived from the InTASC standards (CCSSO, 2013). The final instrument was created by the researcher to assess levels of outdoor adventure engagement.

Significance of the Study

The nature of this study is unique in its focus on the intersection of outdoor adventure education and the preparation of PTs. Additionally, the study is unique in its

use of reciprocal causation to guide the investigation. As emphasized by Bandura (1989), the way people think, believe, and feel affects their actions. Likewise, their interaction with the environment and with experiences impact action and beliefs. The current study is unique in analyzing the environmental factor through outdoor adventure engagement. The use of quantitative methodology is also significant, as more rigorous quantitative research has been called for in the realm of OAE literature (Scrutton & Beames, 2015).

To date there no studies investigate the relationship of OAE and grit. There is anecdotal evidence of this link (Micucci, 2015), but empirical study is needed. Personality traits, as seen with grit, offer an intriguing investigation. As postulated by Duckworth and Quinn (2009),

The implicit assumption is that the tendency to pursue long-term goals with passion and perseverance is relatively domain general, but of course, it is possible that an individual shows tremendous grit in her or his professional life but none at all in her or his personal relationships. Similarly, it may be that an individual see oneself as gritty with respect to a serious hobby but not with respect to one's career (p. 173).

This study offers an opportunity to address the possible domain general link of hobby, such as outdoor adventure engagement, and preparedness for ones' future career.

Previous research has investigated the role of efficacy with outdoor adventure literature (Lamorey, 2013; Odello, Hill, & Gomez, 2008; Paxton, 1998; Paxton & McAvoy, 2000; Probst & Koesler, 1998; Sibthorp, 2003;). Additionally, previous research has investigated teaching outdoor education self-efficacy (Schumann & Sibthorp, 2014). However, the current study is significant in its investigation of OAE and teacher efficacy.

The results of this study will add to the body of knowledge regarding OAE, teacher education, and the intersectionality of these two realms. Additionally, this study will add to the body of knowledge regarding practices for preparing high-quality teacher candidates.

Limitations and Delimitations

One limitation of this study may be seen in any inconvenience for the participants to complete the survey. Care was taken to ensure that an appropriate number of questions will be asked, and incentives will be obtained to better promote participation and completion of the survey. The current study is interested in outdoor adventure engagement. Bozeman, the location of Montana State University, and the surrounding area is known for being an outdoor adventure destination. However, not all students will be interested in the outdoors or adventure, and consequently may be less willing to participate in a study pertaining to outdoor adventure engagement. Additionally, the study relies on self-reported perceptions of the participants.

A delimitation of the study includes the selection of the participants being only from Montana State University. Likewise, the study is interested in outdoor adventure engagement. The study recognizes that there are many different uses of outdoor space, but adventure is the context of investigation.

The current study investigated the relationship between OAE and student perception of preparedness to teach. This investigation was mediated through teacher efficacy and grit. The study is grounded in the theory of reciprocal causation, but it is specifically interested in the effects of the environmental factor, defined as OAE, and its

relationship to preparedness to teach. This specific analysis allows for a deeper investigation of the role of environmental factors, such as OAE, and its relationship to teacher beliefs. Additionally, correlations were obtained analyzing the relationship of teacher efficacy and grit as possible predictors of student perceptions of preparedness to teach. The results of the study are intended to contribute to both the fields of teacher education and adventure education, however, care must be taken in generalizing to populations outside the population of the current study.

Terms Used

1. Grit: is defined as passion and persistence for long-term goals (Duckworth et al., 2007).
2. Outdoor Adventure Education (OAE) is defined as, “a variety of teaching and learning activities and experiences usually involving a close interaction with an outdoor natural setting and containing elements of real or perceived danger or risk in which the outcome, although uncertain, can be influenced by the actions of the participants and circumstances” (Ewert & Sibthorp, 2014, p. 5). Typically, the focus of this type of education is the development of intrapersonal and interpersonal skills and is used for recreational, educational, developmental, and therapeutic purposes (Priest & Gass, 2005).
3. Self-efficacy: a person’s belief in his or her ability to succeed in specific situation (Rosen, Glennie, Dalton, Lennon, & Bozick, 2010).
4. Teacher-efficacy: a teacher’s belief in his or her ability to bring about desired outcomes in student learning (Tschannen-Moran & Hoy, 2001).

CHAPTER 2

LITERATURE REVIEW

Introduction

Student preparedness to teach is an area that all teacher preparation programs seek to promote. The current study takes a unique approach of analyzing student perceptions of preparedness to teach through the lens of reciprocal causation. More specifically, the study investigates the relationship of outdoor adventure engagement (environmental factors), teacher efficacy (behavioral factors), and grit (personal factors) in relation to preparedness to teach. The current study is exploratory in nature, and is specifically focused on the role of outdoor adventure engagement within the triadic structure. Chapter two presents a review of the literature regarding these three characteristics in relation to teacher preparation. Additionally, the study seeks to inform on current trends in outdoor adventure education (OAE) that are supportive of pre-service teacher preparedness to teach.

Environmental Characteristics

As stated by Bandura (1989) “The laws of psychology tell us how to structure environmental influences and to enlist cognitive activities to achieve given purposes” (p. 11). Outdoor adventure is a possible mechanism for this influence. The history of outdoor adventure education (OAE) demonstrates this influence.

Intersection of OAE and Teacher Education

OAE and teacher education share many similarities. Notably, both require specific skills related to the lens of instruction. The exploration of what constitutes masterful teaching (Lowman, 1994) demonstrates the need of interpersonal skills (Chism, 1994; Rendon, 1994; Winsler, 2004) and speaking ability (Soles & Powers, 2003; Priest & Gass, 2005; Anderson & Absolon, 2011) as paramount for success. An ability to understand and relate to students, regardless of the context of instruction, is required for an environment conducive for active learning (Bain, 2004). This ability is equally important to effectively teach to diverse student groups where an understanding of how to relate to students (DeBard, 2004; Owen, 2012) is needed. These abilities are relevant in both the outdoor adventure and K-12 classrooms, highlighting the interrelated elements of OAE and teacher education.

Teacher preparation programs promote interpersonal skills and communication ability. The emphasis of these skills is rightfully stressed. OAE also focuses on these skills. However, intrapersonal skills, which is a tenet central to OAE (Priest & Gass, 2005), is critical in preparing effective and reflective educators. OAE, which has a rich history of this process, is a supportive environment in which to provide intrapersonal developmental experiences. An area that is not within the scope of the current study, but central to OAE, is seen in supporting leadership growth. It is from this area that a greater analysis of the role of adventure as an individualized learning mechanism is highlighted. As stated by Graham (1997), “every good leader develops a personal leadership style dependent on personality” (p. 18). The development of a personal style, as a teacher,

regardless of the classroom context, requires intrapersonal development much like the development of leadership.

The mission of teacher education programs is to prepare pre-service teachers to meet the needs of their future students. This requires the future teacher to develop the ability to reflect and respond (Schon, 1983; 1987) to each of their student's learning needs. OAE provides a framework in which the same need for differentiation is necessary for success as an outdoor educator. The call to teach and relate to a diverse student population (DeBard, 2004) highlights the need for differentiation. This holds true in both the indoor and outdoor classroom. The intersectionality of teacher education and OAE, as seen with outdoor adventure engagement, highlights the role environmental factors. This relationship is further highlighted by the historical groundings of OAE, and the current movement of literature supporting adventure sports coaching (Berry, Lomax, & Hodgson, 2015).

Historical Perspectives

The discussion of the historical perspectives of OAE requires an investigation of adventure leadership. The current study is not investigating the role of leadership with OAE or teacher preparation, but leadership is a central tenet of the founding and current practice of OAE. Consequently, the analysis of the historical perspectives of OAE requires reference to leadership.

The roots of OAE are found more centrally in the United Kingdom. The advent of World War II saw a need for the promotion of leadership skills. Kurt Hahn, considered the founder of the current adventure movement (Priest & Gass, 2005),

addressed this need through the use of the outdoors and adventure education. The implication of the war created a need for “fitness for war and character training” (Cook, 1999, p. 157). This was addressed in the U.K. with promotion of The 1944 Education Act (Cook, 1999). The Act included an emphasis on the utilization of the outdoors in promoting the development of the character of the youth (Cook, 1999).

The creation of Outward Bound in 1941 (Priest & Gass, 2005) is often recognized as the origination of the adventure education movement. Outward Bound was established to address many of the concerns that developed during the war time era. The United States, similar to the United Kingdom, has an extensive history focused in OAE. The first organized summer camp, Camp Gunner, was founded in 1861, in Washington, Connecticut (Ewert and Garvey, 2007). Similar to the call for the development in the U.K., the founding of outdoor opportunities in the United States were based around principles of wartime; “when the Civil War began, the boys were eager to be soldiers, to march, and especially to sleep out in tents” (Ewert and Garvey, 2007, p. 21).

Similar to the trajectory in the U.K., the development of OAE opportunities in the United States was seen from individuals focused in education. Josh Miner, who taught at Hahn’s Gordonstoun School in Scotland during the 1950s before moving to Philips Academy in Massachusetts, was a major catalyst in developing the founding of Outward Bound in the United States (Ewert and Garvey, 2007).

The evolution of the emphasis of leadership within OAE was seen with the founding of the National Outdoor Leadership School (NOLS). Paul Petzoldt, a chief instructor with Outward Bound, founded NOLS in 1965 to address the need for more

leadership training opportunities for guides (Priest & Gass, 2005). The creation of NOLS was an evolution in the adventure leadership field as instructors were now a greater emphasis in the adventure leadership training process.

A further evolution in the OAE field, and one that also stemmed out of the founding of Outward Bound was the creation of Project Adventure. As OAE moved back toward the origins of Hahn's work in education, Project Adventure, along with the founding of the Wilderness Education Association, and the Association for Experiential Education, all aided in the promotion of outdoor adventure in education.

While Outward Bound, and the offshoots created from its implementation aided in the addition of outdoor and adventure opportunities in higher education, there were additional movements that were a catalyst for this change. Outdoor educators became a needed entity as more organized outdoor experiences were becoming available in the United States. Of note, L.B. Sharp received the first ever Ph.D. in camping education from Columbia in 1929 (Kine, 2008). Furthermore, OAE opportunities became more common in higher education during the 1970s with the inclusion of organized outdoor and adventure programs (Raiola & Sugerman, 1999).

Universities have identified OAE as a mechanism for addressing the development of leadership (Canberg, 2003). Likewise, universities seek leadership as a more integral component of their curriculum (Osteen & Coburn, 2012), which adds to the need for more investigation of the intersection of teacher education and OAE. Leadership is a valuable inclusion to any program, but outcomes such as: improved performance on standardized tests, reduction in classroom disruption, increased student engagement and

excitement for learning (Lieberman & Hoody, 1998), and an increased motivation for academic achievement motivation (Athman & Monroe, 2004) add to the importance of analyzing this intersection. The utilization of OAE is a source to address the university wide call for leadership, and can aid as a mechanism for preparing future teachers for the achievement-based society of education.

OAE has returned to the historical grounding of Kurt Hahn's focus of academic institutions promoting developmental opportunities for students within school environments (Priest & Gass, 2005). This is evident with the increase in opportunities available to pursue OAE in higher education (Kime, 2008). However, there are less explicit opportunities for the inclusion of OAE within teacher preparation programs. Hahn's original aspirations focus on intrapersonal and interpersonal skills (Kime, 2008) with school aged youth. These are similar tenets stressed within teacher education programs.

Education programs continue to emerge to address the intersection education of K-12 education and OAE. Currently, institutions such as the High Mountain Institute, in Leadville Colorado, and the Alzar School, of Cascade Idaho, are merging outdoor space, adventure, and academics to provide supportive environments for student growth. Institutions such as the High Mountain Institute and the Alzar School, demonstrate a platform to find meaningful ways to use outdoor space in teaching. Teacher preparation programs have the opportunity to capitalize on the growing OAE movement within higher education (Kime, 2008), and adopt some of the principles originally promoted by Hahn, as a means for addressing the preparation of future generations of educators.

Additionally, as more institutions implement curriculum, such as seen with High Mountain and the Alzar School, teacher preparation programs will need to adapt to provide the skillset needed to teach in the outdoor environment. This includes greater emphasis on experiential learning opportunities.

Experiential Education

The concept of promoting experience in education has long been a valued aspect in encouraging positive learning outcomes with students. As stated by Dewey (1938), “Basing education upon personal experience may mean more multiplied and more intimate contacts between the mature and the immature than ever existed in the traditional school, and consequently more, rather than less, guidance by others” (p. 21).

However, it is also important to note that Dewey (1938) also stressed,

the belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative. Experience and education cannot be directly equated to each other (p. 25).

Further examination of how best to link experience and education in a constructive manner is needed. The investigation of the intersectionality of teacher education and OAE adds to this link.

The steps taken in preparing effective teachers requires careful analysis. Deep learning is aided when the material taught is relevant to the students’ lives. Previous research indicates that students expect learning to be relevant to real world situations (Svinicki & McKeachie, 2014). This is highlighted by the notion that deep learning is grounded in the need for competence, relatedness, and autonomy (Deci, Vallerand,

Pelletier, & Ryan, 1991). These needs relate to effective teaching. Sibthorp, Paisely, Gookin, and Furman (2008) highlight,

teachers who support student autonomy in a traditional educational environment are more effective at fostering both academic developmental outcomes including perceived competence, self-esteem, creativity, and conceptual understanding (p. 137).

Deep learning is aided by student autonomy. Teacher preparation focuses on the overarching goal of preparing teachers for real life situations. The inclusion of outdoor teaching methods, where student autonomy is supported, offers a unique paradigm for future teachers. This includes adding outdoor components to their pedagogical quiver. As a means for developing the skills necessary for future effectiveness as a teacher, a focus on experiences from outside of the classroom can potentially be implemented. These experiences can serve as an outlet for continual pedagogical and cognitive development that will aid the aspiring teacher as they enter their teaching careers.

Current Outdoor Context

The intersectionality of OAE and teacher education is more relevant today as evident by the current context of outdoor use. Currently, there is a growing concern related to the lack of outdoor access for the current generation of children. Consequently, an epidemic termed “nature-deficit disorder” (Louv, 2008) is an area that needs to be addressed to ensure the developmental opportunities presented by nature are allocated to future generations. Access to nature has shown to have positive cognitive benefits such as affective processes (Berman, Jonides, & Kaplan, 2008; Bratman, Daily, Levy, & Gross, 2015), a reduction of stress (Marselle, Irvine, & Warber, 2014) and increased creative thinking (Oppezzo & Schwartz, 2014). The intersectionality of OAE within

teacher education provides well-being and nurture fostered by nature. The use of the outdoors provides teachers and students with beneficial experiences. As indicated in the promotion of placed-based education within nature by Mannion, Fenwick, and Lynch (2013), “place and pedagogy are ontologically linked dimensions of a process within which teachers and learners work and are themselves reworked” (p. 794). Adolescence access to play in nature is critical in supporting creativity, problem solving, and emotional and intellectual capacity (Kellert, 2005). The lack of play has resulted in psychopathology in children and adolescents with such issues as: anxiety, depression, helplessness, and narcissism (Gray, 2011). Within traditional subject instruction, learning outcomes are supported through the use of outdoor space. As posited by Jordet (2010), neurologically, the multisensory experience of the outdoors supports the development of robust long-term episodic memories. Likewise, teachers’ perceptions of the education value of encompassing the outdoors in their more traditional instruction included increased student motivation, communication and participation (Fagerstam, 2014).

Behavioral Characteristics

Belief Structures

As emphasized by Kuzborska (2011), “Teachers’ beliefs influence their goals, procedures, materials, classroom interaction patterns, their roles, their students, and the schools they work in” (p. 102). An effective teacher creates a positive and safe environment that allows for deep learning to take place (Oakes, Lane, Jenkins, & Booker, 2013), while also being reflective in nature to adapt to the needs of diverse learners (DeBard, 2007). Effective teachers set higher goals and are more likely to persist in

attaining these goals (Swanson, 2013). Belief structures that support these outcomes are seen with such beliefs as efficacy. Temiz and Topcu (2013) stress,

it is important to provide preservice teachers necessary knowledge and practice concerning their work to increase their teacher efficacy to become a successful teacher in the future when they participate in teacher education programs (p. 1438).

Self-Efficacy

Bandura (1997) defines self-efficacy as an individual's "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Bandura's (1997) self-efficacy model demonstrates that self-efficacy can be developed in four ways: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional status. Of note, mastery experiences are the strongest predictor of promoting self-efficacy (Sheard & Golby, 2006) and teacher efficacy (Tschannen-Moran & Hoy, 2007). Self-efficacy impacts selection processes as highlighted by the connection of work-stress and teaching. Teaching is one to the most stressful occupations (Johnson et al., 2005), and self-efficacy can aid in this reduction in stress (Klassen & Durksen, 2014). Probst and Koesler (1998) found significant effects of perceived self-efficacy after a university outdoor leadership course. They found that these effects persisted a year following the course (Probst & Koesler, 1998). Further, Bandura (1997) emphasizes in Tschannen-Moran and Hoy (1998),

self-efficacy beliefs can become more *generalized*, which is 'a function of the degree of similarity of qualitative features of activities and the skills they require [as compared to activities and skills for which one already possesses self-efficacy]' (p. 144).

Teacher Self-Efficacy

As defined from Bandura's (1977) theory, "teachers' self-efficacy beliefs would be related to the effort teachers invest in teaching, the goals they set, their persistence when things do not go smoothly and their resilience in the face of setbacks" (Tschannen-Moran & Hoy, 2007, p. 944; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Teacher-efficacy is linked to positive teacher behaviors and student outcomes (Ashton & Webb, 1986; Gibson & Dembo, Tschannen-Moran, Hoy, & Hoy, 1998). Mosely, Reinke, and Bookout (2002) support this notion as,

highly efficacious teachers have been found to be more likely to use inquiry- and student-centered teaching strategies, whereas teachers with a low sense of efficacy are more likely to use teacher-directed strategies, such as lecture and reading from text (p. 10).

Previous research demonstrates that there is a decline in efficacy upon entering the first year of teaching where a "reality shock" takes place (Tschannen-Moran & Hoy, 1998, p. 232). However, previous research demonstrates that efficacy beliefs can be influenced during the early years of a teacher's career, including as pre-service teachers (Tschannen-Moran & Hoy, 1998).

The evolution of teacher efficacy is well linked to the work of Bandura's (1977) social cognitive theory, self-efficacy theory, and outcome efficacy theory (Tschannen-Moran, Hoy, & Hoy, 1998). Gibson & Dembo (1984), who developed an extensive teacher efficacy measurement based on the principle of Bandura's relation to the original RAND items, posit:

If we apply Bandura's theory to the construct of teacher efficacy, outcome expectancy would essentially reflect the degree to which teachers believed that environment could be controlled, that is, the extent to which students

can be taught given such factors as family background, IQ, and school conditions. Self-efficacy beliefs would be teachers' evaluation of their abilities to bring about positive student change (Gibson & Dembo, 1984, p. 570).

The preparation of pre-service teachers benefits from a specific emphasis from the realm of social cognitive theory, and specifically from an investigation of efficacy. A goal of both education and OAE programs is seen in supporting self-efficacy (Ewert & Sibthorp, 2014; Stremba & Bisson, 2009; Bandura, 1997; Bandura 2011). Self-efficacy, as postulated by Bandura (1977), is the ability to accomplish behaviors or tasks and produce the desired outcomes selected.

Roots in Social Cognitive Theory

An element that highlights self-efficacy, and its roots in social cognitive theory, is seen in the active nature of functioning (Bandura, 1997). As posited by Bandura (2001) “people are self-organizing, proactive, self-reflecting, and self-regulating, not just reactive organisms shaped and shepherded by environmental events or inner forces” (p. 2). Teachers need to develop metacognitive skills, and this development is emphasized in the outdoor adventure context. As postulated by Schumann (2013),

metacognition has a particular relevance in outdoor leadership contexts because leaders are required to not only perform physical tasks (e.g., climbing or paddling) but also cognitive tasks or metaskills such as problem solving, decision making, or teaching (p. 27).

Importance of Self-regulation

The proactive nature of social cognitive theory, and self-efficacy, are reliant on the development of self-regulation. Self-regulation and self-efficacy work in conjunction

in moving an individual towards desired outcomes. For example, self-efficacy and self-regulation work together when goals, such as academic attainment, are desired.

How Self-efficacy Affects the Four Psychological Processes Cognition

Self-efficacy and cognition affect each other bidirectionally (Bandura, 1997).

Self-efficacy affects cognition in the proactive nature required to inform behavior and as a mechanism of impacting one's environment. This cognition is informed by the individual's self-efficacy to obtain selected goals or desires. The cognition of individuals can either aid or hinder their efforts towards desired outcomes.

Motivation

Self-efficacy affects motivation in a variety of perspectives. An area that is well established from the outdoor adventure education (OAE) realm is seen with goal properties of self-motivation. For example, Bandura (1997) highlights the nature of goal challenges and how interest promotes self-efficacy: "to mountain climbers it is not crawling on slippery rocks in foul weather that is intrinsically satisfying. It is derived from personal triumphs over lofty peaks that sustain deep engrossment in the activity" (p. 133). The motivation and value of the task will greatly impact regulation utilized to persist. If mountain climbers that Bandura described enjoy the process of slippery rocks in foul weather for its own satisfaction, they may be more motivated by the entire process of climbing the mountain.

Affect

Self-efficacy beliefs affect emotional experiences through control of thought, action, and affect (Bandura, 1997). The development of self-efficacy impacts the belief of the cognitive ability to regulate these emotional states. For example, Klassen & Durksen (2014) examined the relationship of self-efficacy and the reduction of work-stress with pre-service teachers enrolled in practicum experiences. They found that the development of self-efficacy aids the regulation of this psychological affect.

Selection

Self-efficacy affects selection processes as highlighted by the connection of work-stress and teaching. As showcased by Johnson et al., (2005), teaching is one to the most stressful occupations. Teachers are at risk of higher stress and lower levels of self-efficacy (Klassen & Durksen, 2014). As efficacy beliefs can contribute to occupational choice (Bandura, 1997), this indicates the selection process of leaving the teaching profession (Bowman, 2004).

The Promotion of Efficacy

Bandura's (1997) self-efficacy model showcases that self-efficacy can be developed in four ways: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional status. Of note, mastery experiences are the strongest predictor of promoting self-efficacy (Sheard & Golby, 2006) and teacher efficacy (Tschannen-Moran & Hoy, 2007).

Mastery Experiences

Mastery experiences are invaluable in promoting efficacious behavior. With future teachers' exhibiting a limited teaching resume, the inclusion of OAE could provide mastery experiences from actual accomplishments with students (Tschannen-Moran, 2007; Bandura, 1997). With the need for efficacious teacher leaders, OAE offers the opportunity for mastery development in situational leadership. As emphasized by Bandura (1977):

Occasional failures that are later overcome by determined effort can strengthen self-motivated persistence if one finds through experience that even the most difficult obstacles can be mastered by sustained effort...Participants acquire a generalizable skill for dealing with stressful situations, a skill that they use to overcome a variety of dysfunctional fears and inhibition in their everyday lives. Having a serviceable coping skill at one's disposal undoubtedly contributes to one's sense of personal efficacy (p. 195-196).

Mastery experiences are invaluable in supporting efficacious behavior. Moreover, with future teachers' exhibiting a limited teaching resume, tapping into alternative teaching experiences, such as instructing in the backcountry, could allow for mastery experiences from actual accomplishments with students (Tschannen-Moran, 2007; Bandura, 1997). Additionally, with the idea of efficacy being generalized (Ewert & Sibthorp, 2014) perhaps the mastery processes developed in the adventurous pursuit could allow for a greater efficacy in the realm of teaching. A need to develop a deep understanding of the subject matter that is being taught (Bain, 2004) could also be seen in the development in greater pedagogical knowledge. By developing diverse teaching strategies, in a multitude of settings, opportunities arise for a deeper mastery of the subject matter of teaching. OAE, where the individual has the opportunity to take on

teaching opportunities, allows for a unique challenge for the aspiring educator. This includes testing and refining pedagogical strategies through a stimulating experience. Outdoor adventure sports require unique skills, such as motor skill development, and are grounded in real or perceived risk. This adds a unique dimension to the teaching process that can be later brought to the K-12 classroom.

Vicarious Experiences

Vicarious experiences can be seen in the realm of modeling, both the utilization of coping and mastery modeling. Given an opportunity to see peers struggle with tasks and work through their challenges, whether in the outdoors or within the P-20 classroom, individuals are able to develop their own personal efficacy. Furthermore, modeling is a critical aspect for promoting learning transfer (Furman & Sibthorp, 2013).

Vicarious experiences can be seen in the realm of modeling, both the utilization of coping and mastery modeling. The outdoor instructor, much like the K-12 teacher, teaches to a diverse groups of students. The use of coping and mastery strategies benefit both of these classroom dynamics. By gaining experience in overcoming challenging objectives or teaching moments, the instructor is more likely to be able to relate with students who are struggling in the future (Timken & McNamee, 2012). Further, modeling is considered to be a critical aspect for promoting learning transfer (Furman & Sibthorp, 2013).

Social Persuasion

Social persuasion may aid future teachers as “people are persuaded to believe in themselves are more perseverant in the face of difficulties” (Bandura, 2011, p. 13). For a

pre-service teacher an OAE program is an ideal context for promoting positive social persuasion experiences, and offers an opportunity to gain insight into ways to promote and encourage other students to accomplish their tasks and goals. Of note, OAE programs can be an important tool for supporting inclusion as a needed part of teacher training (Peebles & Mendaglio, 2014).

Social persuasion may aid the future teacher as “people are persuaded to believe in themselves are more perseverant in the face of difficulties” (Bandura, 2011, p. 13). For a pre-service teacher an OAE program is an ideal context for supporting positive social persuasion experiences, and an opportunity to gain insight into how better to support and encourage other students in accomplishing tasks and goals. OAE could be an ideal realm for this instruction as programs have been criticized for relying too heavily on theoretical rather than practical skill development (Peebles & Mendaglio, 2014). In instructing in the outdoors, the future teacher has the opportunity to address a wide array of experience and ability levels that could translate well to future classroom endeavors where they may arrive with a greater sense of teacher efficacy.

Physiological and Emotional Status

Physiological and emotional status is well established and supported through the use of OAE programs, where emotional anxiety or physiological challenges are likely to be experienced (Ewert & Sibthorp, 2014). Moreover, OAE programs can be valuable in targeting millennial students, and the need to encompass difficult situations within curriculum (Stewart, 2009; Lipmann, Bulanda, & Wagenaar, 2009; Myers, 2003;

Svinicki & McKeachie, 2014). Adventure allows for a natural process of tapping into the need of development from challenge (Sheard & Golby, 2006).

Emotional anxiety or physiological challenges are likely to be experienced on adventures (Ewert & Sibthorp, 2014). There is much anecdotal evidence, as well as research, that supports the idea that adventurous experiences aid character development and serve as a therapeutic opportunity (Sheard & Golby, 2006). As emphasized in Ewert and Sibthorp's (2014) text focused on OAE:

Occasional failures that are later overcome by determined effort can strengthen self-motivated persistence if one finds through experience that even the most difficult obstacles can be mastered by sustained effort...Participants acquire a generalizable skill for dealing with stressful situations, a skill that they use to overcome a variety of dysfunctional fears and inhibition in their everyday lives. Having a serviceable coping skill at one's disposal undoubtedly contributes to one's sense of personal efficacy (Bandura, 1977, p. 195-196).

By utilizing OAE opportunities in teacher preparation programs, the challenges that are naturally presented in the adventurous pursuits, may lend to the support of efficacy from the outdoor realm into the classroom. Supporting efficacy in a future teacher population is invaluable in aiding the promotion of future success. As posited from Bandura's (1977) theory, "teachers' self-efficacy beliefs would be related to the effort teachers invest in teaching, the goals they set, their persistence when things do not go smoothly and their resilience in the face of setbacks" (Tschannen-Moran & Hoy, 2007, p. 944; Tschannen-Moran, Woolfork Hoy, & Hoy, 1998).

The Intersection of OAE and Self-Efficacy

A large focus of adventure education research is centered on psychological development. The specific lens of self-efficacy is highlighted in many studies that

demonstrate a positive relationship between adventure engagement and efficacy (Lamorey, 2013; Odello, Hill, & Gomez, 2008; Paxton, 1998; Paxton & McAvoy, 2000; Probst & Koesler, 1998; Sibthorp, 2003). Previous research demonstrates challenge courses, a method of OAE, increase college students' leadership-efficacy (Odello et al., 2008) after just four hours of engagement. Probst and Koesler (1998) found significant effects of perceived self-efficacy after a university outdoor leadership course. Furthermore, they found that these effects persisted a year following the course (Probst & Koesler, 1998). Previous research (Paxton, 1998) indicates that students report an increase in self-efficacy after a 21-day adventure program. Additionally, Lamorey (2013) highlights that non-traditional students report increased efficacy from outdoor adventure engagement.

A concern emphasized by Tschannen-Moran and Hoy (2007) is that novice teachers have fewer mastery experiences with teaching. Providing opportunities for mastery experiences teaching is paramount. Adventure education, particularly the guiding element of OAE, can aid in this process. Teaching, in both the K-12 and outdoor classrooms, requires pedagogical content knowledge, classroom management, instruction and assessment, and interpersonal skills. The novice teacher could gain necessary experience within OAE to better support their K-12 instruction.

Personal Characteristics

Personality Traits

Previous research suggests that certain personality traits support more effective teachers, and that “institutes of higher education must be aware of what it takes to foster a

‘quality teacher’” (Rushton, Morgan, & Richard, 2007, p. 440). As suggested by Clark and Guest (1995), more risk-taking catalysts, visionaries, and troubleshooters are needed as teachers. Previous research has supported the concept that personality and motivation may be linked with regards to academic behavior (Komarrju, Karau, Schmeck, & Avdic, 2011). This is evident with consciousness being a predictor of exam performance (Chamorro-Premuzic & Furnham, 2003) and GPA (Conard, 2006). Robertson-Kraft and Duckworth (2014) highlight that limited research investigates the personality characteristics of pre-service teachers. They state,

Personality traits are an attractive target of study because they demonstrate both stability and change over the life course...In young adulthood, when most teachers are most likely to enter the profession, estimates of rank-order stability are even more modest, and it is also during this developmental epoch when mean-level changes in personality are most dramatic” (Robertson-Kraft & Duckworth, 2014, p. 4).

A challenge for pre-service teachers, and those entering their first teaching positions, is experience. This is evident where literature suggests that becoming an expert can require over 10,000 hours of training (Hambrick et al., 2014). The promotion of staying power within the field of education is a daunting challenge, and one that has become an issue as late. This is highlighted by a third of teachers leaving the profession within the first three years of their career and half leaving before their fifth year (Bowman, 2004). To respond to the growing issue of teacher effectiveness, as well as issues of retention, a growing body of literature has begun to investigate the role of personality traits. Previous research has focused on the Big Five personality traits consisting of: conscientiousness, neuroticism, extraversion, openness, and agreeableness (Komarraju et al., 2011). More recently, constructs such as grit have become vogue in

educational research as a predictor for retention (Duckworth et al., 2007) and effectiveness (Duckworth et al., 2009). Personality factors have been investigated as predictors of academic performance in college (Bauer & Liang, 2003; Conard, 2006; Duckworth & Seligman, 2005; Nofle & Robbins, 2007). For example, Conard (2006) found that conscientiousness, a Big Five personality trait, had a direct effect on college GPA. Nofle and Robins (2007) replicated this showcasing conscientiousness as a predictor of college GPA. Their results were significant even when controlling for gender, SAT scores, and high school GPA. To determine a more predictive model, Duckworth et al., (2007) developed the grit scale, which is related to conscientiousness but with a greater emphasis on stamina.

Grit

Grit, as defined by Duckworth, Peterson, Matthews, and Kelly (2007), is “perseverance and passion for long-term goals” (p. 1087). Grit goes beyond the Big Five personality traits as “the gritty individual approaches achievement as a marathon; his or her advantage is stamina” (Duckworth et al., 2007, p. 1088). As further emphasized by Duckworth, Quinn, and Seligman (2009), “gritty individuals tend to work harder than equally able peers, and they remain committed to their chosen pursuits longer (p. 541). Grit has been considered by some (Duckworth et al., 2007) as important as a predictor as IQ to high achievement. Likewise, previous research supports that grittier individuals make fewer career changes (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014), exhibit greater teaching effectiveness (Duckworth et al., 2009; Robertson-Kraft &

Duckworth, 2014), and grittier individuals work harder to reach goals (Robertson-Kraft & Duckworth, 2014).

Previous research has demonstrated grit as a predictor of academic achievement. For example, Duckworth et al., (2007) found, in a study with undergraduate Ivy League psychology students, those with higher grit had higher GPAs in college. More importantly, many of these gritty, high achieving students entered college with lower SAT scores. The correlation of grit and academic achievement has been demonstrated across different cultures. Strayhorn (2014) found that this similar phenomenon took place with Black males attending a predominantly white institution (PWI). His results demonstrate grittier students exhibited higher GPAs in college, higher GPAs in high school, and higher ACT scores in comparison to less gritty Black males.

Previous research indicates that grit has a positive impact on outcomes such as GPA (Duckworth et al., 2007). However, it is important to note that grit can be a detrimental personality trait in certain situations. Lucas, Gratch, Cheng, and Marsella (2015) demonstrate this. They found that, in a controlled laboratory experiment, grittier individuals were able to complete fewer problems in an anagram task (not moving past more difficult questions as seen in scenarios like the SAT), persisted even when losing a game, and persisted when engagement was costly (monetarily) (Lucas et al., 2015). This took place even when participants were provided feedback that they were failing on the task, and they were risking the opportunity to maximize their monetary gains (Lucas et al., 2015). As a result, care is needed in supporting healthy manifestations of grit.

Grit and Teacher Education

There is no denying that grit has become a buzzword in teaching and teacher education of late. Care is needed in applying grit to teaching and learning as too much emphasis can be placed on the notion that “all it takes is hard work” (Ferlazzo, 2015, para. 8). There are problematic issues with grit in education. These concerns are highlighted in Ferlazzo (2015) by Ron Berger. Of note, Berger stresses the issue of not looking at racial and socio-economic issues, grit being equated with obedience, grit promoting single-mindedness (which could impact creativity), and grit research using self-report data. These are valid concerns that need to be addressed. However, grit, to become an effective teacher, is an area that has great value. Effective teachers need to develop a diverse range of pedagogical approaches to best instruct and provide deep learning opportunities for all learners. As further emphasized by Berger, in Ferlazzo (2015),

Grit matters. The key for us is to consider what conditions actually build grit in students, and also how school culture can join grit to other habits of character that we value, e.g., respect, integrity, curiosity, gratitude, compassion (para. 37).

Grit alone is not a magic bullet that can solve all education problems, and care is needed in ensuring that future teachers do not put up blinders in their educational experiences (as both students and aspiring teachers). However, there is a need to empower future teachers with personality traits such as grit, as this has been shown to have positive effects on what is most important, the needs of their students (Duckworth et al., 2009).

Grit and Outdoor Adventure Education

Efforts have been made to support empowerment opportunities that support grit. OAE has been seen as a supportive environment for empowering participants. Currently, no significant studies have been conducted investigating the relationship of grit and outdoor and adventure utilization. However, previous studies investigate areas such as self-regulation in relation to goals (Sibthorp et al., 2015). There is anecdotal support for a possible relationship of grit and OAE. As stressed by Verena Roberts, Chief Innovation Officer of CANeLEARN, “One of the best ways to learn about grit is to focus on outdoor education and go into the wild. Grit is about not freaking out, taking a deep breath and moving on” (Antin & Gregory, 2015).

Grit has been a key component to the foundation of OAE. For example, Outward Bound highlights grit as tenet promoted by founder Kurt Hahn, “Hahn taught the young sailors to have the same perseverance, resilience, and stamina...he taught them grit” (Micucci, 2015, para. 4). Outward Bound stresses that “The grit they build helps them ‘day in, day out’ on their course, and accompanies our students home to help them stick with their futures for many years to come” (Micucci, 2015, para. 5). This notion is further emphasized by the United World College (UWC), which was founded by Hahn. As emphasized by UWC, their wilderness program helps their students develop grit as

Everyone is pushed to their limits at one time or another in the wilderness, where the development of grit is inherent...in the long run, I don't care if students can pitch a tent, use a compass, but I do care if they can deal with adversity, uncertainty, and interpersonal conflict. The ultimate goal of this program is to teach them life skills (Micucci, 2015, p. 7).

There are concerns that should be expressed about grit and outdoor adventure. Of note, there is typically risk, real or perceived, in the context of OAE (Priest & Gass, 2005). However, as demonstrated by Schumann (2013) metacognitive strategies are effective in addressing misguided belief structures. This strategy is possible with elements such as grit. This is emphasized by Lucas et al., (2015), where they highlight the need for metacognitive strategies that remind individuals “there is value in knowing when to quit” (p. 22). The risk management process of OAE supports this development as a critical area in staying safe. This concept can be extrapolated to other areas of education, such as teacher preparation.

The Intersection of Teacher Education and OAE

The role of OAE programs in teacher education is highlighted by Udall and Rugen (1997), who argue that, “when teachers have lived an educational experience and reflected on their own growth as learners, they are better able to grasp the educational value of the experience and to reap its rewards in their own classrooms” (p. 404). The experiential nature of OAE lends itself well to this growth. Research of pre-service teacher engagement in adventure demonstrates an increased appreciation of supportive environments for students (Carlson & McKenna, 2000) and a reduction of stress (Kanters et al., 2002). Timken & McNamee (2012) highlight the role of outdoor adventure experiences in promoting belief changes pertaining to pre-service physical education teachers and their future relating to students.

Research has also focused on teachers’ perception of the value of encompassing the outdoors within their K-12 teaching. These perceptions include increased student

motivation, communication, and participation (Fagerstam, 2014). These perceptions are also supported by neurological research. As posited by Jordet (2010), neurologically, the multisensory experience of the outdoors supports the development of robust long-term episodic memories.

Preparing Pre-Service Teachers

As emphasized by Joseph and Heading (2010) pre-service teachers need to develop skills in the realms of pedagogical knowledge, content knowledge, classroom management, and the ability to engage in reflection. However, many teachers are overwhelmed by their initial entrance into the teaching world (Bowman, 2004). As indicated by Conkling and Henry (1999)

learning to teach is a process that continues throughout a teacher's career and that no matter what we do in our teacher education programs and no matter how well we do it, at best we can only prepare teachers to begin teaching (p. 22).

The intersection of the OAE and teacher education realms can contribute to a deep and diverse preparation for the entrance into the first years of teaching. The use of experiences, such as found in outdoor adventure, can serve as an educative and ongoing learning source. This is particularly the case if the future teacher continues to engage in adventurous pursuits. The utilization of outdoor adventure, particularly if merged within the curriculum of teacher education, allows for a more seamless development of non-academic teaching skills for the young teacher. This process is aided in a simple merger of more experiences and more knowledge that the future teacher can tap into as the transition to their first teaching positions. As emphasized by Dewey (1938) of the value of experience:

Experiences, in order to be educative, must lead out into an expanding world of subject matter...This condition is satisfied only as the educator views teaching and learning as a continuous process of reconstruction of experience. This condition in turn can be satisfied only as the educator has a long look ahead, and view every present experience as a moving force in influencing what future experiences will be (p. 87).

Outdoor adventure experiences offer the opportunity for growth of both teachers and students (Carlson & McKenna, 2000; Lamorey, 2012), which can aid the new, transitioning teacher. While the majority of research that investigates the educational value of OAE focuses on student outcomes, some studies include the value of the experience for the teacher. As evident in Kornelson's (1998) investigation of a school-based adventure education/therapy program, teachers found that they were able to relate what they learned from the adventure realm to their classroom realms. Carlson and McKenna (2000), found that student teachers who participated in a weekend adventure education course experienced increased awareness of the importance of peer support, an increased appreciation of supportive environments, enhanced coping mechanisms, and a better understanding of their own students' experiences in the school they were teaching at.

The transition from pre-service teacher to full-time teacher is a large and daunting leap. As highlighted by Seifert (2004): "Future teachers are worried about more than outward 'professional identity,' about how they look in the classroom. They worry as well about whether they feel committed to teaching as a calling" (p. 2). These concerns are troubling, but can potentially be addressed with the inclusion of OAE. As indicated by Ference (2007) adventure can greatly aid a new teacher in making connections that will allow for success. As she stated, an adventure bike trip served as a catalyst for her

teaching career as it, “provided me with a chance to experience teaching in a way that connected with my teaching philosophy” (2007, p. 3).

Experience and education has long been valued, and the experiential nature of OAE is supportive to the growth of the pre-service teacher. As emphasized by Powell (1992), and derived from Dewey’s teachings:

A teacher education curriculum that acknowledges and accounts for preservice teachers’ personal practical experience and knowledge throughout the teacher education program may ultimately help preservice teachers trust their own intuition for preparing and presenting lessons and for using principles of teaching acquired during teacher preparation (p. 237).

The social element of outdoor adventure engagement highlights the support system that can aid the young teacher. As stressed by Bandura (2011), “social resources are especially important during formative years when preferences and personal standards are in a state of flux, and there are many conflicting source of influence with which to contend” (p. 8). The social support structure, if presented in a professional development context, serves as a positive influence during the early years as a teacher. As further posited by Bandura (2011), “in efforts to develop their cognitive competencies, people draw on their own experiences and turn to others who are well informed on the matters of concern” (p. 13).

Role of Professional Reflection

Schon’s (1983) *The Reflective Practitioner* stresses the value of knowing-in-action and eventually reflecting and practicing-in-action. Practitioners must develop an intuitive understanding of their field, and eventually be able to reflect about what they are doing while doing it. This occurs within what Schon defines as the action present (Schon

1983, 1987). Occasionally, this reflection occurs while engaged in an activity that can stretch minutes or hours (Schon, 1983), or in a period where the practitioner can still make a difference to the situation at hand (Schon, 1987). The action-present, as represented by the intuitive knowing, could be before a problem arises. As reflecting-in-action relates to teaching, reflecting-in-action is the ability to adjust teaching methods to the needs of a diverse student base during the actual instruction in order to promote the best learning outcomes. Reflecting-in-action also can be defined as simply reflecting and adjusting strategies based on the context or current environment.

Critical reflection is important in the field of education as this process promotes a more effective, responsive teacher (Brookfield, 1995). Donald Schon's (1983) *The Reflective Practitioner* stresses the aspect of surprise, which is a common theme in education. The ever-changing environment of the outdoors, and the real or perceived risk encompassed in OAE (Priest & Gass, 2005), allows for the promotion of this intuitive knowing (Densten & Gray, 2001). The guiding and teaching realms are inundated with the surprise element that is stressed by Schon's (1983) *The Reflective Practitioner*. The "intuitive knowing implicit in the action" (Schon, 1983, p. 56) is an area that practitioners in both outdoor adventure and teacher education must develop in the quest to developing as practitioners. This is seen where the aspiring education practitioner needs to develop the ability to respond within an "action present" (Schon, 1983, p. 62) to ensure that critical learning moments are met. Or as evident from the realm of adventure, where risk is involved, the practitioner must respond within an "action present" to ensure the safety of their students. Schon (1987) stresses that this action present is in response to the

context of the situation, which needs to be accomplished so that the practitioner can make a difference to the situation at hand. The K-12 classroom typically does not have the real or perceived risk that is seen within the outdoor adventure classroom. However, both fields require the ability to recognize when teachable moments are presented, how best to adapt teaching methods to meet the needs of students, and how to create an environment of learning.

Schon discusses the importance of the social element of learning, as seen with Bandura and Social Cognitive Theory. The teacher/instructor/coach, in either the indoor or outdoor classroom, is not the only agent for promoting learning. As Schon (1987) stresses, within the learning dynamic, “most [classroom environments] involve groups of students who are often as important to one another as the coach [or teacher]” (p. 38). This is seen as the group allows for an immersion into the world of learning. Consequently, the reflective teacher, regardless of the location of the classroom, must ensure a healthy classroom dynamic where collaboration amongst students is promoted.

Schon (1983; 1987) indicates the artistry that accompanies the reflective practitioner. Artistry as a practitioner, as with the development of reflective practice, is an ongoing process. The development of character highlights this notion. Character development is an arduous process. Stonehouse’s (2011) philosophical investigation of character development within wilderness expeditions highlights this notion.

Summarizing Aristotle, Stonehouse (2011) states,

Aristotle further complicates any hope in character’s development through *brief* stints of OAE programing, by asserting that virtue, a disposition, and the building block of character, is gradually and arduously inculcated over *long* periods of time (p.109).

The aspiring teacher faces a long arduous the path to become an expert. This journey, much like with the development of character, does not occur in brief stints. Consequently, the aspiring teacher is benefited through the encompassing of skills from a variety of sources. The intersectionality of teacher education and OAE showcases many similar elements. For example, in both fields pedagogical content knowledge is necessary to effectively communicate to students.

Pedagogical Content Knowledge

Since the 1980's a growing research emphasis has been seen in the development of a teacher's content knowledge and pedagogical content knowledge (Ball, Thames, & Phelps, 2008; Woolfolk Hoy, Davis, & Pape, 2006; Kleickmann et al., 2013). The inclusion of OAE opportunities for pre-service teachers allows for the opportunity for a deeper more holistic pedagogical development. However, support further development as a teacher in an adventurous setting or in the classroom, value must be placed on developing mastery for individuals in their discipline(s) of choice. As posited by Shulman (1986), content knowledge mastery is necessary as "[t]he teacher need not only understand that something is so, the teacher must further understand why it is so" (p. 9). The development of content knowledge of their future subject matter, whether this is in the classroom or the backcountry, constitutes much needed development. With the proper development of content knowledge, individuals will have more to draw upon in their teaching processes. However, equally important is developing the pedagogical content knowledge, the subject matter for teaching (Shulman, 1986), for delivering the selected curricula to ensure student comprehension (Cochran, King, & DeRuiter, 1991).

As posited by Cochran et al., (1991), “pedagogical content knowledge is that form of knowledge that makes teachers teachers rather than subject area experts” (p.5).

Furthermore, pedagogical content knowledge is invaluable as it provides the tools for the subject matter that the teacher is trying present more accessible the their students (Shulman, 1986).

Schon (1983) promotes the need for reflecting-in-action as constituting effectiveness for practitioners; this same concept is needed in the development of pedagogical content knowledge where the teacher must be able to “see a specific set of concepts from a variety of viewpoints and at a variety of levels, depending on the needs and abilities of the students” (Cochran et al., 1991, p. 6). Additionally, as stressed by Schon (1992) practitioners reflect within their language of practice. To promote learning, an active reflective process is required and is aided by the notion that language aids in the development of consciousness (Schon, 1983; Waks, 2001). This notion is further emphasized within social cognitive theory. As postulated by Bandura (2011), “language thus becomes not only a means of communication but also shapes the form of thought” (p.14). The development of language is necessary in providing the consciousness needed within the development of pedagogical knowledge. This development is needed as a method for effective instruction.

The focus of promoting teacher learning of pedagogical content knowledge, offers more opportunities to develop the necessary skills needed to become a skillful instructor and is paramount to the success of a teacher preparation program. With a focus on how the brain learns, creating opportunities for students to teach and learn in sensory

stimulating environments, such as the outdoors, where the whole individual can be engaged, is likely to promote long lasting learning (Zull, 2006). This long lasting learning can be found with the promotion of strong pedagogical knowledge; more, the adventure realm offers future teachers opportunities to test new pedagogical strategies and refine their existing techniques before entering the classroom.

Effective teachers must development sound content knowledge as well as pedagogical knowledge. This knowledge base is critical, and it has been shown to affect student-learning outcomes and understanding of subject matter (Baumert et al., 2010; Kleickmann et al., 2013). Pedagogical content knowledge has been shown to have a higher predictive power than content knowledge on student learning (Kleickmann et al., 2013). As stressed by Friedrichesen et al., (2009) teachers develop their subject knowledge, as well as pedagogical knowledge, from three main sources: through the teacher's own K-12 learning experiences, through teacher education and professional development programs, and through the individual's teaching experiences. OAE supports a similar trio of learning sources: the individual's own experiences, professional development opportunities in their adventurous disciplines, and their experiences teaching and/or guiding in the adventure realm. These experiences can aid in reinforcing and the teaching knowledge acquired from the more traditional teacher preparation sources. As stressed by Magnusson, Krajcik, and Borko (1999),

teachers with differentiated and integrated knowledge will have a greater ability than those who knowledge is limited and fragmented, to plan and enact lessons that help students develop deep and integrated understandings (p. 95).

The intersection of OAE and teacher education highlights the importance of differentiated and integrated knowledge that can aid in future teaching endeavors.

Adventure Coaching

Currently, an increase in participation in adventure sports has created a greater emphasis on instruction in the outdoors (Collins & Collins, 2012). The adventure-sports coach has to operate as both a teacher and a guide (Collins & Collins, 2012), and requires sound pedagogical knowledge. Adventure sports coaching literature highlights the value of pedagogical knowledge. As emphasized by Berry (2015), good coaches stress the importance of the role as an educator, and “coach people not adventure sports” (p. 28). Likewise, adventure sports pedagogy highlights the importance of reflective practice (Collins & Collins, 2012; Tovey, 2007) that is necessary in instructing in an environment grounded in real or perceived risk (Priest & Gass, 2005).

The shift towards a greater emphasis of adventure-sports coaching highlights the need for greater teacher training. Within the confines of OAE there has been concern on the level of teaching training. As emphasized by Puk (1999), “it is not as easy to find people to teach outdoor experiential programs with the same level of qualifications [than English of physical education]” (p. 179). The intersectionality of teacher education and OAE is a reciprocal process where adventure education and teacher education can equally benefit from experiential growth as instructors in a diversity of settings.

Chapter Summary

The intersection of adventure education and teacher education highlights similar areas of need from an instructor perspective. Masterful teaching, as described by Lowman (1994), emphasizes the value of interpersonal skills and speaking ability as being paramount to excellent instructors; “to become an excellent instructor, one must be outstanding in one of these sets of skills and at least competent in the other” (p. 503). However, the development of interpersonal skills and communication ability requires the promotion of the compulsory intrapersonal skills to be successful. Intrapersonal development is fostered through critical thinking and critical examination of oneself as an adventurer and educator. Likewise, intrapersonal development is an area that is highlighted in OAE literature (Priest & Gass, 2005). Consequently, further investigation of the relationship of outdoor adventure engagement and teacher preparation is valuable.

The current study is grounded within the framework of social cognitive theory. More specifically, the current student is grounded within the framework of a reciprocal causation model (Bandura, 1989) where an emphasis of the environmental factor of the triadic structure is highlighted. There are many areas that aid the aspiring teacher. Personality traits, such as grit, and belief structure, such as teacher efficacy, are areas that have shown to have positive outcomes with teaching and student learning. The overarching goal of teacher education programs is to ensure that pre-service teachers are prepared to begin their teaching careers. The use of a reciprocal causation model showcases a triangulation of factors that can aid the future teacher as they enter their

teacher careers. The current study adds to the literature as little research has examined the intersectionality of teacher education and OAE, and the current study adds to the literature of grit. Grit is a newer construct with anecdotal evidence suggesting a relationship with outdoor adventure education (Antin & Gregory, 2015; Micucci, 2015). However, no research to date has examined this relationship.

CHAPTER 3

METHODOLOGY

Introduction

Educational research has shown that teacher effectiveness is the most important in-school influence on student outcomes (Rivkin et al., 2005; Robertson-Kraft & Duckworth, 2014; Rockoff, 2004; Sanders & Rivers, 1996) and that teacher efficacy (Burton & Pace, 2009; Peebles & Mendaglio, 2014) and grit (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014) are characteristics of highly effective teachers. Additionally, previous research suggests that outdoor utilization and adventure programs can be used to support self-regulated learning (Sibthorp et al., 2015), wellness, reduction of stress (Marselle, Irvine, & Warber, 2014), resilience (Ewert & Yoshino, 2011; Beightol, Jeverson, Carter, Gray, & Gass, 2012), reduction of racial prejudice (Wright & Tolan, 2009), and increased self-efficacy (Probst & Koesler, 1998).

Duckworth and Gross (2014) have called for more investigation of the relationship between grit and other constructs supporting goal attainment. Currently, no other research has investigated the relationship of teacher efficacy and grit, which are both predictors of teacher effectiveness. Grit has become a vogue word in education as late. This is evident in Outdoor Adventure Education (OAE) literature where anecdotal evidence exists of the possible relationship of grit and outdoor adventure (LaGrande, 2015; Micucci, 2015). Much like the lack of research supporting the relationship of grit

and teacher efficacy, to date there has been no research investigating the relationship of OAE and grit.

Purpose

The purpose of the current study is to explore the relationship between engagement in OAE and PTs' perceptions of preparedness to teach mediated by teacher efficacy beliefs and the personality trait of grit. The current study uses the theoretical framework of the reciprocal causation model, but is specifically interested in the effects of the environmental factor of OAE within the triadic structure. The study seeks to add to the literature in informing the intersectionality of teacher education programs and OAE. Furthermore, with the call for more investigation of grit, and its relationship to other constructs pertaining to goals (Duckworth & Gross, 2014), this study seeks to answer the current call for more research. Notably, the study examines the role of teacher efficacy beliefs in relation to long-term, hierarchical goal as emphasized by grit. This study investigated these relationships with undergraduate education majors at Montana State University.

Scrutton and Beames (2015) highlight the need for more rigorous, quantitative research in OAE citing the problems with

the usage of inappropriate self-report questionnaires, low statistical power, over-reliance on inferential statistics, a lack of control or comparison group, a lack of longitudinal data, and a lack of investigation of independent variables (p. 11-12).

The current study seeks to address this call as well as the call for more analysis of effective opportunities to support the promotion of PT preparedness to teach. While the

current study does not address all of the issues raised by Scrutton and Beames, the use of structural equation modeling, existing instruments with strong psychometrics, a stratified sample of participants (that allows for a break down of categories of outdoor adventure experience), and clear independent variables provide a rigorous, and theoretically grounded, investigation of OAE. The study is guided by the following research questions and hypotheses:

1. Is there a relationship between outdoor adventure engagement and student perception of preparedness to teach?

H₀: There is a relationship between outdoor adventure engagement and student perception of preparedness to teach.

H₁: There is not a relationship between outdoor adventure engagement and student perception of preparedness to teach.

2. Is there a relationship between outdoor adventure engagement and teacher efficacy?

H₀: There is a relationship between outdoor adventure engagement and teacher efficacy.

H₁: There is not a relationship between outdoor adventure engagement and teacher efficacy.

3. Is there a relationship between outdoor adventure engagement and grit?

H₀: There is a relationship between outdoor adventure engagement and grit.

H₁: There is not a relationship between outdoor adventure engagement and grit.

4. Is there a relationship between teacher efficacy and grit?

H₀: There is a relationship between teacher efficacy and grit.

H₁: There is not a relationship between teacher efficacy and grit.

5. Does teacher efficacy mediate the effect of grit on student perceptions of preparedness to teach?

H₀: Teacher efficacy mediates the effects of grit on student perceptions of preparedness to teach.

H₁: Teacher efficacy does not mediate the effects of grit on student perceptions of preparedness to teach.

Outdoor Adventure Engagement (OAE) was assessed through demographic questions (Appendix A), preparedness to teach was assessed through a University of Northern Colorado instrument based on the InTASC Standards. Teacher efficacy was assessed through the *Teacher Sense of Efficacy Scale* (Appendix C) (Tschannen-Moran & Hoy, 2001), and grit was assessed through the *Short Grit Scale* (Grit-S) (Appendix D) (Duckworth & Quinn, 2009). The InTASC Standards instrument, provided by faculty and doctoral students at University of Northern Colorado, will not be included in the appendices as per an agreement with the UNC group.

Design

The current study uses Partial Squares Least Regression structural equation modeling (PLS-SEM) to investigate the relationships between OAE and PT perception of preparedness to teach. This structure was analyzed through the mediators of teacher efficacy and grit. The current study works from theory and is testing the relationship of outdoor adventure within this paradigm. Likewise, the current study uses bivariate

correlations to investigate the magnitude and significance of the relationships of teacher efficacy and grit in the examination of PT perceptions of preparedness to teach.

The study recognizes that care must be taken in assigning causation to any results.

Pearl (2012) highlights the historical concern of stating causation with the use of structural equation modeling.

A huge logical gap exist between ‘establishing causation,’ which requires careful manipulative experiments, and ‘interpreting parameters as causal effects,’ which may be based on firm scientific knowledge or on previously conducted experiments, perhaps by other researchers. One can legitimately be in possession of a parameter that stands for a causal effect and still be unable, using statistical means alone, to determine the magnitude of that parameter given nonexperimental data (p. 1).

This is particularly the case in PLS-SEM, and is in keeping with research questions of the current study where relationships are under investigation. PLS-SEM allows for a hypothesis-testing approach where appropriate methods are taken to investigate the plausibility of relationships. In this case, the study is investigating the plausibility of a relationship between OAE and PT perceptions of preparedness to teach. As stated by Hair, Hult, Ringle, and Sarstedt (2017),

PLS-SEM applies ordinary least squares (OLS) regression with the objective of minimizing error terms...PLS-SEM estimates coefficients (i.e., path model relationships) that maximize the R^2 values of the (target) endogenous constructs. This feature achieves the prediction objective of PLS-SEM (p. 17).

Care should be taken with all methodological approaches. However, PLS-SEM allows for both exploratory and confirmatory approaches, of the model fit, where mediating variables and goodness-of-fit are analyzed to aid in the analysis of relationships. Visual inspection of the data is available as PLS-SEM provides graphical

representations for analysis. This visual representation is seen through the path modeling with latent variables. As indicated by Hair et al., (2017)

Relationships between constructs as well as between their assigned indicators are shown as arrows. In PLS-SEM, the arrows are always single headed, thus representing directional relationships. Single-headed arrows are considered predictive relationships and, with strong theoretical support can be interpreted as causal relationships (p. 11).

These relationships are explored as latent constructs where indicator variables investigate the model. In this study, this is seen where latent variables such as engagement in outdoor adventure, instructing outdoor adventure, and expeditions explain the latent construct of OAE.

PLS-SEM allows for flexibility in analyzing the direct and indirect effects, and it allows for an analysis of error that is not available in other formats. Furthermore, PLS-SEM allows for model error and coefficients to be measured across several groupings. PLS-SEM allows for a more holistic investigation of relationships, which is needed in a study such as this one.

The current study recognizes that there is a multitude of ways to analyze data.

PLS-SEM is no exception. As stated by Hair et al., (2017),

There are two types of SEM: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM; also called PLS path modeling). CB-SEM is primarily used to confirm (or reject) theories (i.e., a set of systematic relationships between multiple variables that can be tested empirically). It does this by determining how well a proposed theoretical model can estimate the covariance matrix for a sample data set. In contrast, PLS-EM is primarily used to develop theories in exploratory research (p. 4).

While the current study operates from theory, it remains exploratory in nature. Accordingly, the best course of action for determining the use of CB-SEM or PLS-SEM was to allow the data to speak for itself. Much like adventure consists of unknowns, so too does research. Thus, the researcher completed exploration of both models (using Lisrel for CB-SEM and Smart-PLS for PLS-SEM). After review it was determined that the best fit for the data was through the use of PLS-SEM due to significantly non-normal data. The current study recognizes that there is a contention over the use of PLS-SEM, and whether or not PLS-SEM is actually considered to be a structural equation model (Ronkko and Evermann 2013). However, as stressed by Byrne (1998),

The term structural equation modeling conveys two important aspects of the procedure: (a) that the causal processes under study are represented by a series of structural (i.e., regression) equations, and (b) that these structural relations can be modeled pictorially to enable a clearer conceptualization of the theory under study (p. 3).

In this light, the researcher believed that PLS-SEM satisfied both these criteria (Hensler et al., 2014).

SmartPLS version 3.2.3 was used to analyze the relationship of OAE and PT perceptions of preparedness to teach. SmartPLS was used to analyze the measurement model metrics of reliability, convergent validity, and discriminant validity. Additionally, the current study used PLS for evaluation of the measurement model (reflective measurement model), and the evaluation of the structural model (Hair et al., 2017). PLS-SEM is a suitable approach for addressing the research questions of the current study. Likewise, while the study is grounded in the theoretical framework of reciprocal causation, and is specifically interested in the environmental factor of the triadic

structure. As a result, an exploration of this particular element was needed, and PLS-SEM allows for this investigation to take place. Table 1 demonstrates the paths that were analyzed.

Table 1. Paths Analyzed.

| Paths to be Analyzed |
|---|
| Outdoor Adventure Engagement → Preparedness to Teach |
| Outdoor Adventure Engagement → Teacher Efficacy → Preparedness to Teach |
| Outdoor Adventure Engagement → Grit → Preparedness to Teach |
| Teach Efficacy → Preparedness to Teach |
| Grit → Preparedness to Teach |
| Grit → Teacher Efficacy → Preparedness to Teach |

Sample Size

The overarching interest of the study was to investigate the relationship of OAE and PT perception of preparedness to teach. This relationship is mediated through teacher efficacy and grit. PLS-SEM was used to investigate this relationship. The use of PLS-SEM instead of CB-SEM is preferred when sample sizes are smaller. For example, a sample size of 200 is considered to be an adequately close fit to the data in CB-SEM (MacCallum, Browne, & Sugawara, 1996). Some overestimate the ability to use small samples in PLS-SEM (Hair et al., 2017), so care is needed in addressing appropriate statistical power. According to Cohen (1992), the current model (with three independent variables) needs 145 participants to detect minimum R^2 values of 0.10 at a significance

level of 1%. 103 participants are needed at the 5% significance level. The current study obtained 209 participants, which allowed for the data to determine which SEM method was appropriate.

Sampling Procedure

For this study, a stratified sampling procedure was used at Montana State University. The current study was interested in the relation of OAE and PT perceptions of preparedness to teach. The stratified sample consisted of students who were enrolled in a variety of education courses during the Spring 2016 semester. Education courses were strategically chosen (Gay, Mills, & Airasian, 2012) to ensure an even distribution of participants were freshman, sophomores, juniors and seniors, as well as an even distribution of elementary and secondary education majors.

Data were collected with both face-to-face paper copies and online through Qualtrics. According to Weigold, Weigold, and Russell (2013), response rates for paper-and-pencil and Internet data collection methods tends to be equivalent. As a result both methods were used, and the type of administration was determined based on the availability to visit the class. The use of oversampling aided in ensuring that the needed sample size was met. The sample selected consisted of a possible 400 students. 234 (58.5%) students participated in the survey, and 209 (52.25%) of the participants completed the survey with enough data to be included in the analysis.

The study took students between 15-25 minutes to complete, and included an opportunity to provide an email address to be entered into a drawing for prizes. The prizes were generously provided by Exodus Reps, and had a value of roughly \$167.75.

The prizes were used to promote participation and demonstrate appreciation for participation.

Variables

A PLS-SEM was utilized to examine the relationship of OAE and PT perceptions of preparedness to teach. This analysis had an independent variable of outdoor engagement, mediating variables of teacher efficacy and grit, and a dependent variable of preparedness to teach. Teacher efficacy and grit also served as independent variables as direct effects were measured with these variables. Teacher efficacy also served as a mediating variable to grit.

The analysis required three factors of OAE (a question pertaining to outdoor adventure expeditions, instructing outdoor adventure activities, and the level of engagement within the past two years of outdoor adventure activities). The TSES scale historically has three factor loadings (Tschannen-Moran & Hoy, 2001). However, factor analysis in the current study required the use of two distinct factors. Likewise, the grit scale typically has two factors, and these were maintained in the current analyses.

The dependent variable of preparedness to teach was aligned with the 10 InTASC Standards, and resulted in six distinct factors in the current study. The scale was originally designed for graduates of a teacher education program, so the current participants were unique to the scale. Demographic information (year in school, gender, and background-rural, suburban, or urban) was also collected.

Instruments

Four instruments were used in the current study to collect data to regarding degree of engagement in OAE, teacher efficacy, grit and preparedness to teach. Demographic questions included: gender, year in school, major, age, and a question pertaining to the place where participants grew up. The four locations include urban (over 100,000), suburban, town (over 25,000), and rural. The location demographics were obtained from the National Center for Education Statistics' New Urban-Centric Locale Codes (NCES, n.d.). This question is pertinent to the study in addressing the issue of access to outdoor space (Appendix A).

The assessment of outdoor adventure engagement consisted of three questions: longest outdoor adventure trip (expedition), outdoor adventure activities that the participants have worked as a formal or informal instructor, and the level of engagement in outdoor adventure activities they have participated in the last two years. Participation was measured as: "Never, Hardly Ever, Occasionally, and Frequently" (Hakel, 1968).

The *Teacher Sense of Efficacy Scale* (TSES) (Tschannen-Moran & Hoy, 2001) has both a 24 and 12 item instrument. This instrument consists of a 1-9 likert scale where 1 corresponds to "nothing", 3 corresponds to "very little", 5 corresponds to "some influence", 7 corresponds to "quite a bit", and 9 corresponds to "a great deal". The scale also incorporates options in between the descriptions as seen with 2, 4, 6, and 8. Each of these has been found to have moderate to strong psychometrics with three factors: student engagement, instruction practice, and classroom management. A factor analysis of the 12-item scale, which is more pedagogically focused, accounted for 65-68% of the

variance. Furthermore, the alpha levels found consisted of .90 (overall), .81 (engagement), .86 (instruction), and .86 (management) (Tschannen-Moran & Hoy, 2001). The survey instrument has been found to be viable for pre-service teachers (Duffin, French, & Patrick, 2012), novice and experienced teachers (Tschannen-Moran & Hoy, 2007), and with international teachers (Nie, Lau, & Liao, 2010).

The *Short Grit Scale* (Grit-S) (Duckworth & Quinn, 2009) is an eight-item likert scale that has been validated over a series of studies. These studies included samples of United States Military Academy, West Point, cadets, finalists of the 2005 Scripps National Spelling Bee, and undergraduate Ivy League students (Duckworth & Quinn, 2009). These groups were used in the process of transitioning to the 8-item Grit-S, which is shorter and psychometrically stronger than the original 12-item original grit scale. The Grit-S alpha levels consisted of .73 to .83 across four samples, and .73 to .79 for Consistency of Interest and .60 to .78 Perseverance of Effort (Duckworth & Quinn, 2009). Additionally, the two factors showed adequate internal consistency as they were strongly intercorrelated ($r = .59, p = .001$) (Duckworth & Quinn, 2009). The Grit-S instrument consists of a 1-5 likert scale with questions ranging from “very much like me”, “mostly like me”, “somewhat like me”, “not much like me” to “not like me at all”. Four of the questions are reversed scored (asking questions that does showcase grit), and adding all points and dividing by eight calculates the cumulative “gritty” score. An average score of 5 constitutes extremely gritty whereas a score of 1 constitutes not at all gritty (Duckworth & Quinn, 2009). Questions 2, 4, 7, and 8 were transformed in SPSS to

a reversed score. This is according to the protocols called for by Duckworth and Quinn (2009).

Questions pertaining to preparedness to teach were obtained from an instrument derived from the InTASC Standards (Sherman et al., 2015). (Table 2).

Table 2. InTASC Standards (CCSSO, 2011).

| Category | Standards |
|-----------------------------|--|
| The Learner and Learning | Learner Development |
| | Learning Differences |
| | Learning Environments |
| Content Knowledge | Content Knowledge |
| | Application of Content |
| Instructional Practice | Assessment |
| | Planning for Instruction |
| | Instructional Strategies |
| Professional Responsibility | Professional Learning and Ethical Practice |
| | Leadership and Collaboration |

Faculty and doctoral students at University of Northern Colorado (UNC) created the instrument, and gave permission to use the instrument in the current study (Sherman et al., 2015). Because the instrument is fairly new, the questionnaire will not be provided in the appendices. However, the reliabilities are presented below in Table 3.

Table 3. Preparedness to Teach InTASC Standards Psychometrics (Sherman et al., 2015).

| Standard | Guttman's Lamda 2 | Number of Items |
|----------|-------------------|-----------------|
| 1 | .85 | 5 |
| 2 | .88 | 6 |
| 3 | .89 | 4 |
| 4 | .90 | 5 |
| 5 | .84 | 4 |
| 6 | .88 | 5 |
| 7 | .90 | 4 |
| 8 | .94 | 6 |
| 9 | .91 | 6 |
| 10 | .80 | 3 |

After a substantial review process, the members of UNC formulated the instrument consisting of 48 questions. The scale uses a 1-5 likert scale ranging from “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, to “strongly agree” (Sherman et al., 2015). The stem to the instrument was altered to better address the needs of the current study. The current study asked participants, “We are interested in your views about your current level of preparedness to become a K-12 teacher. Please answer the following questions:”, and it used the stem “I am prepared to...”. Like the UNC version, the stem was displayed on every page of the preparedness instrument (Sherman, 2015). The original instrument was designed to assess graduates of UNC’s teacher

education program. Therefore, the use of this instrument with undergraduate participants is unique.

Data Collection

The demographic questions pertaining to outdoor adventure engagement were piloted before the administering of the survey. These questions were originally piloted with undergraduate students at Montana State University who were enrolled in an outdoor adventure education course. There were 27 students enrolled in this course. The original questions were based off of *Outdoor Leader Experience Use History* (OLEUH) (Galloway, 2003). However, after receiving feedback from the students, the OLEUH scale did not resonate with these students indicating the challenge of measuring outdoor use. As a result questions were designed to analyze outdoor use from an expeditionary (longest trip in days), instructional, and engagement perspective. The demographic, outdoor adventure engagement questions were conducted after receiving approval from Institutional Review Board (IRB).

Data collection began once IRB approval was obtained. Data collection took place over two weeks in March and April of 2016. The nature of this survey was designed for minimal risk of the participating students. The questions created for the study were non-offensive and non-controversial in nature. The teacher efficacy and grit questionnaires are also non-offensive and non-controversial in nature based on the IRB application. Additionally, industry leaders and experts have utilized these two instruments (Duckworth et al., 2007; Duckworth & Gross, 2014; Duffin et al., 2012; Tschannen-Moran & Hoy, 2001; 2007). The survey was conducted in person with paper

copies and online using Qualtrics. 116 of the surveys were completed face-to-face and 93 of the surveys were completed online. All surveys were entered into Qualtrics for secure storage. The paper copy surveys were manually entered into the program, and the paper forms were immediately placed in a secure location for shredding. Montana State University provides access to Qualtrics to all students, and their security measures were an added consideration. Additionally, the data from the surveys will be deleted within one year of being collected. If students had questions or concerns regarding the survey and research they will have the right to contact me at any time during and after the data collection process.

A drawing was completed after data collection was finished to determine who would receive the prizes provided by Exodus Reps. Participants who completed the paper version of the survey were provided with a note card that was stapled onto the back. The participants were told to provide their email addresses on the card, the card was removed, and the cards were placed into a container separate from their surveys. The email addresses from cards were entered into an excel sheet. The cards with the email addresses were placed in shredding along with the paper surveys. The students who completed the online, Qualtrics form of the survey were informed to provide their email addresses on a separate, last page. The email addresses in the online database were transferred to the excel document. Once the data collection process was completed, a raffling process took place where the winners were notified and prizes were delivered. An online random number generator was used to obtain the winning email addresses.

Data Analysis

The first step of the data analysis process was to review the outdoor adventure engagement question to determine if any irregularities or outliers existed (Gravetter & Wallnau, 2009). This was to ensure that the questions being asked were appropriately targeting the correct constructs. This examination was conducted over multiple periods with expert panels. Data were collected via Qualtrics for students who the researcher was not able to visit in class, and with paper copies to be administered to students in their class. All paper surveys were later entered into Qualtrics by the researcher. The data were initially reviewed in SPSS for skewness and normality. An initial exploratory factor analysis was completed in SPSS to ensure that the data were interpreted based on the responses of the participants. The exploratory analysis was necessary as little prior knowledge existed on how the variables related (Hair et al., 2017). Consequently, unique factor loadings in comparison to previous research emerged. Because of the unique population, and the lens of outdoor adventure engagement, this was not unexpected. The selection of PLS-SEM aided in addressing this issue. As indicated by Hair et al., (2017),

PLS-SEM's statistical properties provide very robust model estimations with data that have normal as well as extremely non-normal (i.e., skewness and/or kurtosis) distributional properties...It must be remembered, however, that influential outliers and collinearity do influence the OLS regressions in PLS-SEM, and researchers should evaluate the data and results for these items (p. 27).

The data were analyzed for influential outliers and collinearity issues to ensure the analysis of this data was appropriate.

Methodology Summary

The purpose of this study was to investigate the relationship of outdoor adventure engagement and student perception of preparedness to teach. This relationship was mediated through teacher efficacy and grit. This study was also interested in investigating the relationship of teacher efficacy and grit and how they relate to student perception of preparedness to teach. The current study addresses both the call of Scrutton and Beames (2015) call for more rigorous quantitative research in outdoor adventure literature, and it supports the call or Duckworth and Gross (2014) for more investigation of grit in relation to other constructs.

CHAPTER 4

RESULTS

Introduction

The purpose of this study was to examine the possible relationship between outdoor adventure engagement and pre-service teacher perceptions of preparedness to teach. Given that there are many components that lead to the preparation of an effective teacher. The current study used the reciprocal causation model (Bandura, 1989) as its foundation. The reciprocal causation model recognizes the importance of the interaction of behavioral, personal, and environmental factors in human growth and development. The current study postulates that outdoor adventure engagement (environmental factor), teacher efficacy (behavioral factor), and grit (personal factor) relate to a student's perception of preparedness to teach. There is scant quantitative research conducted on the intersection of teacher education and OAE. Likewise, while grit has been discussed anecdotally in relation to OAE (Garwin, 2014; LaGrande, 2015), no previous studies have analyzed this relationship.

There are many factors that support PTs as they enter their first teaching position. Teacher efficacy (Mosely et al., 2002; Tschannen-Moran & Hoy, 1998; 2001; 2007) and grit (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014) are found to have positive outcomes for effective teaching and student learning. However, as stressed by Duckworth and Gross (2014), investigation of the relation of grit to other goal oriented

constructs is needed. Currently, no other research has investigated the relationship between grit and teacher efficacy.

This chapter presents demographic information and results from the analysis of data collected to answer the research questions and hypotheses:

1. Is there a relationship between outdoor adventure engagement and student perception of preparedness to teach?

H₀: There is a relationship between outdoor adventure engagement and student perception of preparedness to teach.

H₁: There is not a relationship between outdoor adventure engagement and student perception of preparedness to teach.

2. Is there a relationship between outdoor adventure engagement and teacher efficacy?

H₀: There is a relationship between outdoor adventure engagement and teacher efficacy.

H₁: There is not a relationship between outdoor adventure engagement and teacher efficacy.

3. Is there a relationship between outdoor adventure engagement and grit?

H₀: There is a relationship between outdoor adventure engagement and grit.

H₁: There is not a relationship between outdoor adventure engagement and grit.

4. Is there a relationship between teacher efficacy and grit?

H₀: There is a relationship between teacher efficacy and grit.

H₁: There is not a relationship between teacher efficacy and grit.

5. Does teacher efficacy mediate the effect of grit on student perceptions of preparedness to teach?

H₀: Teacher efficacy mediates the effects of grit on student perceptions of preparedness to teach.

H₁: Teacher efficacy does not mediate the effects of grit on student perceptions of preparedness to teach.

Preliminary Analysis

Prior to conducting exploratory and confirmatory factor analysis the data was analyzed to with tests of normality and skewness. These tests were analyzed for the three questionnaires (TSES, Grit-S, the questions based off of the InTASC Standards), as well as the questions based on outdoor adventure engagement.

Outdoor demographic questions consisted of: a question pertaining to the longest expedition the individual had completed (in days), if they had formally (paid or volunteer) instructed in outdoor adventure activities, and how engaged they were in adventure activities in the past two years (Never, Hardly Ever, Occasionally, and Frequently). Instructing adventure activities was entered as categorical (yes or no). 48.3% ($n=101$) of the participants indicated that they had instructed outdoor adventure activities, while 50.7% ($n=106$) indicated that they had not instructed adventure activities. After initial review of the data, engagement was analyzed as the highest level of engagement (regardless of activity) within the past two years. The participants indicated 64.1% ($n=134$) were frequently, 28.2% ($n=59$) were occasionally, 7.2% ($n=15$) were

hardly ever, and 0.5% ($n=1$) were never engaged in outdoor adventure activities.

Participants indicated a wide range of multi-day adventures (listed as “expeditions”) in analysis. This ranged from 1 to 91 days. Frequencies and percentages of outdoor adventure are presented in Table 4.

Table 4. Adventure distributions.

| | <i>n</i> | Percent |
|-------------------|----------|---------|
| Instruct | | |
| Yes | 101 | 48.3 |
| No | 106 | 50.7 |
| Engagement | | |
| Frequently | 134 | 64.1 |
| Occasionally | 59 | 28.2 |
| Hardly Ever | 15 | 7.2 |
| Never | 1 | 0.5 |
| Expedition | | |
| 1 | 28 | 13.4 |
| 2-3 | 49 | 23.4 |
| 4-6 | 35 | 16.7 |
| 7-13 | 60 | 28.7 |
| 14-30 | 27 | 12.9 |
| 31-91 | 10 | 4.78 |

Normality and skewness tests were also performed on the outdoor adventure questions. As emphasized by Fabrigar, Wenger, MacCallum, and Strahan (1999), variables are not adversely affected when skewness is less than 2.00 and kurtosis is not greater than 7.00 (Table 5).

Table 5. Means, Standard Deviations, Skewness, and Kurtosis of OAE.

| Factor | Mean (<i>M</i>) | Standard Deviation (<i>STDEV</i>) | Skewness | Standard Error (<i>STERR</i>) | Kurtosis | Standard Error (<i>STERR</i>) |
|----------|-------------------|---|----------|---------------------------------------|----------|---------------------------------------|
| Exp | 9.48 | 14.901 | 3.987 | .168 | 17.420 | .335 |
| Eng | 3.56 | .649 | -1.292 | .168 | .942 | .335 |
| Instruct | 1.474 | .519 | -.102 | .168 | -1.512 | .335 |

The variable Exp (expeditions) was significantly skewed and all of the variables were significantly non-normal (Table 6).

Table 6. Tests of Normality for OAE.

| Factor | Kolmogorov-Smirnov | | | Shapiro-Wilks | | |
|----------|--------------------|-----|-----------------|---------------|-----|-----------------|
| | Statistic | df | <i>P</i> -Value | Statistic | df | <i>P</i> -Value |
| Exp | .291 | 209 | .000 | .504 | 209 | .000 |
| Eng | .392 | 209 | .000 | .675 | 209 | .000 |
| Instruct | .336 | 209 | .000 | .671 | 209 | .000 |

Normality and skewness tests were performed on the TSES, Grit-S, and preparedness factors. All of the factors had adequate skewness and kurtosis (Table 7).

Table 7. Means, Standard Deviations, Skewness, and Kurtosis of TE, Grit, & Prep.

| Factor | Mean (<i>M</i>) | Standard Deviation (<i>STDEV</i>) | Skewness | Standard Error (<i>STERR</i>) | Kurtosis | Standard Error (<i>STERR</i>) |
|--------|-------------------|---|----------|---------------------------------------|----------|---------------------------------------|
| TE1 | 7.253 | 1.083 | -.550 | .168 | .796 | .335 |
| TE2 | 7.164 | 1.165 | -.769 | .168 | 1.256 | .335 |
| G1 | 3.024 | .786 | -.233 | .168 | -.233 | .335 |
| G2 | 3.925 | .662 | -.560 | .168 | .244 | .335 |
| P1 | 4.081 | .698 | -.838 | .168 | 1.278 | .335 |
| P2 | 4.310 | .571 | -1.228 | .168 | 4.340 | .335 |
| P3 | 4.111 | .671 | -.853 | .168 | 1.781 | .335 |
| P4 | 4.123 | .668 | -.989 | .168 | 2.234 | .335 |
| P5 | 4.268 | .630 | -1.108 | .168 | 3.146 | .335 |
| P6 | 3.947 | .759 | -.686 | .168 | .498 | .335 |

However, as evident in Table 8, tests of normality found that all variables were significantly non-normal.

Table 8. Tests of Normality for TE, Grit, and Prep.

| Factor | Kolmogorov-Smirnov | | | Shapiro-Wilks | | |
|--------|--------------------|-----|-----------------|---------------|-----|-----------------|
| | Statistic | df | <i>P</i> -Value | Statistic | df | <i>P</i> -Value |
| TE1 | .064 | 209 | .037 | .966 | 209 | .000 |
| TE2 | .117 | 209 | .000 | .958 | 209 | .000 |
| G1 | .097 | 209 | .000 | .982 | 209 | .011 |
| G2 | .148 | 209 | .000 | .951 | 209 | .000 |
| P1 | .114 | 209 | .000 | .937 | 209 | .000 |
| P2 | .119 | 209 | .000 | .898 | 209 | .000 |
| P3 | .093 | 209 | .000 | .930 | 209 | .000 |
| P4 | .101 | 209 | .000 | .919 | 209 | .000 |
| P5 | .149 | 209 | .000 | .881 | 209 | .000 |
| P6 | .121 | 209 | .000 | .947 | 209 | .000 |

Two hundred thirty four (234) students completed the entire set of instruments. Twenty-five (25) students were removed from the analysis as they chose to not answer a large portion of the questions, leaving two hundred nine (209) (89.32%) participants for analysis.

Demographic information was collected on participant gender, year in school, major, age, and location where participants were raised. A summary of demographic findings is displayed in Table 9.

Table 9. Descriptive Statistics for Demographic Data.

| | <i>n</i> | Percent |
|-----------------------|----------|---------|
| Year in School | | |
| Freshman | 42 | 20.1 |
| Sophomore | 47 | 22.5 |
| Junior | 58 | 27.8 |
| Senior | 61 | 29.2 |
| Major | | |
| Elementary Education | 105 | 50.24 |
| Secondary Education | 50 | 23.92 |
| “Other” Education | 9 | 4.31 |
| HHD | 5 | 2.40 |
| Non-Education | 40 | 19.13 |
| Age | | |
| 18 | 17 | 8.1 |
| 19 | 39 | 18.7 |
| 20 | 39 | 18.7 |
| 21 | 38 | 18.2 |
| 22 | 35 | 16.7 |
| 23 | 12 | 5.7 |
| 24-42 | 29 | 13.86 |
| Location | | |
| Urban (Over 100,000) | 31 | 15.2 |
| Suburban | 39 | 19.1 |
| Town (Over 25,000) | 63 | 30.9 |
| Rural | 71 | 34.8 |

The gender breakdown for the 209 participants consisted of 64 males (30.6%) and 145 females (69.4%). 208 of the 209 (99.52%) participants answered the year in school

question. A stratified sample participants enrolled in education classes was used to elicit an even range of progress through the degree process. This even distribution is evident, though a higher percentage of participation is seen throughout each sequential year in school. This breakdown of year in school is evident with: 20.1% ($n=42$) freshman, 47% ($n=47$) sophomores, 27.8% ($n=58$) juniors, and 29.2% ($n=61$) seniors. Participants were asked to provide the major they are currently enrolled in. After review of their response, major in school was broken down to: 50.24% ($n=105$) elementary education, 23.92% ($n=50$) secondary education, 4.31% ($n=9$) “other” education (music, agriculture, and technology), 2.4% ($n=5$) health and human development (HHD), and 19.13% ($n=40$) non-education majors. 204 of the 209 (97.61%) participants responded to the question pertaining to location participants grew up in. The location labels were derived from the National Center for Education Statistics (NCES) locale codes. The locations and percentages consisted of 15.2% ($n=31$) urban (over 100,000), 19.1% ($n=39$) suburban, 30.9% ($n=63$) town (over 25,000), and 34.8% ($n=71$) rural. Additionally, the age of the participants ranged from 18 to 42.

Exploratory Factor Analysis

All three instruments have previously gone through both exploratory factor analysis and confirmatory factor analysis. For the current study, an initial factor analysis was completed to determine if the data was loading as expected based on previous research. This analysis was also necessary to determine the best course of action with regards to analyzing the data during the SEM process. In analyzing the current data, it is also important to recognize that this is a unique data set. The instrument based on the

InTASC standards is quite new, and no comparison of teacher efficacy and grit has been completed. Most important to consider is the lens in which the data was prompted by the participants, which is central to the current study. The study is focused on the intersection of outdoor adventure education and teacher education. The responses of participants were impacted by their experience in outdoor adventure activities.

The instrument provided by UNC has previously gone through exploratory and confirmatory factor analysis. The original loadings, in relation to the InTASC Standards is seen as follows:

Table 10. Original Factor Loadings Based on InTASC Standards.

| Questions | InTASC Standard |
|------------------------------|-----------------|
| P1, P2, P3, P4, P5 | 1 |
| P6, P7, P8, P9, P10, P11 | 2 |
| P12, P13, P14, P15 | 3 |
| P16, P17, P18, P19, P20 | 4 |
| P21, P22, P23, P24 | 5 |
| P25, P26, P27, P28, P29 | 6 |
| P30, P31, P32, P33 | 7 |
| P34, P35, P36, P37, P38, P39 | 8 |
| P40, P41, P42, P43, P44, P45 | 9 |
| P46, P47, P48 | 10 |

Factor analysis of the 48 questions related to preparedness to teach resulted in six (6) factors. Of note, 14 questions were cross-loaded. The following cross-loaded questions were removed from analysis: P.1, P.5, P.7, P. 10, P.15, P.16, P.18, P.23, P.27, P.29, P.32, P.35, P.36, and P.39. The six factors are presented below in Table 11.

An analysis of the traits demonstrated an overarching theme of theoretically guided practice.

- Factor 1: The need for reflective practice that is guided, flexible, yet informed through practice.
- Factor 2: The value of responsible practice that is informed by the need to incorporate families, the environment, culture, and technology.
- Factor 3: Reflective practice that is grounded in psychologically based practice.
- Factor 4: The need for professional development to inform and ensure high quality practice.
- Factor 5: The importance of the social process of learning.
- Factor 6: The use of differentiation in a manner that is supported through experiential learning.

It is important to note this instrument was designed for teacher education graduates. The current study analyzes participants who are undergraduates ranging from freshman to seniors. Accordingly, it is not unexpected that the factor loadings were low, and that 6 rather than 10 factors emerged.

Table 11. Factor Loadings of Preparedness to Teach.

| | Factors | | | | | | |
|----------|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Factor 1 | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 |
| P. 42 | | .661 | .209 | .296 | .102 | .326 | .212 |
| P. 25 | | .633 | .287 | .271 | .201 | .176 | .174 |
| P. 26 | | .628 | .233 | .159 | .360 | .182 | .264 |
| P. 28 | | .605 | .221 | .360 | .162 | .234 | .211 |
| P. 30 | | .580 | .302 | .324 | .334 | .221 | .014 |
| P. 43 | | .538 | .414 | .145 | .276 | .054 | .401 |
| P. 45 | | .531 | .427 | -.056 | .354 | .101 | .347 |
| P. 31 | | .524 | .261 | .303 | .414 | .229 | .020 |
| Factor 2 | | | | | | | |
| P. 47 | | .308 | .695 | .208 | .088 | .252 | .194 |
| P. 48 | | .173 | .642 | .309 | .105 | .279 | .138 |
| P. 33 | | .142 | .634 | .246 | .232 | .223 | .062 |
| P. 40 | | .086 | .632 | .193 | .221 | .175 | .174 |
| P. 46 | | .360 | .562 | .193 | .060 | .167 | .439 |
| P. 41 | | .292 | .556 | .042 | .180 | .191 | .226 |
| P. 44 | | .437 | .537 | .180 | .233 | .255 | -.006 |
| Factor 3 | | | | | | | |
| P. 4 | | .180 | .268 | .726 | .099 | .222 | .231 |
| P. 9 | | .222 | .237 | .578 | .270 | .109 | .381 |
| P. 3 | | .360 | .170 | .542 | .313 | .323 | .153 |
| P. 34 | | .298 | .278 | .512 | .480 | .211 | .054 |
| P. 2 | | .212 | .250 | .510 | .263 | .437 | .154 |
| P. 19 | | .355 | .210 | .506 | .281 | .167 | .366 |
| P. 17 | | .352 | .294 | .505 | .327 | .149 | .161 |
| Factor 4 | | | | | | | |
| P. 20 | | .137 | .213 | .177 | .659 | .164 | .302 |
| P. 21 | | .322 | .096 | .020 | .641 | .336 | .270 |
| P. 38 | | .437 | .190 | .289 | .552 | .184 | .113 |
| P. 37 | | .274 | .426 | .385 | .533 | .030 | .115 |
| P. 22 | | .290 | .259 | .394 | .519 | .114 | .279 |
| Factor 5 | | | | | | | |
| P. 12 | | .178 | .299 | .134 | .170 | .718 | .232 |
| P. 13 | | .212 | .296 | .095 | .274 | .714 | .101 |
| P. 14 | | .321 | .340 | .330 | .222 | .552 | .065 |
| P. 11 | | .208 | .403 | .324 | .069 | .548 | .162 |
| Factor 6 | | | | | | | |
| P. 6 | | .176 | .265 | .288 | .210 | .088 | .676 |
| P. 8 | | .373 | .092 | .393 | .186 | .345 | .506 |
| P. 24 | | .259 | .349 | .126 | .390 | .242 | .481 |

The TSES-12 consists of three distinct factors: *Efficacy for Instructional Strategies*, *Efficacy for Classroom Management*, and *Efficacy for Student Engagement* (Tschannen-Moran & Hoy, 2001). However, for the current model, two distinct factors emerged. Additionally, item seven, “How much can you do to calm a student who is disruptive or noisy”, cross-loaded between the two factors. Consequently, it was dropped from analysis. The two factors are presented below.

Table 12. Factor Loadings of Teacher Efficacy.

| | Factor 1 | |
|--|-------------|-------------|
| 9. How much can you use a variety of assessment strategies? | .816 | .216 |
| 10. To what extent can you provide an alternative explanation or example when students are confused? | .781 | .208 |
| 12. How well can you implement alternative strategies in your classroom? | .777 | .280 |
| 8. How well can you establish a classroom management system with each group of students? | .682 | .439 |
| 5. To what extent can you craft good questions for your students? | .661 | .245 |
| 6. How much can you do to get children to follow classroom rules? | .591 | .477 |
| 11. How much can you assist families in helping their children do well in school? | .579 | .333 |
| Factor 2 | | |
| 2. How much can you do to motivate students who show low interest? | .170 | .876 |
| 3. How much can you do to get students to believe they can do well in school? | .264 | .822 |
| 4. How much can you do to help your students to value learning? | .356 | .741 |
| 1. How much can you do to control disruptive behavior in the classroom? | .375 | .638 |

The Short Grit Scale consists of two distinct factors: *Consistency of Interest* and *Perseverance of Effort* (Duckworth & Quinn, 2009). The current study loaded as expected based on previous research with the two distinct factors. However, question seven, “I finish whatever I begin”, cross-loaded across the two factors. Consequently, it was removed from analysis.

Table 13. Factor Loadings for Grit.

| Factor 1 | | |
|--|-------------|-------------|
| (Consistency of Effort) | | |
| 5. I often set a goal but later choose to pursue a different one. | .790 | .078 |
| 6. I have difficulty maintaining focus on projects that take more than a few months to complete. | .784 | .132 |
| 3. I have been obsessed with a certain idea or project for a short time but later lost interest. | .758 | .101 |
| 1. New ideas and projects sometimes distract me from previous ones. | .674 | .167 |
| Factor 2 | | |
| (Perseverance of Effort) | | |
| 8. I am diligent. | .225 | .842 |
| 4. I am a hard worker. | .006 | .833 |
| 2. Setbacks don't discourage me. | .120 | .605 |

Structural Equation Model

After, exploratory factor analysis, the best course for moving forward was to investigate the relationship of outdoor adventure engagement, teacher efficacy, grit, and preparedness to teach in a multitude of ways. An examination of the data, using both Lisrel and SmartPLS, with the collected data ($n = 209$) was completed. As emphasized in chapter 3 the current study is both exploratory and grounded in theory. Henseler and Sarstedt (2013) add to the conversation regarding the choice of CBSEM or PLS-SEM

PLS path modeling's popularity among scientists and practitioners is due to four genuine advantages: First, PLS path modeling 'involves no assumptions about the population or scale of measurement'. PLS path modeling can thus be used when distributions are highly skewed...Second, even when having a small sample, PLS path modeling can be used to estimate relationships between latent variable with several indicators...Third, modern easy-to-use PLS path modeling software with graphical user-interfaces, like SmartPLS...Fourth, PLS path modeling is preferred over covariance based structural equation modeling (CBSEM) when improper or non-convergent results are likely...as for instance in more complex models, for which the number of variables is high in relationship to the number of observations, and the number of indicators per latent variable is low (p. 566).

As emphasized by Hair et al., (2017), "The goal of PLS-SEM is maximizing the explained variance (i.e., the R^2 value) of endogenous latent variables in the PLS path model" (p. 105). This requires the measurement model metrics of reliability, convergent validity, and discriminant validity. Additionally, the current study requires an evaluation of the measurement model (reflective measurement model), and an evaluation of the structural model (Hair et al., 2017). A description of labels for the latent traits and their indicators in SmartPLS is found in Table 14.

Table 14. Description of Labels.

| Coded Name | Variable |
|------------------------|---|
| Latent Trait | Outdoor adventure engagement |
| OAE | |
| Indicators | |
| Instruct | Formally or informally instructing OAE |
| Exp | Longest outdoor adventure trip |
| Eng | Highest level of outdoor adventure engagement |
| Latent Trait | |
| TE | Teacher efficacy |
| Indicators | |
| TE1, TE2 | Teacher efficacy factors |
| Latent Trait | |
| Grit | Grit |
| Indicators | |
| G1, G2 | Grit factors |
| Latent Trait | Perception of preparedness to teach |
| Prep | |
| Indicators | |
| P1, P2, P3, P4, P5, P6 | Preparedness factors |

Measurement Model Analysis

The outer loadings of the indicators are shown in Table 15. Indicator reliability of 0.70 is the preferred. However, as the research is exploratory in nature, 0.4 or higher is acceptable (Hulland, 1999). Factor loadings that are less than the accepted 0.4 are marked with an asterisk (*). This item loaded below the acceptable lever, but because of the nature of the study (a focus on outdoor adventure engagement), it remained in analysis.

Table 15. Outer Loadings.

| Indicators | Construct | Outer Loadings |
|------------|-----------|----------------|
| Eng | OAE | 0.372* |
| Exp | OAE | 0.745 |
| Instruct | OAE | -0.447 |
| TE1 | TE | 0.930 |
| TE2 | TE | 0.933 |
| G1 | Grit | 0.742 |
| G2 | Grit | 0.872 |
| P1 | Prep | 0.917 |
| P2 | Prep | 0.884 |
| P3 | Prep | 0.911 |
| P4 | Prep | 0.874 |
| P5 | Prep | 0.845 |
| P6 | Prep | 0.863 |

The reliability and validity statistics are presented in Table 16. As emphasized by Bagozzi and Yi (1988), internal consistency reliability should be 0.7 or higher. However, as the research is exploratory in nature, 0.6 or higher is acceptable (Bagozzi & Yi, 1988). As evident, the composite reliability and Cronbach's alpha for OAE were both below the requisite cut-off. Additionally, the Cronbach's alpha for Grit was below 0.6.

Reliabilities that are less than the accepted 0.6 are marked with an asterisk (*).

Convergent validity is determined through the average variance extracted (AVE). As suggested by Bagozzi and Yi, 1988, the AVE should be 0.5 or higher. As seen in the current model, OAE fell below this number, and it was denoted with an asterisk.

Table 16. Reliability and Validity.

| Construct | AVE | Sqrt(AVE) | Composite Reliability | Cronbach's Alpha |
|-----------|--------|-----------|-----------------------|------------------|
| OAE | 0.298* | 0.546 | 0.176* | 0.461* |
| TE | 0.868 | 0.932 | 0.929 | 0.847 |
| Grit | 0.655 | 0.809 | 0.790 | 0.482* |
| Prep | 0.779 | 0.883 | 0.955 | 0.943 |

Discriminant validity is the extent to which a construct is empirically distinct from other constructs (Hair et al., 2017). According to Hair et al., (2017), there are two methods for determining discriminate validity, cross loadings and the Fornell-Larkner criterion. They emphasize, "an indicator's outer loading on the associated construct should be greater than any of its cross-loadings (i.e., its correlation) on other constructs"

(p. 115). Table 17 displays the cross-loadings. The loading showcase that discriminate validity is maintained.

Table 17. Cross Loadings.

| Indicator | OAE | TE | Grit | Prep |
|-----------|---------------|--------------|--------------|--------------|
| Eng | 0.372 | 0.080 | 0.094 | 0.038 |
| Exp | 0.745 | 0.120 | -0.076 | 0.003 |
| Instruct | -0.447 | -0.110 | 0.012 | -0.039 |
| TE1 | 0.182 | 0.930 | 0.270 | 0.304 |
| TE2 | 0.181 | 0.933 | 0.206 | 0.361 |
| G1 | -0.003 | 0.168 | 0.742 | 0.147 |
| G2 | -0.029 | 0.238 | 0.872 | 0.189 |
| P1 | 0.010 | 0.326 | 0.209 | 0.917 |
| P2 | 0.019 | 0.352 | 0.184 | 0.884 |
| P3 | 0.049 | 0.322 | 0.242 | 0.911 |
| P4 | 0.009 | 0.253 | 0.152 | 0.874 |
| P5 | 0.101 | 0.316 | 0.146 | 0.845 |
| P6 | 0.053 | 0.359 | 0.166 | 0.863 |

According to Hair et al., (2017), the Fornell-Larker criterion compares the square root of the AVE values. The value should be greater than its highest correlation with any other construct. Table 18. Displays the Fornell-Larker criterion. The cross-loadings and Fornell-Larker criterion demonstrate that discriminant validity was achieved.

Table 18. Fornell-Larker Criterion.

| Construct | Grit | OAE | Prep | TE |
|-----------|--------|--------|-------|-------|
| Grit | 0.809 | | | |
| OAE | -0.022 | 0.546 | | |
| Prep | 0.210 | 0.0045 | 0.883 | |
| TE | 0.255 | 0.195 | 0.358 | 0.931 |

As evident in both the cross-loadings and the Fornell-Larker criteria, indicator loadings of the constructs differ to a large extent. This supports the discriminant validity of the data (Hair et al., 2017).

Structural Model Analysis

PLS-SEM has been criticized in the past for the lack of a global goodness-of-fit measure (Hensler & Sarstedt, 2013). However, Hensler et al., (2014) introduced the standardized root mean residual (SRMR) for PLS-SEM, which has previously been used in CB-SEM. The SRMR is defined as, “the root mean square discrepancy between the observed correlations and the model-implied correlations” (Hair et al., 2017, p. 193). According to Hu and Bentler, (1999), when applying a SRMR to a CB-SEM, a value of less than 0.08 is considered a good fit. Hair et al., (2017) indicate that 0.08 is most likely too low for PLS-SEM. They state,

The reason is that the discrepancy between the observed correlations and the model-implied correlations plays different roles in CB-SEM and PLS-SEM. Whereas the CB-SEM algorithm aims at minimizing the discrepancy, in PLS-SEM, the discrepancy results from the model estimation, whose aim is to maximize the explained variance of the endogenous construct(s). That is minimizing the discrepancy is the target

criterion of CB-SEM, whereas this is not the case in PLS-SEM (Hair et al., 2017, p. 193).

The standardized root mean residual (SRMR = 0.033) of the current study indicates a good fit of the model. Figure 4 displays the path analysis for the current model. This includes path coefficients and *p*-values.

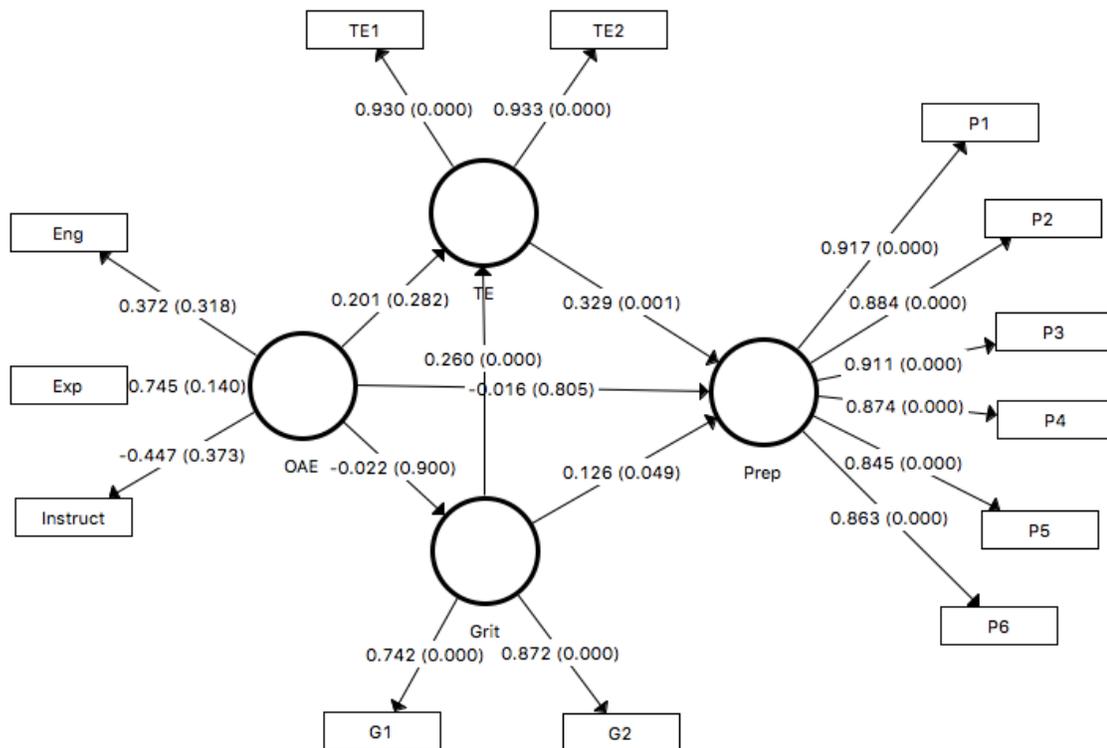


Figure 4. Path Analysis.

The current demonstrates acceptable discrepancy between the variables.

The bootstrap statistical output, containing the correlation coefficients, p-values, and t-statistics associated with each relationship are displayed in Table 19. The relationships of TE on Prep, Grit on Prep, and Grit on TE were significant at the 5% significance level. Of note, none of the relationships with OAE yielded significance.

Table 19. Bootstrap Statistical Output. Note. * $p < 0.05$.

| Causal Relationship | Original Sample (<i>O</i>) | Sample Mean (<i>M</i>) | Standard | Standard | <i>T</i> Statistic | <i>P</i> -Value |
|---------------------|---------------------------------|--------------------------|-------------------------------|---------------------------|-----------------------|-----------------|
| | | | Deviation (<i>STDEV</i>) | Error (<i>STERR</i>) | | |
| Grit->Prep | 0.126 | 0.126 | 0.064 | 0.064 | 1.976 | 0.049* |
| Grit->TE | 0.260 | 0.263 | 0.064 | 0.064 | 4.074 | 0.000* |
| OAE->Grit | -0.022 | -0.003 | 0.172 | 0.172 | 0.126 | 0.900 |
| OAE->Prep | -0.016 | -0.012 | 0.065 | 0.065 | 0.247 | 0.805 |
| OAE->TE | 0.201 | 0.090 | 0.187 | 0.187 | 1.077 | 0.282 |
| TE->Prep | 0.329 | 0.335 | 0.097 | 0.097 | 3.382 | 0.001* |

The R^2 and adjusted R^2 showcase the models predictive power (Hair et al., 2017). The current model fails to explain the variance of the model with the Grit construct. This is the case with both the R^2 and adjusted R^2 models. TE exhibited a low R^2 and adjusted R^2 , explaining at most 10.5% of the variance. Prep also exhibited a low R^2 and adjusted R^2 , explaining at most 14.3% of the variance. The total R^2 and adjusted R^2 explained 24.8% and 22.4% of the variance of the model. Cohen (1988) suggests effect sizes for R^2 values be interpreted according to the following criteria: .02 = small, .13 = moderate and .25 = large effects. The R^2 values reported in Table 20 demonstrate the effect sizes. According to the criteria of Cohen (1988), Grit has no effect, TE has a small effect, and Prep has a large effect.

Table 20. Correlations, R^2 , and Adjusted R^2 Results.

| Construct | Correlation (R) | R^2 | Adjusted R^2 |
|-----------|---------------------|-------|----------------|
| Grit | 0.000 | 0.000 | -0.004 |
| Prep | 0.378 | 0.143 | 0.131 |
| TE | 0.324 | 0.105 | 0.097 |

Journal editors and reviewers have increasingly encouraged the f^2 effect size to be presented in findings by (Hair et al., 2017). Hair et al., (2017) state that assessing f^2 effect as: small (0.02), medium (0.15), and large (0.35). Table 21 displays the effects of the relationships.

Table 21. Effect Size.

| Causal Relationship | Original Sample (O) | Sample Mean (M) | Standard Deviation ($STDEV$) | Standard Error ($STERR$) | T Statistic | P -Value |
|---------------------|-------------------------|---------------------|--------------------------------|----------------------------|---------------|------------|
| Grit->Prep | 0.017 | 0.022 | 0.018 | 0.019 | 0.942 | 0.347 |
| Grit->TE | 0.075 | 0.081 | 0.041 | 0.041 | 1.847 | 0.065 |
| OAE->Grit | 0.000 | 0.032 | 0.036 | 0.036 | 0.013 | 0.990 |
| OAE->Prep | 0.000 | 0.005 | 0.007 | 0.007 | 0.039 | 0.969 |
| OAE->TE | 0.045 | 0.048 | 0.034 | 0.034 | 1.319 | 0.188 |
| TE->Prep | 0.113 | 0.135 | 0.083 | 0.083 | 1.361 | 0.174 |

The current model shows no effect for OAE on Grit, OAE on Prep, and Grit on Prep.

The model exhibits small effect for Grit on TE, OAE on TE, and TE on Prep. In

addition, TE was found to partially mediate the direct effect of Grit on Prep. The direct effect of Grit on Prep was significantly ($p < .01$) reduced from .126 to .085 when mediated by TE.

Summary

Overall, the model showed significantly non-normal factors throughout. This non-normality is most likely due to the questions being closely related. The model itself showed good fit, as evident from the SRMR. The model did exhibit indicator reliability issues with the engagement in outdoor adventure activities variable. Likewise, the reliabilities for OAE, as well as Grit were less than required. As a result, care is needed in interpreting the data.

The data does not reveal significant relationships with outdoor adventure engagement, which is the central component of investigation. However, significant relationships of teacher efficacy and grit in relation to preparedness to teach were found. The relationship of teacher efficacy with Preparedness had the strongest relationship evidenced by a path coefficient of .329 and R^2 of .105. Additionally, the results show Grit was significantly related, at the 5% significance level, to teacher efficacy and preparedness to teach, as evident from significant path coefficients (.126). This is noteworthy as it supports Duckworth and Gross's (2014) recommendations to further examination of the relationship between grit and other goal related constructs.

Additionally, the study reveals the perspective of preparedness to teach of undergraduate students enrolled in teacher education courses. The questions pertaining to preparedness to teach were originally based on the InTASC Standards, which consist of

10 distinct standards. However, the instrument used was designed for students who have successfully completed a teacher education program and who were working as teachers. Thus, it is not unexpected that undergraduates (ranging from freshman to seniors) have a different perspective of what it means to be prepared to teach. As a result, the current participants viewed preparedness to teach as 6 distinct factors.

CHAPTER 5

DISCUSSION

Introduction

This study was designed to examine the relationship between engagement in outdoor adventure education and students' perceptions of preparedness to teach as mediated by teacher efficacy beliefs and the personality trait of grit. Specifically, the study used the reciprocal causation model to investigate the relationship between outdoor adventure engagement (environmental factors), teacher efficacy (behavioral factors), and grit (personal factors) in relation to preparedness to teach. The current study was designed to add to the literature pertaining to the constructs of outdoor adventure engagement, teacher efficacy, and grit and address the intersectionality of teacher education and outdoor adventure education.

This chapter presents a summary and interpretation of the results of the investigation. It provides an overview of the study design and analysis of the data. Finally, this chapter describes the study's contributions to literature, its implications for professional practice and possible avenues for further study.

Design of the Study

The current study analyzed the relationship of outdoor adventure engagement and student perception of preparedness to teach. This relationship was mediated through teacher efficacy and grit. The current study is grounded theoretically through the use of a

reciprocal causation model. However, the current study is specifically interested in the environmental factor (outdoor adventure engagement) of the triadic structure. The study of undergraduate students enrolled in teacher education courses was guided by the following research questions and hypotheses:

1. Is there a relationship between outdoor adventure engagement and student perception of preparedness to teach?

H₁: There is a relationship between outdoor adventure engagement and student perception of preparedness to teach.

H₀: There is not a relationship between outdoor adventure engagement and student perception of preparedness to teach.

2. Is there a relationship between outdoor adventure engagement and teacher efficacy?

H₁: There is a relationship between outdoor adventure engagement and teacher efficacy.

H₀: There is not a relationship between outdoor adventure engagement and teacher efficacy.

3. Is there a relationship between outdoor adventure engagement and grit?

H₁: There is a relationship between outdoor adventure engagement and grit.

H₀: There is not a relationship between outdoor adventure engagement and grit.

4. Is there a relationship between teacher efficacy and grit?

H₁: There is a relationship between teacher efficacy and grit.

H₀: There is not a relationship between teacher efficacy and grit.

5. Does teacher efficacy mediate the effect of grit on student perceptions of preparedness to teach?

H₀: Teacher efficacy mediates the effects of grit on student perceptions of preparedness to teach.

H₁: Teacher efficacy does not mediate the effects of grit on student perceptions of preparedness to teach.

Summary and Interpretation of the Findings

Overview

The results of the current study demonstrate the unique nature of outdoor adventure engagement in relation to pre-service teachers. The current study did not find significant relationships between outdoor adventure engagement and perceptions of preparedness to teach. This may be the result of a homogenous population that reported a higher than expected level of experience with outdoor adventure activities. Results from the path analysis did find significant direct effects of teacher efficacy and grit on preparedness to teach. However, the direct effect of grit on preparedness was significantly mediated by teacher efficacy.

Relationship Between OAE and Perceptions of Preparedness to Teach

The current study did not support the hypothesis that there is relationship between outdoor adventure engagement and student perceptions of preparedness to teach. This finding may be influenced by the demographics of Montana State University. The

location of the study is a place well-known for its outdoor adventure environment. For example, 48.3% ($n=101$) of the participants reported previous experience instructing outdoor adventure activities. Additionally, 64.1% ($n=134$) reported being frequently engaged in outdoor adventure activities within the past two years. While outdoor recreation is a major element of the culture of the Bozeman Montana, where Montana State University is located, this degree of engagement was still surprising in light of the fact that Montana State University does not have a formal outdoor adventure education program.

Another area that is intriguing, and requires further investigation, is the role of gender in OAE. Outdoor adventure has historically been a male dominated field (Warren, Roberts, Breunig, & Alvarez, 2014). This is particularly the case with instructing or guiding outdoor adventure activities (Wittmer, 2001). The current study exhibited a gender breakdown of 64 males (30.6%) and 145 females (69.4%). This gender distribution is not unexpected in teacher education programs. However, the engagement over the past two years was highly skewed towards frequently engaged in adventure activities. Likewise, roughly half of the participants reported having experience instructing outdoor adventure activities. The current demographic of participants is unique in being highly skewed towards outdoor adventure engagement, thus reducing the variability needed to establish a significant relationship between outdoor adventure engagement and student perceptions of preparedness to teach. As a result, the lens that the participants bring to their preparation is unique. This lens may be particularly unique as evident from issues of gender equity in outdoor adventure

(Wittmer, 2001; Warren, 2014). Subsequently, the experience of women in outdoor adventure may impact perceptions towards teacher efficacy, grit, and preparedness to teach and future research would do well to explore this important issue.

The current study used a preparedness to teach survey instrument aligned to the 10 InTASC Standards. The findings from this study revealed pre-service teachers' perceptions of preparedness to teach with this instrument. Thus, the factor loadings of the instrument, based on the 10 InTASC Standards, demonstrated the unique view of the participants, and provides insight into the influence of outdoor adventure engagement as well as the view of pre-service teachers. Six distinct factors emerged during exploratory factor analysis. However, these factors, or traits of preparedness, were highly correlated. The factors that were highly related were factors 1, 2, 4, and 5. The four factors all share a similar element of relating to reflective practice (Schon, 1983; 1987). Factor 1, highlights the need for reflective practice that is guided, flexible, yet informed through practice. Factor 2, emphasizes the value of responsible practice that is informed by the need to incorporate families, the environment, culture, and technology. Factor 4, stresses the need for professional development to inform and ensure high quality practice. Factor 5, showcases the importance of the social process of learning. Together, these four factors provide a basis for informed and well-reflected practice. This concept is further emphasized by the two remaining unique factors. Factor 3, highlights reflective practice that is grounded in psychologically based practice. Factor 6, showcases the use of differentiation in a manner that is supported through experiential learning.

Although, the current study did not find a significant relationship between outdoor adventure engagement and preparedness to teach, it did provide, through the factor structure, evidence of the unique perspective of preparedness to teach of undergraduate pre-service teachers who are involved in outdoor adventure. As emphasized by Schon (1987),

Practitioners of a profession differ from one another, of course, in the subspecialties, the particular experiences and perspectives they bring to their work, and their styles of operation. But they also share a common body of explicit, more or less systematically organized professional knowledge and what Geoffrey Vickers has called an ‘appreciative system’ – the set of values, preferences, and norms in terms of which they make sense of practice situations, formulate goals and directions for action, and determine what constitutes acceptable professional conduct (p. 33).

Relationship Between OAE and Teacher Efficacy

The current study did not support the hypothesis that there is relationship between outdoor adventure engagement and the mediating variable of teacher efficacy. However, as seen with research question 1, the factor loadings were informative. The TSES, which is originally a three-factor instrument, loaded on two distinct factors in the current study. The unique element of the loadings is seen with factor 2. This factor, with strong loadings throughout, highlights the notion of motivation towards learning. Perhaps, because of the experiential nature of OAE, and the overarching outdoor adventure engagement of the participants, increased motivation could be considered to be a byproduct of engaging education. As emphasized by Ellison (2013),

a learning model that relies on intrinsic motivation, one that allows learners to understand and appreciate the purpose of assignments and activities, and positions learning as personally meaningful is necessary (p.182).

The majority of the students surveyed (only one listed his/her outdoor adventure engagement over the past two years as never) has incorporated the use of the outdoor and adventure as a part of their lives. Factor 2 may represent a belief structure that experiential based education practices support student motivation and engagement. Consequently, a focus on factor one, and efficacy for assessment, teaching strategies, and management may be viewed as the area of development that students are most keen to address.

Relationship between OAE and Grit

The current study failed to support the hypothesis of a relationship between outdoor adventure engagement and grit. The Grit-S scale loaded as expected with the two established factors (consistency of effort and perseverance of effort). Question seven, “I finish whatever I begin”, cross-loaded across the two factors. Consequently, it was removed from analysis. The questions regarding outdoor adventure engagement did not demonstrate significance in any relationship. This could be the result of instrument design or it could be due to a large amount of outdoor adventure experience. As emphasized by Duckworth and Gross (2014), previous research has identified “harmonious passion (i.e., autonomous internalization of a passionate activity into one’s identity) as a predictor of deliberate practice and, in turn, performance” (p. 320). The factor loadings provide evidence that more investigation into the relationship between the constructs of grit and outdoor adventure is needed. This need is particularly evident with the current theme of promoting grit in outdoor adventure education (Antin & Gregory, 2015; Micucci, 2015).

Relationship Between Teacher Efficacy and Grit

The current study supports the hypothesis that there is a positive and significant relationship between grit and teacher efficacy. This relationship is seen in relationship to students' perception of preparedness to teach. Previous research has clearly demonstrated the relationship between teacher efficacy and improved student outcomes (Ashton & Webb, 1986; Gibson & Dembo; Mosely et al., 2002; Tschannen-Moran, Hoy, & Hoy, 1998). The current study grit extends our understanding by demonstrating that grit is related to teacher efficacy and perceptions of preparedness to teacher.

Research on grit is still in its infancy (Duckworth & Gross, 2014). An investigation of grit and other constructs related to goal attainment is needed. For example,

Lower-order goals are more numerous, context specific, short-term, and substitutable, whereas higher-order-goals are typically fewer in number, more abstract, more enduring, and more important to the individual (p. 321).

Teacher efficacy, a teacher's belief in his or her ability to bring about desired outcomes in student learning (Tschannen-Moran & Hoy, 2001), is necessary when working toward goals. This is particularly the case when discussing lower-order goals. Sanders and Horn (1998) stress that high quality teachers are the most important factor in student academic success. Overcoming obstacles to achieve higher order goals, or in ensuring that lower order goal, that are central to the success of students, is necessary. Grit could play an important role in this outcome. As stated by Duckworth and Gross (2014),

grit entails having a dominant superordinate goal (e.g., producing useful new insights into the psychological determinants of success) and tenaciously working toward it in the obstacles and setbacks, often for years or decades (p. 321).

Implications for Theory

Contributions to Social Cognitive Theory

The results of the model address and extend social cognitive theory. The study examined preparedness to teach through outdoor adventure engagement. There were no significant relationships with outdoor adventure engagement, but the mediating variables of teacher efficacy and grit were significantly related to grit. The current study suggests that based on the unique factor loadings for teacher efficacy and preparedness to teach, that pre-service teachers in this study have a unique view of teacher efficacy and preparedness to teach.. This outcome indicates it is important to consider context when examining outdoor adventure through the lens of social cognitive theory.

The study is conceptually grounded by the construct of reciprocal causation. However, the study is exploratory in nature, and the emphasis of the study is seen in addressing the environmental factor of outdoor adventure. The outdoor adventure engagement was not able to support the conceptual model. Nonetheless, the contributions to social cognitive theory are seen with the comparison of teacher efficacy (as a behavioral factor) and grit (as a personal factor) and their relationship to preparedness to teach. The measure of outdoor adventure engagement proved difficult to define. As a result, it is unclear if the OAE could add to the conceptual model in explaining the environmental factor of the theoretical model. However, the current study,

as evident with the significant relationships, does contribute the theoretical model of reciprocal causation in relation to student perceptions of preparedness to teach.

The current study specifically analyzed the role of outdoor adventure engagement (the environmental factor of a reciprocal causation model) and its relationship to preparedness to teach (Bandura, 1989). The results of the study do not explicitly support the model. However, there are elements of the results that do provide some evidence of this model. For example, grit (a personal factor) and teacher efficacy (a behavioral factor) were significantly related to student perceptions of preparedness to teach. The data did not reveal significant relationships between outdoor adventure engagement and grit, teacher efficacy, or preparedness to teach. However, as evident by a high degree of engagement (seen over the past two years and as instructors) the environmental influence of the reciprocal model may have influence on student perceptions of preparedness to teach that was undetectable due to lack of variability in the data. Perhaps the location of the study (where the outdoors and adventure are major draws), the questions asked, sample size, or a variety of other factors limited the ability to investigate the environmental factor of the theoretical model. Previous research supports environmental factors promoting positive outcomes related to academic achievement (Athman & Monroe, 2004). However, the current study found defining outdoor adventure engagement to be challenging. Future research would benefit from ascertaining constructs that support this analysis.

Contributions to Teacher Efficacy Theory

Previous research has linked teacher efficacy to positive teacher behaviors and improved student outcomes (Tschannen-Moran & Hoy, 2007, p. 944; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Additionally, previous research has demonstrated that teacher efficacy is influenced during the early years, including pre-service, of a teaching career (Tschannen-Moran & Hoy, 1998; Duffin et al., 2012). While it is possible that OAE could support the development of teacher efficacy in aspiring teachers, the analyses in the current study did not reveal a significant relationship between OAE and teacher efficacy.

This is seen with the significant relationship of teacher efficacy and preparedness to teach. Probst and Koesler (1998), for example, found that OAE programs can have a significant impact on self-efficacy and this impact includes increases in self-efficacy persisting a year after an OAE program ends (Probst & Koesler, 1998). The participants reported high levels of engagement in outdoor adventure activities, and this engagement may be influencing their efficacy as suggested by Probst & Koesler (1998).

Previous research has investigated teaching efficacy in an outdoor context with non pre-service teachers (Schumann, 2013). The current study contributes to teacher efficacy theory by examining teaching efficacy with pre-service teachers through the lens of OAE. Although the current study did not find a significant relationship between teacher efficacy and OAE, teacher efficacy was found to have a positive and significant relationship with student perception of preparedness to teach. The current research contributes to theory as this relationship is situated within the lens of outdoor adventure.

A critical issue for both OAE and teacher education is the accuracy of these efficacy beliefs. Self-efficacy beliefs are “based on a self-perception of competence rather than *actual* level of competence” (Tschannen-Moran & Hoy, 2007, p. 946). Schumann (2013) found that accuracy in self-efficacy beliefs is critical within the scope of outdoor education. The element of accuracy is particularly critical in realm of OAE because participants must continually evaluate their abilities in light of real or perceived risk (Priest & Gass, 2005). An overestimation of ones’ abilities to teach in the outdoor classroom can have drastic consequences. Consequently, strategies are needed to address this overestimation. Schumann (2013) stressed that

Outdoor and adventure-based education is one such context to avoid the inflation of self-efficacy beliefs due to the physical and educational consequences associated with failure (e.g., psychological harm, injury, or death) (p. 2-3).

Teacher education programs face similar issues with accuracy of efficacy beliefs. Though physical consequences are not an issue that is nearly as common as in OAE, the educational consequences of over estimation of teacher efficacy could be an area of concern for the K-12 teacher.

Schumann (2013) discussed the danger of inaccurate efficacy beliefs as a teacher.

He stresses,

Overinflated efficacy beliefs may cause the leader [or teacher] to attempt facilitating a discussion beyond her ability, possibly resulting in psychological damage to her participants. Conversely, she may underestimate her competence in the future task, avoid processing the event, and fail to provide a valuable learning opportunity. In sum, the accuracy of self-efficacy beliefs is an important consideration amidst the myriad of tasks an effective outdoor leader [or K-12 teacher] must perform (Schumann, 2013, p. 14).

These metacognitive monitoring methods described by Schumann are valuable to include in both OAE and teacher education programs because they are successful in addressing inaccurate efficacy beliefs. This research provided by Schumann (2013) is encouraging and informative to teacher education programs as misguided intentions can have seriously detrimental consequences to future generations of students. The current demographic of participants exhibited high levels of outdoor adventure engagement. Likewise, nearly half of the participants reported experience instructing outdoor adventure activities. Therefore, this group may benefit from the metacognitive strategies suggested by Schumann (2013) to ensure that their efficacy beliefs are accurate.

Contributions to Theory of Grit

The current study found a positive and significant relationship between grit and student perceptions of preparedness to teach. Additionally, the study found the effects of grit on preparedness to teach was mediated by teacher efficacy. This finding is in agreement with previous research examining grit in relation to positive teaching outcomes (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014). The current study contributes to the research on grit in demonstrating a significant relationship between grit and pre-service teachers' positive teaching outcomes (perception of preparedness to teach). Additionally, the study addresses the call for more research on grit and its relationship to other constructs that support goal attainment (Duckworth & Gross, 2014).

The current study found a significant relationship between grit and teacher efficacy, with a significant indirect effect of grit on preparedness to teach mediated

through teacher efficacy. This finding demonstrates the role of grit and teacher efficacy in attaining the goal of preparedness to teach. Long-term goals, such as preparedness to teach, require strategies to ensure that these goals are met. In light of the fact that grit is defined as passion and persistence for long-term goals (Duckworth, 2007), a possible implication of the findings is that grittier individuals exhibit efficacy as means of overcoming obstacles to reach their desired goals.

This study did not identify a relationship between OAE and grit despite previous literature, which indicated a positive relationship between these two constructs (Antin & Gregory, 2015; Micucci, 2015). Prior research suggests that grittier individuals make fewer career changes (Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014), exhibit greater teaching effectiveness (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014), and grittier individuals work harder to reach goals (Kraft & Duckworth, 2014). Unfortunately, grit has become, to some, a magic pill for success. Consequently, previous research has investigated empowerment programs for supporting the growth of grit (Gamel, 2014). The current study, however, did not address empowerment strategies, but instead examined a direct relationship between grit and actual perceptions of competencies necessary to be prepared to teach. For this study, although grit was related to teacher preparedness, a significant proportion of grit's influence on teacher preparedness was mediated by teacher efficacy. A possible explanation for this influence is the nature of grit and teacher efficacy in relation to goals. Grit's emphasis is towards long-term goals and perhaps, efficacy is a construct that aids the individual in meeting these goals. Grit is typically labeled as either a personality

factor or a non-cognitive skill. However, the relationship of grit and teacher efficacy suggests that belief structures play a role for the construct of grit and teacher efficacy. This is evident as a significant proportion of grit's influence on student perceptions of preparedness to teach was mediated through a belief structure (teacher efficacy). More investigation is needed to address the relationship between belief structures and grit.

Schumann (2013) stressed the importance of accuracy of beliefs in teaching outdoor education. This is necessary as physical and psychological harm can come from an overestimation in these beliefs. The current study demonstrated the relationship between grit and teacher efficacy, and both of these constructs benefit from metacognitive strategies to ensure that a teacher's efficacy or grit is not toxic to him/herself or his/her students. As a result, an emphasis on the development of metacognition along with the development of healthy grit is critical.

Healthy grit is an important quality. Healthy grit can aid the mountain climber who realizes that the conditions and context of the situation at hand require turning around. Healthy grit can aid the K-12 teacher in realizing the context of the situation at hand requires altering a lesson plan. The grit scale discusses components such as being a hard worker, diligent, and finishing what one starts. This is not always a good thing for all conditions. Being stubbornly attached to one's goals can be detrimental, as seen with the heuristic traps. Rather, a greater focus on mastery and reflective practice (Schon, 1983; 1987) in informing goal attainment is more applicable to both outdoor adventure and education.

Lucas et al., (2015) present the potential danger of toxic grit. Passion and persistence for long-term goals is simply not always a good thing. Lucas et al., (2015) showcased this with a laboratory experiment, highlighting the care required when attempting to promote the development of grit. As emphasized by Rushton et al., (2007), “It is imperative that individuals be aware and conscious of their personality type so that they may make the necessary changes to adapt and persevere” (p. 440). Outdoor adventure provides an example and a framework for addressing toxic grit. Likewise, through metacognitive monitoring strategies, as seen as an effective course in dealing with inaccurate efficacy beliefs, can guide in showcasing healthy grit.

Avalanches are an area of concern with backcountry ski travel, and showcases when toxic grit can cause serious harm. Both industry professionals and researchers have attempted to address the cause of many of these incidents. A major cause in these incidents is what is deemed as the human factor (Atkins, 2000). McCammon (2004) expands upon the human factors that can lead to decision-making strategies that can go against all evidence supporting a go or no go in backcountry skiing. These heuristic traps are familiarity, consistency, acceptance, the expert halo, social facilitation, and scarcity (McCammon, 2004). To provide a base for those who are unfamiliar with avalanches and skiing, decision-making traps, such as familiarity, can occur when an individual has experience skiing a certain area. The trap may cause them to misread the situation at hand. They may say to themselves, “I have skied this before and it did not avalanche.” Their drive or goal to ski a certain line may overtake proper decision-making strategies.

Decision-making in both OAE and K-12 classrooms tends to be unique and context specific. One mechanism for avoiding misguided decision-making would be to inform preservice teachers how to avoid heuristic traps through mechanisms such as metacognition and self-assessment (McCammon, 2004). Adventure-sports coaching stress the importance of self-assessment. This includes analyzing one-self, in their adventure disciplines, physiologically, psychologically, technically, and tactically (PPTT) (Berry et al., 2015). This model allows for the individual to address deficiencies with action plans. This includes an analysis of improper decision making strategies, such as found with those exhibiting toxic grit.

Contribution to Understanding of Outdoor Adventure Engagement

Results from this study do not explicitly align with previous research supporting outdoor adventure and efficacy (Lamorey, 2013; Odello, Hill, & Gomez, 2008; Paxton, 1998; Paxton & McAvoy, 2000; Probst & Koesler, 1998; Sibthorp, 2003). Likewise, the current study does not explicitly align with the speculative relationship of OAE and grit (Antin & Gregory, 2015, Micucci, 2015). The findings in the current study may be influenced by a non-normal distribution of data, which may be due to a homogeneous sample with a higher than expected level of outdoor adventure engagement and experience instructing outdoor adventure activities. The unique factor loadings, and the significant relationships of teacher efficacy and grit on preparedness to teach, support a need for more analysis of outdoor adventure.

Previous research has highlighted the value of the outdoors particularly in the context of strengthening teaching. Previous research has found that teacher's perceptions

of outdoor use in teaching supports increased student motivation, communication, and participation (Fagerstam, 2014). Additionally, research on the benefits of outdoor use has been supported neurologically as outdoor use supports the development of robust long-term episodic memories (Jordet, 2010). The use of outdoor space as a teaching/learning space improves performance on standardized tests, reduces classroom disruptions, increases student engagement and excitement for learning (Lieberman & Hoody, 1998), and increases academic achievement motivation (Athman & Monroe, 2004). The current study, particularly when considering the factor structure that emerged from the teacher efficacy and grit scales for this group of pre-service teachers extends the current body of literature pertaining to the role of the outdoors and adventure in relation to teaching.

Teaching is inundated with the surprise element as discussed by Schon (1983) in *The Reflective Practitioner*. An invaluable development of the practitioner is in “the intuitive knowing implicit in the action” (Schon, 1983, p. 56). This development, particularly being able to respond within the “action present” (Schon, 1983, p. 62), is a necessary attribute of a teacher and leader. The teacher must understand when flexibility is needed as a leader (Colton & Sparks-Langer, 1993; Priest & Gass, 2005; Vaughn, 2014), but the teacher and leader must also know when to stay the course and allow for learning moments to take place. Teaching in both the classroom and outdoor realms has showcased the value of discovery learning.

While deep experience and commitment is needed, effective teaching in both the K-12 and outdoor classroom is supported by developing the vision of reflection-in-action

(Schon, 1983), flexibility (Colton & Sparks-Langer, 1993; Priest & Gass, 2005; Vaughn, 2014), interpersonal skills (Bain, 2004; Bowman, 2014; Lowman, 1996), and autonomy (Bandura, 1997; Svinicki, 2010). The utilization of adventure education in teacher preparation allows for the merger of individuals' personal interests within the professional development process (Dewey, 1944; Isaak, 2014).

Implications for Practice

The current study addresses the intersection of OAE and teacher education. The results were not significant in regards to the effects of OAE on teacher preparedness to teach. However, several key elements from the study emerged. Of note, 64% of the participants indicated that they were frequently involved in outdoor adventure activities during the past two years. The overwhelming engagement in outdoor adventure was not expected. Consequently, a homogeneous sample of outdoor adventure participants provided unexpected insights through which to view teacher efficacy, grit, and preparedness.

The current study recognizes that influences on learning occur through personal, behavioral, and environmental factors (Bandura, 1989). Likewise, previous research supports the positive relationships of grit and teacher effectiveness (Robertson-Kraft & Duckworth, 2014). Consequently, this exploratory study focused on the role of outdoor adventure engagement (environmental factor) within the triadic structure. Although, the variable in this study did not exhibit significant relationships with outdoor adventure engagement, teacher efficacy and grit had positive and significant direct effects on student perception of preparedness. However, teacher efficacy was found to significantly

reduce the direct effect of grit student perceptions of preparedness. The PLS-SEM data analyses did not support the relationship between outdoor adventure engagement and preparedness to teach for this sample of preservice teachers. There are many factors that could have contributed to this, such as a difficulty in defining outdoor adventure engagement. However, the demographic information is illuminating. Only one individual out of 209 selected “Never” as engagement in outdoor adventure activities during the past two years. Additionally, 98 (46.89%) of the participants indicated that they have experience instructing adventure activities. The participation in outdoor adventure was skewed toward being frequently engaged. Given that student learning is grounded in the need for competence, relatedness, and autonomy (Deci, Vallerand, Pelletier, & Ryan, 1991), it would be wise to remember that

authentic learning refers to learning that is rooted in real-world contexts and therefore personally relevant to students...Creating a school or classroom culture that inspires students to succeed requires an awareness of the cultural values and beliefs individual students bring to the learning environment (Ellison, 2013, p. 182).

Learning is an active and ongoing process that requires deep cognitive engagement and is promoted through social interactions (Bandura, 1977). The participants in this study exhibited a strong connection to outdoor use and adventure engagement. Consequently, implications for practice, to support this use and engagement, could be to support critical reflection. Critical reflection on these experiences is necessary to promote the development of knowledge, and this knowledge is understood through language. As posited by Schon (1983), “one must use words to describe a kind of knowing, and a change of knowing, which are probably not originally represented in words at all” (p. 59). Nearly half of the participants reported experience

instructing outdoor adventure activities. Potentially, these individuals will continue this outdoor adventure instructing throughout their careers. This practice could be informative if a focus on areas such as pedagogical knowledge and reflection are explored in both the K-12 and outdoor classroom.

OAE offers the opportunity to develop the pedagogical skills that will aid in classroom instruction. Additionally, OAE offers future teachers perpetual growth if continuation in adventurous pursuits persists throughout their lives. The utilization of adventure education is a unique, alternative approach to the continuation of developing teaching skills, and provides a continual outlet that can aid the teacher in stress reduction, resilience, and efficacy (Gu & Day, 2007). The benefits derived from OAE are also seen within the realm of physical education.

Physical Education and Fitness

A study by Sutherland, Stuhr, and Ayvazo (2014) found that, “Embarrassing, boring, irreverent, and lacking personal meaning are among some of the terms that middle and high school students have used to describe physical education” (p. 2).

Timken and McNamee (2012) found that OAE could be an important component for physical education students. This value includes the promotion of lifetime activity. As emphasized by a participant in their study,

I think it is also important to introduce students to activities that they can do the rest of their lives. They do not need nine others to go mountain biking...It helps the kids that do not like team sports [know] that there are more options and gives them a chance to be physically active and like what they are doing (Timken & McNamee, 2012, p. 31).

Bailey et al., (2009) showed the social benefits related to OAE and physical education, which relates to the social elements of social cognitive theory. Likewise, they found affective and cognitive benefits, which relate to improved academic outcomes (Bailey, et al., 2009).

Adventure sports have seen a recent growth in popularity (Berry et al., 2015). This includes adventure-based sports, such as skiing and snowboarding, gaining credibility as Olympic events. Greater access to adventure is also seen with the current trend of indoor climbing gyms. While this is not an outdoor pursuit, many of the current top climbers started their climbing careers in gyms (Duane, 2015). In fact, climbing gyms are being developed in areas that were not considered to be traditional locations of climbing (Malone, 2015). One reason for this, as stated by Malone (2015), “Climbing has turned into the new squash or tennis for a certain young professional set, projecting an air of health-conscious cool less frenetic than Crossfit and grittier than SoulCycle” (para. 2). Engagement in adventure sports may be one path leading to the development of self-efficacy in addition to formal physical education classes.

Physical fitness has long been recognized as an important element of education (Bailey et al., 2009). There have been various reasons for the need for physical education. The concept of this dates back to Plato who stressed, “The moral value of exercises and sports far outweighed the physical value” (Plato, 1920, p. 6).

Teacher educators need to understand that physical education and physical fitness are important areas to explore with preservice teachers. With the current lack of access to outdoor space and play (Mainella, Agate, & Clark, 2011), there are concerns that a lack

of physical fitness is likely to persist throughout life. In a recent study, Loprinzi, Branscum, Hanks, and Smit (2016) analyzed the habits of 4745 adults aged 20 to 85 years. They investigated healthy lifestyle characteristics consisting of being sufficiently active, eating a healthy diet, being a nonsmoker, and having a recommended body fat percentage. They found that a mere 2.7% of the participants met the requirements for all four characteristics (Loprinzi et al., 2016). Ellen Smit (Cha, 2016), stressed, “This is pretty low, to have so few people maintaining what we would consider a healthy lifestyle...This is sort of mind boggling. There’s clearly a lot of room for improvement” (para. 5).

Teachers may naturally be viewed as a role model (Lumpkin, 2008) and the intersection of OAE and teacher preparation programs can present students with an example of a healthier lifestyle (Pryor, Carpenter, & Townsend, 2005). The Kaiser Family Foundation found that a lack of outdoor exposure has become a common trend where children between the ages of eight and 18 year old spend an average of seven hours and thirty-eight minutes each day with electronic devices (Mainella, Agate, & Clark, 2011). Research has found that outdoor utilization promotes physical fitness, mental health, and cognitive development in adolescents (Mainella et al., 2011) and that the utilization of the outdoors during adolescence promotes future environmental stewardship (Wells, & Lekies, 2006; Chawla, 2009), which is an area that is equally important to pass to future generations. Teachers may naturally be viewed as role models, and showcasing a healthy and environmentally conscious lifestyle could have valuable implications to future generations.

Preparing and Retaining Teachers

The preparation of highly effective teachers is a complex, ongoing undertaking. Teachers need to continue to grow throughout their careers and once preservice teachers graduate from a program, they have an entire career to evolve to best continue to meet the needs of their students. Teachers need support to continually develop the ability to reflect-in-action (Schon, 1983) and the flexibility needed to respond effectively to students' needs (Colton & Sparks-Langer, 1993; Priest & Gass, 2005; Vaughn, 2014). Reflective and responsive practitioners (Schon, 1983) may benefit from OAE as it naturally provides the element of surprise.

Deci et al., (1991) stress that competence, relatedness, and autonomy are necessary for deep learning. Autonomy can be readily produced in the outdoor environment as many exhibit the motivation to pursue these opportunities. As Svinicki (2010) emphasizes "those feelings of autonomy then lead to higher levels of motivation for the task, even if the task is not itself motivating" (p. 77). For those motivated to pursue and develop as adventurers, their intrinsic motivation is well served. This motivation can serve as a catalyst for development in the classroom as well as for professional development opportunities through outdoor adventure. This could be seen with finding ways to provide lessons within the outdoors, or developing pedagogical skills in a diversity of teaching contexts. The knowledge of more pedagogical strategies, derived from a diversity of environments, can aid the aspiring teacher as they seek to address the needs of a diversity of learners.

Conkling and Henry (1999) stated that, “learning to teach is a process that continues throughout a teacher’s career and that no matter what we do in our teacher education programs and no matter how well we do it, at best we can only prepare teachers to begin teaching” (p. 22). Previous research supports the notion that OAE can aid in positive teaching outcomes (Carlson & McKenna, 2000; Lamorey, 2012, Timken & Mcnamee, 2012). The current study was not able to extend this research. However, implications of a relationship of outdoor adventure and positive teaching outcomes are possible. OAE offers the opportunity to utilize an individual’s intrinsic motivation for the outdoors and adventure as a possible source for this continual development. As Bain (2004) emphasizes, “the best teachers assume that learning has little meaning unless it produces a sustained and substantial influence on the way people think, act, and feel” (p. 17). The utilization of OAE offers the opportunity for a merger of skill development in both the outdoors and the classroom (Harris, Lowery-Moore, & Farrow, 2008). OAE addresses the learning that Bain (2004) stresses as developing mastery and autonomy within each individual’s adventurous pursuits of choice (Kurfiss, 1988), can support success in the classroom environment.

To strive to improve the outcomes of teacher preparation programs, with the goal of serving future students, the use of OAE has the ability to serve in a proactive manner by focusing on the knowledge and interests already currently present in the individual. Preparation programs could employ OAE to foster the growth of pre-service teachers through offering the opportunity for continual development through the pursuit of adventure.

The reflective process is one key aspect that is shared between the pursuit of adventurous disciplines and the development of effective teachers. Critical reflection is important in the field of education as this process promotes a more effective, responsive teacher (Brookfield, 1995). Additionally, in the outdoor environment much emphasis has been placed on the importance of autonomy in adventure disciplines. As Svinicki (2010) emphasizes “those feelings of autonomy then lead to higher levels of motivation for the task, even if the task is not itself motivating” (p. 77). The motivation developed from outdoor and adventure can aid the classroom setting. Although this research failed to establish an empirical link between outdoor adventure engagement and teacher preparedness, previous research has demonstrated that environmentally based education can serve to promote academic motivation (Athman & Monroe, 2009).

Recommendations for Further Research

More investigation of the intersection between OAE and the preparation of new teachers is needed. The current study was limited by participants who had reported a high degree of engagement in outdoor adventure activities, creating a homogeneous participation group with little variability in outdoor adventure experience. It would have preferable to investigate pre-service teachers with a range of outdoor adventure experiences to examine the relationship between this experience and teacher preparedness. Moreover, the outdoor engagement construct proved difficult to define. Consequently, more investigation is needed to better ascertain the indicators that define a range of engagement in outdoor adventure.

Finally, there are social elements of outdoor adventure that would be well-served by further research. For example, the current study had a gender breakdown of 64 males (30.6%) and 145 females (69.4%), yet the participants reported a heavy skew towards being engaged in outdoor adventure activities. This includes roughly half of the participants reporting having experience instructing outdoor adventure activities. Previous research has demonstrated gender equity issues in outdoor adventure (Wittmer, 2001; Warren, 2014). Therefore, more investigation is needed of gender and the intersection of OAE and teacher education. Likewise, there are social aspects of outdoor adventure such as location that requires further analysis. For example, the current study asked participants to indicate the geographic location where they were raised. Further analysis of these locations could provide more insight as access and the types of adventure may impact efficacy, grit, and perceptions of preparedness.

The current study was guided by social cognitive theory. As a result, aspects such as mastery experiences require more investigation. The current study asked participants about engagement in various outdoor adventure activities. These activities may provide more insight into outdoor adventure and belief structures. For example the skillset required, and risk involved, for climbing, ice climbing, backcountry skiing, and whitewater boating differs from cross country skiing, hiking, and flat water boating. Accordingly, future research should investigate the varying types of outdoor adventure in relation to belief structures.

Grit and efficacy are both key elements to education, regardless of the classroom context. Efficacy has a rich history of research in both teacher education and OAE.

Previous research has demonstrated that metacognitive strategies are effective in addressing overestimation of teaching efficacy (Schumann, 2013). However grit, and more specifically healthy grit, is an area that needs more investigation. The relationship of grit to teacher efficacy supports the use of metacognitive monitoring strategies (Schumann, 2013) to ensure the accuracy and healthy manifestation of grit. Consequently, investigation of factors that represent healthy grit, and the value of strategies, such as the use of heuristic traps (McCammon, 2004), is needed.

Conclusion

The transition from pre-service teacher to in-service teacher can be a large and daunting leap. As highlighted by Seifert (2004): “Future teachers are worried about more than outward ‘professional identity,’ about how they look in the classroom. They worry as well about whether they feel committed to teaching as a calling” (p. 2). These concerns are serious, but could potentially be addressed with the inclusion of adventure education. This inclusion could aid future teachers in their development and the skills gained could support the transition to their teaching careers. As stressed by Ference (2007) engagement in adventure activities that positively impact efficacy can greatly aid a new teacher in making connections that will allow for success. As she stated, an adventure bike trip served as a catalyst for her teaching career as it, “provided me with a chance to experience teaching in a way that connected with my teaching philosophy” (2007, p. 3).

The intersection of OAE programs and the teacher preparation realm offers future teachers the option to merge their personal and professional lives. As emphasized by Obenchain and Ives (2006),

Teachers are not likely to implement new approaches that they have learned about in teacher education programs unless their training in new approaches is continuous, large scale, offers incentives, and can be done without significantly greater time commitment (p. 73).

Bandura (1997) stated that, “When people lead active lives by engagement in interesting pastimes, they gain not only biological benefits but psychological well-being” (p.408). It is possible that the inclusion of OAE in preservice teacher education would give them the opportunity to specialize in their adventure disciplines as well as develop the efficacy and reflective practice needed to excel in their chosen profession. The more student-centered approach of specialization will support not only the preservice teachers involved, but also increase the overall effectiveness of the teacher preparation program.

The work of teaching is a sophisticated and complex task. They need to understand when flexibility is needed as a leader (Colton & Sparks-Langer, 1993; Priest & Gass, 2005; Vaughn, 2014) and when to stay the course and allow for learning moments to take place. They need to constantly reflect on their instruction and weigh their efforts in light of the needs of their students (Mezirow, 1997). Today’s society needs these highly qualified teachers who can be efficacious and insightful in the face of unbelievable odds. OAE programs offer a possible way forward. As evident in Kornelson’s (1998) investigation of a school-based adventure education/therapy program, teachers found that they were able to transfer and relate what they learned from the adventure realm into their classrooms. The inclusion of OAE programs can support the

growth of effective teachers while offering continual professional developmental opportunities as retention in the adventure realm persists.

REFERENCES CITED

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From Cognition to behavior* (pp. 11-39). Berlin: Springer Verlag.
- Anderson, D., & Absolon, M., (2001). *NOLS expedition planning*. Mechanicsburgh, PA: Stackpole Books.
- Antin, M. L., & Gregory, P. (2015, Spring). True grit! *Princeton-Blairstown Outlook*, 1.
- Atkins, D. (2000). *Human factors in avalanche accidents*. Colorado Avalanche Information Center: Boulder, Colorado
- Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers sense of efficacy and student achievement*. New York: Longman.
- Athman, J. A., & Monroe, C. M., (2004). The effects of environmental-based education on students' achievement motivation. *Journal of Interpretation Research*, 9(1), 9-25.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing and Science*, 16(1), 74-94.
- Bain, K. (2004). *What the Best College Teachers Do*. Cambridge, Mass: Harvard University Press.
- Bailey, R., Armour, K., Kirk, D., Jess, M., Pickup, Sandford, R., & BERA Physical Education Sport Pedagogy Special Interest Group. (2009). The educational benefits claimed for physical education and school sport: An academic review. *Research Papers in Education*, 24(1), 1-27.
- Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, 59, 389-407.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development. Vol. 6. Six theories of child development* (pp. 1-60). Greenwich, CT: JAI Press.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.
- Bandura, A., (2011). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, 38, 9-44.

- Bauer K. W., & Liang, Q. (2003). The effect of personality and precollege characteristics on first-year activities and academic performance. *Journal of College Student Development*, 44(3), 277–290.
- Beightol, J., Jeverson, J., Carter, S., Gray, S., & Gass, M. (2012). Adventure education and resilience enhancement. *Journal of Experiential Education*, 35(2), 307-325.
- Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., &...Tsai, Y.-M. (2010). Teachers' mathematical knowledge, cognitive activation in the classroom, and student progress. *American Educational Research Journal*, 47, 133-180.
- Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychology Science*, 19(12), 1207-1212.
- Berry, M., Lomax, J., & Hodgson, C. (2015). *Adventure sports coaching*. New York: Routledge.
- Berry, M. (2015). Understanding the role of pedagogy in adventure sports coaching. In M. Berry, J. Lomax, & C. Hodgson (Eds.), *Adventure sports coaching* (pp. 24-40). New York: Routledge.
- Bowdrige, M. (2010). *Outdoor Adventure Education in Schools: Curriculum or Pedagogy? Considerations for Teacher Preparation and Program Implementation*, ProQuest Dissertations and Theses.
- Bowman, F. R. (2004). Teachers as leaders. *Clearing House*, 77(5), 187-189.
- Bratman, G. N., Daily, G. C., Levy, B. J., & Gross, J. J. (2015). The benefits of nature experience: Improved affect and cognition. *Landscape and Urban Planning*, 138, 41-50.
- Brookfield, D. S. (1995). What it means to be a critically reflective teacher. In D. S. Brookfield, *Becoming a Critically Reflective Teacher* (pp. 527-540). San Francisco, CA: Jossey-Bass Publishers, Inc.
- Burton, D., & Pace, D. (2009). Preparing pre-service teachers to teach mathematics in inclusive classrooms: A three-year case study. *School Science and Mathematics*, 109, 108–115.
- Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming*. New York, NY: Psychology Press.

- Cakir, O., & Alici, D. (2009). Seeing self as others see you: Variability in self-efficacy ratings in student teaching. *Teachers and Teaching: Theory and Practice*, 15(5), 541-561.
- Canberg, A. S. (2003). *The influence of perceived innovation attributes on the adoption of outdoor adventure leadership degree programs by American colleges and universities*, (Unpublished doctoral dissertation). Clemson University, GA.
- Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, 44, 473-490.
- Carlson, T. B., & McKenna, P. (2000). A reflective adventure for student teachers. *Journal of Experiential Education*, 23(1), 17-25.
- Cha, A. E. (2016, March 22). Seriously, America? Study finds mere 2.7 percent of U.S. adults meet criteria for 'healthy lifestyle'. *The Washington Post*, Retrieved from <https://www.washingtonpost.com/news/to-your-health/wp/2016/03/22/seriously-america-study-finds-mere-2-7-percent-of-u-s-adults-meet-criteria-for-healthy-lifestyle/>
- Chamorro-Premuzic, T., & Furnham, A. (2003). Personality traits and academic examination performance. *European Journal of Personality*, 17, 237-250.
- Chawla, L., (2009). Growing up green: becoming an agent of care for the natural world. *The Journal of Developmental Processes* 4(1), 6-23.
- Chism, N. (1994). Taking student diversity into account. In McKeachie, J. W (Ed.), *Teaching Tips: Strategies, Research, and Theory for College and University Teachers* (9th ed.). (pp. 185-191). Belmont, CA: Wadsworth.
- Clark, D. J., & Guest, K. (1995). Voila. *Executive Educator*, 17(1), 18-24
- Cochran, F. K., King, A. R., & DeRuiter, A. J. (1991). *Pedagogical content knowledge: A tentative model for teacher preparation*. Chicago, Ill.: American Educational Research Association.
- Cohen (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Erlbaum
- Cohen (1992). A power primer. *Psychological Bulletin*, 112, 155-159.

- Collins, L., & Collins, D. (2012). Conceptualizing the adventure-sports coach. *Journal of Adventure Education & Outdoor Learning*, 12(1), 81-93.
- Coladarci, T. (1992). Teachers' sense of efficacy and commitment to teaching. *The Journal of Experiential Education*, 60(2), 323-337.
- Colton, A., & Sparks-Langer, G. (1993). A conceptual-framework to guide the development of teacher reflection and decision-making. *Journal Of Teacher Education*, 44(1), 45-54.
- Conard, M. A. (2006). Aptitude is not enough: How personality and behavior predict academic performance. *Journal of Research in Personality*, 40, 339-346.
- Conkling, S. W. & Henry, W. (1999). Professional development partnerships: A new model for music teacher preparation. *Arts Education Policy Review*, 100(4), 19-23.
- Cook, L., (2010). The 1944 education act and outdoor education: from policy to practice. *History of Education: Journal of the History of Education Society*. 28(2), 157-172.
- Council of Chief State School Officers. (2013, April). Interstate teacher assessment and support consortium *InTASC model core teaching standards and learning progressions for teachers 1.0: A resource for ongoing teacher development*. Washington, DC: Author.
- Danielson, C. (2013). *The framework for teaching: Evaluation instrument*. Alexandria, VA: ASCD.
- Debard, R. (2004). Millennials coming to college. In DeBard, R., & Coomes, D. M. (Eds.), *Millennials Coming to College* (pp. 33-45). New Directions for Student Services, (106).
- Deci E.L., & Ryan R.M. (1985). *Intrinsic motivation and self determination in human behavior*. New York: Plenum.
- Deci, E. L., Vallerand, R. J. Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3 & 4), 325-346.
- Densten, I. L., & Gray, J. H. (2001). Leadership development and reflection: What is the connection? *International Journal of Educational Management*, 15(3), 119-124.
- Dewey, J. (1938). *Experience and Education*. New York, NY: Touchstone.

- Dewey, J. (1944). *Democracy and Education: An Introduction to the Philosophy of Education*. New York, NY: Free Press.
- Duane, D. (2015, July 25). The rise of climbing. *The New York Times*, Retrieved from http://www.nytimes.com/2015/07/26/opinion/sunday/the-rise-of-climbing.html?_r=1
- Duckworth, A. L. & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Journal of Educational Psychology*, 16(12), 939-944.
- Duckworth A. L., Peterson, C. Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087-1101.
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91, 166–174.
- Duckworth, A. L., & Quinn, P. D., & Seligman, M. E. P. (2009). Positive predictors of teacher effectiveness. *The Journal of Positive Psychology*, 4(6), 540-547.
- Duckworth, A., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science*, 23(5), 319-325.
- Duffin, L. C., French, B. F., & Patrick, H. (2012). The teachers' sense of efficacy scale: Confirming the factor structure with beginning pre-service teachers. *Teaching and Teacher Education*, 28, 827-834.
- Ellison, K. (2013). Fostering outdoor learning experiences with urban youth through placed-based expeditionary learning. *Journal of Outdoor Recreation, Education, and Leadership*, 5(3), 179-191.
- Ewert, A., & Yoshino, A. (2011). The influence of short-term adventure-based experiences on levels of resilience. *Journal of Adventure Education and Outdoor Learning*, 11(1), 35-50.
- Ewert, W. A., & Sibthorp, J., (2014). *Outdoor adventure education: foundations, theory, and research*. Champaign, IL: Human Kinetics.
- Fabrigar, L. R., Wenger, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272-299.

- Fagerstam, E. (2014). High school teachers' experience of the educational potential of outdoor teaching and learning. *Journal of Adventure Education & Outdoor Living*, 14(1), 56-81.
- Ference, J. (2007). *Impact of an Adventure Education Experience on Collective Teacher Knowledge and Teacher Identity*, ProQuest Dissertations and Theses.
- Ferlazzo, L. (2015). Response: 'It's time to change the conversation about grit'. *Education Week Teacher*, Retrieved from http://blogs.edweek.org/teachers/classroom_qa_with_larry_ferlazzo/2015/10/response_isgrit_an_asset_or_an_excuse.html
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new era of cognitive-development inquiry. *American Psychologist*, 34, 906-911
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing research*, 18(1), 39-50.
- Friedrichsen, P. J., Abell, S. K., Pareja, E. M., Brown, P. L., Lankford, D. M., & Volkmann, M. J. (2009). Does teaching experience matter? Examining biology teachers' prior knowledge for teaching in an alternative certification program. *Journal of Research in Science Teaching*, 46, 357-383.
- Furman, N. & Sibthorp, J. (2013). Leveraging experiential learning techniques for transfer. *New Directions for Adult and Continuing Education*, (137), 17-26.
- Galloway, S. P. (2003). The effect of experience on decision-making in outdoor leaders from the perspective of social judgment theory. Unpublished doctoral dissertation, Indiana University, Bloomington.
- Gamel, M. (2014). Impact of character development and empowerment program on grit and resilience in early and middle adolescents. *Dissertation, Theses, and Capstone Projects*, Paper 646.
- Gay, L. R., & Mills, G. E., & Airasian, P. (2012). *Educational Research: Competencies for analysis and applications* (10th ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Gibson, S. & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569-582.

- Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal*, 37(2), 479–507.
- Graham, J. (1997). *Outdoor Leadership: Technique, Common Sense and Self-Confidence*. Seattle, WA: Mountaineers Press.
- Gray, T. & Madson, L. (2007). Ten ways to engage your students. *College Teaching*, 55(2), 83-87.
- Gray, P. (2011). The decline of play and the rise of psychopathology in children and adolescents. *American Journal of Play*, 3(4), 443-463.
- Gravetter, F. J., & Wallnau, L. B. (2009). *Statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.
- Gu, Q., & Day, C. (2007). Teachers resilience: A necessary condition for effectiveness. *Teaching and Teacher Education*, 23, 1302-1316.
- Hair, J. F. Jr., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. (2nd edition). Los Angeles, CA: Sage Publications, Inc.
- Hakel, M. D. (1968). How often is often. *American Psychologist*, 23, 533-534.
- Hambrick, D. Z., Oswald, F. L., Altmann, E. M., Meinz, E. J., Gobet, F., & Campitelli (2014). Deliberate practice: Is that all it takes to become an expert? *Intelligence*, 45, 34-45.
- Harris, S., Lowery-Moore, H., & Farrow, V. (2008). Extending transfer of learning theory to transformative learning theory: A model for promoting teacher leadership. *Theory Into Practice*, 47(4), 318-326.
- Hensler, J., & Sarstedt, M. (2013). Goodness-of-fit indices for partial least squares path modeling. *Comput Stat*, 28, 565-580.
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about partial least squares: Comments on Ronkko & Everman. *Organizational Research Methods* 17(2): 182-209.

- Hu L. T., & Bentler P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Model*, 6(1), 1–55.
- Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, 20(2), 195-204.
- Isaak, J. (2014). Beyond meaningless leisure: John Dewey's influence on eastern Oregon University's outdoor program. *Journal of Outdoor Recreation, Education and Leadership*, 6(1), 88-94.
- Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P., & Miller, C. (2005). The experience of work-related stress across occupations. *Journal of Managerial Psychology*, 20, 178-187.
- Jordet, A. (2010). *Klasserommet utenfor. Tilpasset opplæring i et utvidet læringsrom* [The classroom outdoors. Education in an extended classroom]. Latvia: Cappelen Damm AS.
- Joseph, D., & Heading, M. (2010). Putting theory into practice: Moving from student identity to teacher identity. *Australian Journal of Teacher Education*, 35(3), 75-87.
- Kagan, D. M. (1992). Professional growth among preservice and beginning teachers. *Review of Educational Research*, 62, 129-169.
- Kanters, M. A., Bristol, D. G., & Attarian, A. (2002). The effects of outdoor experiential training on perceptions of college stress. *Journal of Experiential Education*, 25, 257-267.
- Kellert, S. (2005). *Building for life: Designing and understanding the human-nature connection*. Washington, DC: Island Press.
- Kime, D. B. (2008). *Outdoor adventure education instructor training in postsecondary education settings: Educational connoisseurship and criticism case studies in Canada, New Zealand, and the United States* (Unpublished doctoral dissertation). University of Denver, CO.
- Klassen, R. M., & Tracy, L. D. (2014). Weekly self-efficacy and work stress during the teaching practicum: A mixed methods study. *Learning and Instruction*, 22, 158-169.
- Kleickmann, T., Richter, D., Kunter, M., Elsner, J., Besser, M., Krauss, S., & Baumert, J. (2013). Teachers' content knowledge and pedagogical content knowledge: The

- role of structural differences in teacher education. *Journal of Teacher Education*, 64, 90-106.
- Kolb, A. D. (1994). Learning styles and disciplinary differences. In Chickering, W. A. (Ed.), *The Modern American College: Responding to the Realities of Diverse Students and a Changing Society* (pp. 222-255). San Francisco, CA: Jossey-Bass Publishers, Inc.
- Komarraju, M., Karau, S. J., Schmeck, R. R., Avdic, A. (2011). The big five personality traits, learning styles, and academic achievement. *Personality and Individual Differences*, 51, 472-477.
- Kornelson, A. (1998). *A qualitative study of the process and outcomes of a school-based adventure education/therapy program*. University of New Brunswick, Fredericton.
- Kraus, A. (2012). Engaging theories and models to inform practice. *New Directions for Teaching and Learning*, 138, 13-27.
- Kurfiss, J. (1988). Intellectual, psychosocial, and moral development in college: Four major theories. In J.P. Balas & J.R. Judy (Eds.), *A Handbook on Values Development in Lutheran Church-Related College* (pp. 139-162). Thiel College.
- Kuzborska, I. (2011). Links between teachers' beliefs and practices and research on reading. *Reading in a Foreign Language*, 23(1), 102-128.
- Lamorey, S. (2012). Adventure experiences and early childhood teacher education students. *Journal of Early Childhood Teacher Education*, 34, 320-334.
- Larabee, D. (2002). On the nature of teaching and teacher education: Difficult practices that look easy. *Journal of Teacher Education*, 51, 3, 228- 233.
- Lieberman, G. A., & Hoody, L. L. (1998). *Closing the achievement gap: Using the environment as an integrating context for learning*, Poway, CA: Science Wizards.
- Lippmann, S., Bulanda, E. R., & Wagenaar, C. T. (2009). Student entitlement: issues and strategies for confronting entitlement in the classroom and beyond. *College Teaching*, 57(4), 197-204.
- Loprinzi, P. D., Branscum, A., Hanks, J., & Smit, E. (2016). Healthy lifestyle characteristics and their joint association with cardiovascular disease biomarkers in US adults. *Mayo Clinic Proceedings*, 91(4), 432-442.

- Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Louv R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill: Algonquin Books.
- Lowman, J. (1994). What constitutes masterful teaching. In K. A. Feldman & M. B. Paulsen (Eds), *Teaching and learning in the college classroom* (pp. 503-526). Boston, MA: ASHE Reader Series, Pearson.
- Lucas, G. M., Gratch, J., Cheng, L., & Marsella, S. (2015). When the going gets tough: Grit predicts costly perseverance. *Journal of Research in Personality*, 59, 15-22.
- Lumkin, A. (2008). Teachers as role models teaching character and moral values. *Journal of Physical Education, Recreation & Dance*, 79(2), 45-50.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1, 130-149.
- Magnusson, S, Krakjick, J., & Borko, H. (1999) Secondary teachers 'knowledge and beliefs about subject matter and their impact on instruction In: G. Newsome, J. and Lederman, N.G. (Eds.) *Examining Pedagogical Content Knowledge*, Dordrecht: Kluwer Academic Publishers, 95-132.
- Malone, C. (2015, March 30). Selling rock climbing in the social-media era. *The New Yorker*, Retrieved from http://www.newyorker.com/news/sporting-scene/selling-rock-climbing-in-the-social-media-era?mbid=social_facebook
- Mannion, G., Fenwick, A., & Lynch, J. (2013). Place-responsive pedagogy: Learning from teachers' experiences of excursions in nature. *Environmental Education Research*, 19(6), 792-809.
- Marselle, M. R., Irvine, K. N., & Warber, S. L. (2014). Examining group walks in nature and multiple aspects of well-being: A large scale study. *Ecopsychology*, 6, 134-147.
- McCammom, I. (2004). Heuristic traps in recreational avalanche accidents: Evidence and implications. *Avalanche News*, 68, 1-10.
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, (pp. 5-12). (74). San Francisco, CA: Josey-Bass Publishers, Inc.

- Micucci, D. (2015). Got grit: Redefining what it means to succeed. *Kaleidoscope UWC USA*, 48, 1-28.
- Moseley, C., Reinke, K., & Bookout, V. (2002). The effect of teaching outdoor environmental education on preservice teachers' attitudes toward self-efficacy and outcome expectancy. *The Journal of Environmental Education*, 34(1), 9-15.
- Mulholland, J., & Wallace, J. (2001). Teacher induction and elementary science teaching: Enhancing self-efficacy. *Teaching and Teacher Education*, 17, 243-261.
- Myers, S. A. (2003). Strategies to prevent and reduce conflict in the college classroom. *College Teaching*, 51, 94-98.
- National Center for Educational Statistics (n.d.). Common core of data (CCD). Retrieved from https://nces.ed.gov/ccd/rural_locales.asp#defs
- Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, 19, 317-328.
- Nie, Y., Lau, S., & Liau, A. K. (2010). The teacher efficacy scale: A reliability and validity study. *The Asia-Pacific Education Researcher*, 21(2), 414-421.
- Nilson, L. (1998). *Teaching at Its Best: A Research Based Resource for College Instructors*. Jaffrey, NH: Anker Publishing Company, Inc.
- Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personality and Social Psychology*, 93(1), 116-130.
- Oakes, W. P., Lane, K. L., Jenkins, A., & Booker, B. B. (2013). Three-tiered models of prevention: Teacher efficacy and burnout. *Education and Treatment of Children*, 36(4), 95-126.
- Obenchain, K., & Ives, B. (2006). Experiential education in the classroom and academic outcomes: For those who want it all. *Journal of Experiential Education*, 29(1), 61-77.
- Odello, t., Hill, E., & Gomez, E. (2008). The effectiveness of a four-hour challenge course on leadership efficacy and work efficacy. *Journal of Unconventional Parks, Tourism & Recreation Research*, 1(1), 18-22.
- Opezzo, M., & Schwartz, D. L. (2014). Give your ideas some legs: The positive effect of walking on creative thinking. *Journal of Experimental Psychology*, 40(4), 1142-1152.

- Osteen, L., & Coburn, M. B. (2012). Considering context: Developing students' leadership capacity. *New Directions for Student Services*, (140), 5-15.
- Owen, E. J. (2012). Using student development theories as conceptual frameworks in leadership education. *New Directions for Student Services*. (pp. 17-35). (140), San Francisco, CA: Wiley Periodicals, Inc.
- Pajares, F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.
- Paxton, T., & McAvoy, L. (2000). Social psychological benefits of a wilderness adventure program. In A. E. Watson, G. H. Aplet, and J. C. Hendee (Eds.). *Personal, societal, and ecological values of wilderness: Volume 3: Sixth World Wilderness Congress proceedings on research, management, and allocation* (USDA Forest Proceedings RMRS-P-15. pp. 202-206). Ogden: Rocky Mountain Research Station.
- Pearl, J. (2012). The causal foundation of structural equation modeling. *California University Los Angeles Department of Computer Science*, 370, 1-36.
- Pendergast, D., Garvis, S., & Keogh, J. (2011). Pre-service student-teacher self-efficacy beliefs: An insight into the making of teachers. *Australian Journal of Teacher Education*, 36(12), 46-58.
- Peebles, J. L., & Mendaglio, S. (2014). The impact of direct experience on preservice teachers' self-efficacy for teaching in inclusive classrooms. *International Journal of Inclusive Education*, 18(12), 132-1336.
- Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40
- Plato. (1920). Protagoras. In A. Chubberley (Ed.), *Readings in the history of education* (pp. 4-6). New York: Houghton-Mifflin.
- Powell, R. R. (1992). The influence of prior experience on pedagogical constructs of traditional and nontraditional pre-service teachers. *Teaching and Teacher Education*, 8, 225-238.
- Priest, S., & Gass, M. A., (Eds.). (2005). *Effective leadership in adventure programming*. (2nd ed.). Champaign, IL: Human Kinetics.

- Probst, D. B., & Koesler, R. A. (1998). Bandura goes outdoors: Role of self-efficacy in the outdoor leadership development process. *Leisure Sciences*, 20, 319-344.
- Pryor, A., Carpenter, C., & Townsend, M. (2005). Outdoor education and bush adventure therapy: A social-ecological approach to health and wellbeing. *Australian journal of outdoor education*, 9(1), 3-13.
- Puk, T. (1999). Is the process of experiential learning (outside the classroom) practical in higher education settings? – yes. In S. Wurdinger & T. Potter (eds.) *Controversial Issues in Adventure Education*, Dubuque, Iowa: Kendall/Hung.
- Railoa, E., & Sugerman, D. (1999). Outdoor leadership curricula. In J. Miles & S. Priest (Eds.), *Adventure programming* (pp. 241-245). State College, PA: Venture.
- Rendon, L. I. (1994). Validating culturally diverse students: Toward a new model of learning and student development. *Innovative Higher Education*, 19(1), 33-51.
- Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417-458.
- Robertson-Kraft, C., & Duckworth, A. (2014). True grit: Trait level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record*, 116, 1–27.
- Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review*, 94(2), 243-252.
- Ronkko, M., & Evermann, J. (2013). A critical examination of common beliefs about partial least squares path modeling. *Organizational Research Methods*, 16(3), 425-448.
- Rosch, M. D. & Anthony, D. M. (2012). Leadership pedagogy: Putting theory to practice. *New Directions for Student Services*. (pp. 37-51). (140), San Francisco, CA: Wiley Periodicals, Inc.
- Rosen, J. A., Glennie, E. J., Dalton, B. W., Lennon, J. M. & Bozick, R. N., (2010). Noncognitive skills in the classroom: new perspectives on educational research. RTI Press publication No. BK-0004-1009. Research Triangle Park, NC: RTI International. Retrieved 2/13/13 from <http://rti.org/rtipress>.
- Rushton, S., Morgan, J., & Richard, M. (2007). Teacher's Myers-Briggs personality profiles: Identifying effective teacher personality traits. *Teaching and Teacher Education*, 23, 432-441.

- Sanders, W., & Horn, S. (1998). Research findings for the Tennessee value-added assessment system (TVAAS) database: Implications for educational evaluation and research. *Journal of Personnel Evaluation in Education*, 12(3), 247-256.
- Sanders, W. L., & Rivers, J. C. (1996). Cumulative and residual effects of teachers on future student academic achievement. *Research progress report*, University of Tennessee Value-Added Research and Assessment Center.
- Schon, D. A., (1983). *The reflective practitioner: how professionals think in action*. New York: Basic Books.
- Schon, D. A., (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Josey-Bass Publishers.
- Schon, D. (1992). 'The theory of inquiry: Dewey's legacy to education'. *Curriculum Inquiry*, 22(2), 119-139.
- Schumann, S. (2013). *The accuracy of self-efficacy beliefs in outdoor education*, ProQuest Dissertations and Theses.
- Schumann, S., & Sibthorp, J. (2013). The development and scaling of the teaching outdoor education self-efficacy scale. *Journal of Outdoor Recreation, Education and Leadership*, 12, 80-98.
- Sigel, I. E. (1985). A conceptual analysis of beliefs. In I. E. Sigel (Ed.) *Parental belief systems: The psychological consequences for children* (pp. 345-371). Hillside, NJ: Erlbaum.
- Scrutton, R., & Beames, S. (2015). Measuring the unmeasurable: Upholding rigor in quantitative studies of personal and social development in outdoor adventure education. *Journal of Experiential Education*, 38(1), 8-25.
- Seifert, K. (2004). Learning to feel like a teacher. *Canadian Journal of Educational Administration and Policy*, (32), 1-25.
- Seligman, M. E. P. (1991). *Learned optimism*. New York: Knopf.
- Sheard, M., & Golby, J. (2006). The efficacy of an outdoor adventure education curriculum on selected aspects of positive psychological development. *Journal of Experiential Education*, 29(2), 187-209.
- Sherman, V. JH., Floren, M., & Sileo, N. M., Hess, C., & Sheehan, E. (2015). Accreditation by design: Creating a survey to measure completer perceptions. Presented at 38th Annual TED Conference, Phoenix Arizona, 2015.

- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- Sibthorp, J. (2003). An empirical look at Walsh and Gollis' adventure education process model: Relationships between antecedent factors, perceptions of characteristics of an adventure education experience, and changes in self-efficacy. *Journal of Leisure Research*, 35(1), 80-106.
- Sibthorp, J., Collins, R., Rathunde, K., Paisely, K., Schumann, S., Pohja, M., Gookin, J., & Baynes, S. (2015). Fostering experiential self-regulation through outdoor adventure education. *Journal of Experiential Education*, 38(1), 26-40).
- Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology*, 99(3), 611-625.
- Soles, C., & Powers, P., (2003). *Climbing: expedition planning*. Seattle, WA: The Mountaineers Books.
- Standerfer, S. (2003). The experiential learning profiler: Instrument development and implementation. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.
- Stewart, K. (2009). Lessons from teaching Millennials. *College Teaching*, 57(2), 111-117.
- Stonehouse, P. (2011). The rough ground of character: A philosophical investigation into character development on a wilderness expedition through a virtue ethical lens. *Journal of Outdoor Recreation, Education and Leadership*, 3(2), 108-111.
- Strayhorn, T. L. (2014). What role does grit play in academic success of black male collegians at predominately white institutions? *Journal of African American Studies*, 18(1), 1-10.
- Stremba, B., & Bisson, A. C. (Eds.). (2009). *Teaching adventure education theory: best practices*. Champaign, IL: Human Kinetics.
- Strutchens, M. E. (2000). Confronting beliefs and stereotypes that impede the mathematical empowerment of African American students. In M. E. Strutchens, M. Johnson, W. Tate (Eds.). *Changing the faces of mathematics: Perspectives Americans* (pp. 7-14). Reston, VA: National Council of Teachers in Mathematics.

- Svinicki, D. M. (2010). Student learning: From teacher-directed to self-regulation. *New Directions for Teaching and Learning*, (pp. 73-83). (123), San Francisco, CA: Wiley Periodicals, Inc.
- Svinicki, M., & McKeachie, (2014). *McKeachie's teaching tips: Strategies, research, and theory for college and university teachers* (14th edition). Boston, MA: Houghton Mifflin Company.
- Sutherland, S., Stuhr, P. T., & Ayvazo, S. (2014). Learning to teach: Pedagogical content knowledge in adventure based learning. *Physical Education and Sport Psychology*, 21(3), 233-248.
- Swanson, P. B. (2013). From teacher training through the first year on the job: Changes in foreign language teacher efficacy. *Electronic Journal of Foreign Language Teaching*, 10(1), 5-16.
- Temiz, T., & Topcu, M. S. (2013). Preservice teachers' teacher efficacy beliefs and constructivist-based teaching practice. *European Journal of Psychology of Education*, 28, 1435-1452.
- The White House. (2012). *Weekly address: Congress should back plan to hire teachers*. Retrieved from <https://www.whitehouse.gov/the-press-office/2012/08/18/weekly-address-congress-should-back-plan-hire-teachers>
- Tiezzi, L. J. & Cross, B. E. (1997). Utilizing research on prospective teacher's beliefs to inform urban field experiences. *The Urban Review*, 29, 113-125.
- Timken, G., & Mcnamee, J. (2012). New perspectives for teaching physical education: Preservice teachers' reflections on outdoor and adventure education. *Journal Of Teaching In Physical Education*, 31(1), 21-38.
- Tovey, H. (2007). *Playing outdoors, spaces and places, risk and challenge*. Maidenhead: Open University Press.
- Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68(2), 202-248.
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.
- Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education*, 23, 944-956.

- Udall, D., & Rugan, L. (1997). From the inside out. *Phi Delta Kappa*, 78(5), 404-410.
- Vaughn, M. (2015). Adaptive teaching: Reflective practice of two elementary teachers' visions and adaptations during literacy instruction. *Reflective Practice*, 16(1), 43-60.
- Waks, L. J. (2001). Donald Schon's philosophy of design and design education. *International Journal of Technology and Design Education*, 11, 37-51.
- Warren, K., Roberts, N. S., Breunig, M., & Alvarez, M. A. G. (2014). Social justice in outdoor experiential education: A state of knowledge review. *Journal of Experiential Education*, 37(1), 89-103.
- Weigold, A., Weigold, I. K., & Russell, E. J. (2013). Examination of the equivalence of self-report survey-based paper-and-pencil and Internet data collection methods. *Psychological Methods*, 18(1), 53-70.
- Weiner, B. (1974). *Achievement motivation and attribution theory*. Morristown, NJ: General Learning Press.
- Wells, M. N., & Lekies, S. K., (2006). "Nature and the life course: pathways from childhood natural experiences to adult environmentalism. *Children, Youth and Environments*. 16(1), 1-24.
- Wentworth, N., Pinnegar, S. (1996). Stories of learning and schooling: Capturing pre-service teachers' beliefs about teaching and learning. *Professional Educator*. 19(1), 1-11.
- Winser, S. (Ed.). (2004). *Royal geographical society expedition handbook*. London, England: Profile Books.
- Wittmer, C. R. (2011). Leadership and gender-role congruency: A guide for wilderness and outdoor practitioners. *The Journal of Experiential Education*, 24(3), 173-178.
- Wong, K. K-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.
- Woolfolk A. E., Rosoff, B., & Hoy, W. K. (1990). Teachers' sense of efficacy and their beliefs about managing students. *Teaching and Teacher Education*, 6, 137-148.
- Woolfolk A. E., Davis, H., & Pape, S. J. (2006). Teacher knowledge and beliefs. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 715-737). Mahwah, NJ: Lawrence Erlbaum.

- Wright, A. N., & Tolan, J. (2009). Prejudice reduction through shared adventure: A qualitative outcome assessment of a multicultural education class. *Journal of Experiential Education*, 32(2), 137-154.
- Zach, S., Harari, I., & Harari, N. (2011). Changes in teaching efficacy of pre-service teachers in physical education. *Physical Education and Sport Psychology*, 17(5), 447-462.
- Zull, E. J. (2006). Key aspects of how the brain learns. *New Directions for Teaching and Learning*, (pp. 3-9). (110), San Francisco, CA: Wiley Periodicals, Inc.

APPENDICES

APPENDIX A

DEMOGRAPHIC QUESTIONS

Gender: Male:___ Female:___

Year in School (circle one): Freshman Sophomore Junior Senior

Major: _____

Age: _____

Which term BEST describes the place you grew up?

Urban (over 100,000):___ Suburban:___ Town (over 25,000):___ Rural:___

What is the length of your longest outdoor adventure trip? (in days): _____

Please indicate the outdoor adventure activities that you have worked as a

FORMAL instructor (paid or a volunteer) (check all that apply):

Climbing:___ Ice Climbing:___ Cross Country Skiing:___ Backcountry Skiing:___

Mountain Biking:___ Horseback Riding:___ Hiking/Backpacking:___ Mountaineering:___

Flat Water Boating:___ White Water Boating:___ Other (please

list):_____

In the last two years, indicate how often you have participated in the following outdoor adventure activities:

| | Never | Hardly Ever | Occasionally | Frequently |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Climbing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ice Climbing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cross Country Skiing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Backcountry Skiing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Mountain Biking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Horseback Riding | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hiking/Backpacking | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Mountaineering | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Flat Water Boating | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| White Water Boating | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other (please list) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <input type="text"/> | | | | |

APPENDIX B

TEACHER SELF EFFICACY SCALE (TSES-12)

APPENDIX C

THE SHORT GRIT SCALE (GRIT-S)

Please respond to the following 8 items. Be honest - there are no right or wrong answers! Your answers are confidential.

| | Very much like me | Mostly like me | Somewhat like me | Not much like me | Not like me at all |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. New ideas and projects sometimes distract me from previous ones. | <input type="radio"/> |
| 2. Setbacks don't discourage me. | <input type="radio"/> |
| 3. I have been obsessed with a certain idea or project for a short time but later lost interest. | <input type="radio"/> |
| 4. I am a hard worker. | <input type="radio"/> |
| 5. I often set a goal but later choose to pursue a different one. | <input type="radio"/> |
| 6. I have difficulty maintaining focus on projects that take more than a few months to complete. | <input type="radio"/> |
| 7. I finish whatever I begin. | <input type="radio"/> |
| 8. I am diligent. | <input type="radio"/> |
