

The Impact of Participation in an Outdoor Education Program on Physical Education Teacher Education Student Self-Efficacy to Teach Outdoor Education

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Purpose: Self-efficacy, having been identified as a factor influencing teacher effectiveness, combined with the increased prevalence of outdoor education (OE) content being taught within physical education contexts, warrants the need for physical education teacher education (PETE) programs to address OE outcomes. Therefore, the purpose of this study was to determine if participation in an OE program increased self-efficacy to teach OE among PETE students. **Methods:** PETE students ($N = 95$) were taught OE content in multiple residential environments and were evaluated using the “Survey of Self-efficacy for Teaching Outdoor Education.” **Results:** Results indicated a significant increase in self-efficacy scores from pretest to posttest in all content areas (OE skills, group dynamic skills, and models and theories). Overall, the OE program had a large effect in changing self-efficacy scores. **Conclusion:** Participation in the program positively affected PETE students’ self-efficacy for teaching OE, which may improve their ability to ultimately teach this content in physical education settings.

Keywords: adventure education, self-confidence, teacher training

Self-Efficacy

Bandura (1977) described self-efficacy as a belief that one can perform a specific behavior to achieve a specific result, or situation-specific self-confidence. When the term teacher self-efficacy is examined, this belief centers on the teacher’s perception of how well he or she can teach a certain skill, concept, or idea in their classroom (Dellinger, Bobbett, Olivier, & Ellett, 2008; Loreman, Sharma, & Forlin, 2013). These beliefs, or one’s self-efficacy, can be affected both positively and negatively by gaining knowledge of and experience with a specific topic. Generally, a positive learning experience leads to an increase in self-efficacy, whereas a negative learning experience, or one where an individual is not successful, can result in a decrease in self-efficacy (McGowan, 1986). Although self-efficacy has been explored in a variety of settings and using various populations, one of the areas that is lacking is the self-efficacy of physical education teacher education (PETE) students to teach outdoor education (OE) skills and concepts. As self-efficacy, and more specifically teacher self-efficacy, is defined as a teacher’s perception of how well they can teach a specific topic at a specified level in a specified situation (Dellinger et al., 2008; Siwatu, 2011), it is important to determine how effectively PETE students believe that they can teach OE.

Applying Bandura’s theory of self-efficacy (1977) to OE, for a PETE student, self-efficacy is a situation-specific perception; in this case, a belief in one’s ability to teach OE with confidence in a variety of OE settings in the future. When the right learning conditions and incentives are present, efficacy expectations (beliefs about one’s competence) will develop (Feltz & Weiss,

1982). In addition, effort, activity choice, and persistence at a given task are all connected to self-efficacy. When an individual experiences success (i.e., meeting the learning objectives while participating in a certain task in a specific situation), it appears to be an important determinant of developing positive self-efficacy (Bandura, 1997; Siwatu, 2011; Skaalvik & Skaalvik, 2007). Fahlman, Hall, and Gutuskey (2013) support Bandura’s self-efficacy theory “because people are unlikely to participate in behaviors unless they believe that they are capable of performing those behaviors successfully” (p. 321). Fahlman et al. (2013) further explain that teachers with high self-efficacy for teaching the material expect success, overcome barriers to success, and are more likely to invest in teaching the material. Conversely, if an individual is not successful in a specific activity, participation in the activity may lower their self-efficacy (McGowan, 1986).

Teacher Self-Efficacy

It is important to note a historical confusion in the literature that relates to the definitions of “teacher self-efficacy” and “teacher efficacy.” Teacher self-efficacy, as previously defined, reflects Bandura’s theoretical foundation of self-efficacy theory and focuses distinctively on the belief that the teacher can teach specific tasks in their specific teaching environment. Rooted in locus of control theory (Rotter, 1966), teacher efficacy is a different construct and is defined as “teachers’ beliefs in their abilities to affect student performance” (Dellinger et al., 2008, p. 753).

This change in student performance may be caused by a variety of teaching and learning behaviors and overlooks the critical role of teachers’ beliefs in their ability to teach a wide variety of teaching tasks necessary in the specific teaching situation (Dellinger et al., 2008; Henson, 2002; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Skaalvik and Skaalvik (2007) and Sharma and George (2016)

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further reinforced the importance of the teaching task and setting as critical elements of the definition of teacher self-efficacy. In other words, teacher efficacy overlooks the importance of a teacher's belief in their abilities and rather focuses on the outcome of their teaching (student learning). It is important to acknowledge that student learning may be affected by many different constructs (home life, student characteristics, etc.), including teacher self-efficacy (Dellinger et al., 2008).

When self-efficacy is applied to teaching, it is argued that teachers who have high self-efficacy for teaching their specific content are also more likely to become effective teachers. Moseley, Reinke, and Bookout (2002) described effective teachers as those who perceive that they can teach effectively, in other words, have high self-efficacy for teaching-specific subject matter. Dellinger et al. (2008) defined teacher self-efficacy as teachers' individual beliefs about their own abilities to successfully teach specific learning tasks in their classrooms. Gibson and Dembo (1984) attempted to apply Bandura's theory to teachers while creating their Teacher Efficacy Scale, stating that those with self-efficacy beliefs, or confidence in their teaching abilities, are likely to show persistence, give better feedback, and create a superior academic focus in comparison with peers who believe they have less ability to impact learning.

In an attempt to overcome the theoretical and psychometric problems associated with the commonly used Teacher Efficacy Scale (Gibson & Dembo, 1984), Dellinger et al. (2008) refuted its use as an appropriate measure of teacher self-efficacy. They argued the Teacher Efficacy Scale focuses on teacher efficacy, as previously stated, a different, more general construct than teacher self-efficacy. Dellinger et al. (2008) attempted to introduce a valid and reliable study of teachers' self-efficacy beliefs, with a secondary goal of clarifying the difference between teacher efficacy and teacher self-efficacy. Their focus was on creating an instrument, and subsequently using their survey to measure self-efficacy as defined by Bandura. They addressed the historical confusion in differentiating between the two constructs and created a valid instrument to measure teacher self-efficacy (as opposed to teacher efficacy). The difference in these constructs is something considered in this study, especially as it relates to creating an instrument for PETE students rather than current teachers. As the goal of this study was to determine how well PETE students believe they can teach in an OE environment, as opposed to how well they will generally affect student performance, teacher self-efficacy was considered a more appropriate term to use when creating our tool.

Theoretical Foundation

Bandura's (1977, 1986) theory posits that perceived efficacy levels can be based on four factors: performance attainment, also referred to as mastery experiences (Aydeniz & Ozdilek, 2014; Henson, 2002); vicarious experiences, physiological states, and verbal persuasion. In OE contexts, performance attainment is used to refer to extensive practice opportunities that directly relate to increased abilities with regard to OE skills and concepts. Vicarious experiences refers to the observation of appropriate mastery teaching of OE concepts and skills. Physiological states refers to gaining experience on tasks in a controlled setting, which mitigates stress and anxiety that may increase when put to practice in a more demanding outdoor setting. Verbal persuasion refers to receiving feedback on performance and competence of OE skills from mastery level teachers, which affects one's confidence level. These

factors may affect self-efficacy of individuals in an OE program due to self-perception of competence from participation in the program.

Propst and Koesler (1998), in applying this theory, note that self-efficacy has a positive connection to success, confidence, and development of the outdoor leadership process. Aydeniz and Ozdilek (2014) state that "prolonged engagement with mastery practices and collective reflection upon experience may be the key to increase self-efficacy" (p. 1271) among preservice teachers. Henson (2002) identified mastery experiences as likely the strongest factor in increasing self-efficacy to teach. Others have applied Bandura's work to their research on teacher candidates' self-efficacy to teach (Fahlman et al., 2013) and although teaching differs from outdoor leadership, there are overlapping characteristics of both when self-efficacy theory is applied.

Outdoor education is considered to be any program that provides physical, mental, and emotional challenges to participants in an outdoor setting and in a way that a traditional classroom may not be able to provide (Priest & Gass, 2005). North (2015) concurred, and described OE as a distinctly different natural environment in which PETE students are engaged in learning. Similarly, adventure education, according to Sutherland and Stuhr (2014), is defined as a program that "encompasses a variety of different programmatic influences including wilderness education, adventure-based counseling, developmental adventure, and challenge education" (p. 491). Horwood (1999) describes adventure as having specific criteria including, "uncertain outcome, risk, inescapable consequences, energetic action, and willing participation" (p. 9), which adds to the unique environment in which learning is occurring. A comparison of OE and adventure education clarifies their main differences, in terms of primary focus, setting, and risk. In OE, the focus is on skill development, the environment is natural or outdoors, and the risk is actual (not invented). In adventure education, the focus is on intrapersonal and interpersonal skill development, the setting may or may not be in the natural environment, the environment is either created or controlled, and the risk is mainly perceived (Timken & McNamee, 2012). In the context of this research, both adventure education and OE depict dynamic settings similar to those in the program investigated through this study. Although the program has been defined as an OE program, it contains elements of both constructs.

These dynamic settings are notable as they relate to the definition of teacher self-efficacy, in which Dellinger et al. (2008) included the element of a specific classroom environment. In other words, as it relates to this study, teacher self-efficacy involves one's belief that he or she can execute the specific teaching tasks needed to achieve certain outcomes in the specific OE environment. There is consistent evidence that self-efficacy is most impacted in the preservice teacher environment (Henson, 2002; Housego, 1992; Hoy & Woolfolk, 1990), and more experienced teachers tend to have more modest increases in self-efficacy (Anderson, Greene, & Loewen, 1988; Henson, 2002; Tschannen-Moran et al., 1998). Although Bandura's self-efficacy theory does not define specific criteria for how one would determine their beliefs in their abilities to teach, the factors described (performance attainment, vicarious experiences, physiological states, and verbal persuasion) influence this determination. Thus, success can best be defined for PETE students in an OE course as attaining self-efficacy to teach OE content in a similar future environment, through the totality of their experiences in the unique OE learning environment in which they are immersed.

Self-Efficacy to Teach OE

There is limited specific research on PETE programs and OE, and according to Sutherland and Legge (2016), there is a need to study adventure education and how to best prepare PETE students to teach it. Sutherland and Stuhr (2014) concluded that an undergraduate OE course provided PETE students with a foundation of content knowledge and pedagogical content knowledge to teach OE. When specific transfer of knowledge to K–12 students was examined, it was found that it was difficult for PETE students to successfully teach OE content, even when they were specifically trained to teach OE within their respective PETE programs (North, 2015; Sutherland & Legge, 2016). For example, Dillon, Tannehill, and O’Sullivan (2017) found that while preservice teachers gained confidence in their ability to select appropriate OE activities and were able to describe specific OE pedagogy, they essentially lacked the judgment needed to make decisions aligned with goals of the learner-centered environment of outdoor adventure education. This literature indicates that PETE programs with OE courses increase self-efficacy to teach this subject matter, but more research is needed to determine how success in increasing self-efficacy to teach actually translates to future increases in teacher impact on student learning. In addition, previous examination has been primarily qualitative in nature, which does not provide definitive evidence related to PETE students’ and PE teachers’ self-efficacy for teaching OE content.

As OE is widely accepted as an appropriate lifetime activity to teach in high school physical education (SHAPE America, 2014), PETE students need to participate in an adequate amount of coursework in this area so they are prepared to teach OE content to their students. Although we recognize that the program focuses mainly on performance attainment, we acknowledge the relevance of the other sources of information (i.e., vicarious experiences, physiological states, and verbal persuasion) and the impact they may have on self-efficacy. This is especially true as PETE students (who have had other experiences in the field of teaching through the curriculum) enter the field of teaching and are impacted by a variety of sources of information. Due to a paucity of research in the area of teacher self-efficacy as it relates to outdoor educator self-efficacy, this study aims to fill a gap in the existing literature. Therefore, the purpose of this study was to determine if participation in an OE program increased self-efficacy to teach OE among PETE students.

Methods

Participants

Convenience sampling was used to obtain a participant group of 111 PETE students (aged 19–36 years old, mean age 21.5), who were registered to take a 2-week OE course at a midsized university in the northeast United States. All surveys were returned, but 16 participants were eliminated due to incompleteness. Gender demographics revealed more males ($N=59$) than females ($N=36$), but an adequate sample size of both groups. The course was required for PETE students at this university and is typically taken by students in their junior or senior year. At this point in the PETE curriculum, students have been exposed to both content knowledge and pedagogical content knowledge in a variety of other courses.

Approval to conduct this research study was obtained through the institutional review board at the State University of New York at Cortland, prior to administration of the survey. All students who registered and attended the course during the summer were asked to

participate in the study. The survey was given on Day 1 of the program shortly after students arrived to the course site, following a tour of the facility, swim test, and welcome to the program. Although the researchers were also instructors of the course, it was made clear (both verbally and in writing) that participation in the study would not affect students’ grades or standing within the PETE program.

During administration of the survey, a letter of consent was provided and read to potential participants as surveys were distributed. In addition, participants were instructed that they could accept the survey and hand it back blank if they decided not to participate. Surveys were precoded so that during administration and data analysis numbers, rather than names, would be connected to individual data to provide greater anonymity. Upon completion of the surveys, they were collected by a staff member who was not affiliated with the survey as another measure to increase student confidence that participation would have no impact on their grade.

The survey was given again in the evening before students were dismissed from the program and 95 were completed. The program is organized so that pedagogical components of the course are complete the evening before students are dismissed, which gives students time to rest after a strenuous backcountry trip and before a potentially long drive home. Participants were again informed, in a similar manner as the pretest, that participation in the study was not required as a part of the course. All participants consented to participation before data were collected.

Program

The OE program is part of a PETE curriculum that teaches students pedagogy as well as content. The course is one of the pedagogy courses included in the PETE curriculum at the university. Course objectives listed on the syllabus with an explanation of how the objective is met through the course (see Table 1), help to explain the level of content knowledge versus pedagogical content knowledge students are exposed to during this course. Objectives help to focus the course on the obtainment of skills in addition to enhancing students’ pedagogical content knowledge related to OE and teaching these topics within a PE curriculum.

A group of educators with training and extensive experience specific to this course facilitated the program. A procedure is in place where potential facilitators move through a training process which includes being a teaching assistant with incrementally more demanding roles prior to becoming an instructor. The length and strenuousness of the training process is based on previous experience teaching and facilitating a program such as this one. The training to facilitate the learning and experience is coordinated by a program director with a specific focus on course objectives. A facilitator handbook guides the educators during the teaching and processing of the experience.

The program is split into two components. Component 1 focuses on three areas: learning OE skills necessary for living and traveling in the wilderness with a group, giving students opportunities to examine and engage in group dynamic skills that may be used when working with a group, and learning models and theories that are considered relevant to teaching OE at the high school level. Component 2 is a group backcountry camping experience.

During Component 1 of the experience, group sizes ranged from small (8–10) to large (42–45) based on the various activities in which participants were taking part. Activities that facilitated the learning of skills and gave students opportunities to engage in

Table 1 Content Knowledge Versus Pedagogical Content Knowledge

Course objectives	Objective application
Learn and apply developmentally appropriate methods of teaching outdoor adventure education activities as a component of a physical education curriculum.	Experience model lessons of a variety of OE content.
Learn and discuss the efficacy of outdoor adventure education activities as a component of the physical education curriculum.	Debrief activities. Learn and apply models and theories of OE.
Learn and discuss the value of outdoor adventure education activities as a means of promoting the development of positive intrapersonal and interpersonal skills necessary to becoming a functional member of a group.	Apply and discuss stages of group development and implications it has for teaching OE in a K-12 PE curriculum.
Develop the skills (physical, cognitive, and affective) necessary for personal participation and effective instruction in outdoor adventure education activities.	Learn and practice OE skills.
Apply skills, concepts, and principles associated with traditional physical education activities to activity in the natural environment.	Engage in a backcountry camping trip.
Learn how to organize and administer outdoor adventure education programs.	Plan and lead a backcountry camping trip.
Learn and discuss the value of conserving natural resources through minimum impact camping techniques.	Learn and apply concepts of LNT.
Learn and discuss the balance of technological advancements and the use of the natural environment.	Discussion of GPS technology and emergency devices.
Develop an appreciation and respect for the natural environment.	Learn and apply concepts of LNT with a course expectation that LNT principles will be adhered to during the course.
Learn respect for the physical, cultural, and social aspects of human diversity.	Learn and apply concepts of the stages of group development.

Note. OE = outdoor education; LNT = Leave No Trace; GPS = global positioning system.

group dynamic skills included: canoeing, map and compass, and other skill instruction; a day trip to a local mountain; camping instruction by setting up a mock camp site, which included cooking a meal and completing various camp chores (cleaning dishes, food storage, etc.); completing low ropes and high ropes courses; and planning a five nights/six days backcountry camping trip. Models and theories were taught and incorporated into the activities during Component 1 and continued to be woven into the backcountry camping experience in which the participants took part. The Outward Bound Process Model (Walsh & Golins, 1976); concepts of adventure, risk, and flow (Csikszentmihalyi, 1975); the stages of group development (Tuckman & Jensen, 1977); and a reflective cycle provided the framework in which students were learning about OE and how to teach OE at the high school level. Participants were exposed to modeling of best practices for using all three of these elements throughout Component 1.

The reflective cycle guides debriefing that occurs throughout the OE program. The reflective cycle utilized was modified from Borton (1970); Rolfe, Freshwater, and Jasper (2001); and Gibbs (1988). Borton's original reflective cycle (What?, So what?, and Now what?) was adapted by Rolfe et al. (2001) for use outside the field of education. Gibbs (1988) added the element of feeling into a reflective cycle, which was used in the OE program. After a given experience students were asked to describe events from the experience (What?), identify how they felt during those events (Gut?), discuss what they learned from the experience (So What?), and how they will apply this knowledge later in the OE program and in the future as a physical education teacher (Now what?). This reflective cycle was utilized throughout the OE program and is spiraled into the PETE program at this institution. This was the primary method of developing pedagogical content knowledge in the OE program.

During Component 2 of the experience, group sizes were between six and nine (including at least one instructor) as per regulations where the backcountry camping took place. Trips were backpacking, paddling, or a combination of backpacking and

paddling. Instructors became observers and facilitators of the experience. Participants were expected, collectively, to "lead" the trip, undertaking all navigation tasks, camp setup, cooking, and decision making, applying what they explicitly learned during Component 1. Instructors were present to facilitate the experience, mainly through debriefing, and to ensure that participants were making safe decisions in the backcountry environment.

The overarching pedagogical link between Component 1 and Component 2 is grounded in the reflective cycle. In addition, this model is utilized in several other pedagogy courses within the PETE curriculum. This model helps participants make connections between the OE program, what they are learning in the PETE curriculum, and their future roles as physical education teachers.

Instrument

Although there are a variety of instruments for measuring self-efficacy, none specifically measure self-efficacy of PETE students to teach OE. As such, the instrument ("Survey of Self-efficacy for Teaching Outdoor Education") was developed to determine self-efficacy for teaching OE at the high school level. The survey focuses on teaching OE at the high school level to align with National Standards & Grade Level Outcomes for K-12 Physical Education (SHAPE America, 2014), which indicate that high school physical education should focus on lifetime activities, fitness activities, and dance (SHAPE America, 2014). OE is typically considered a lifetime activity.

A multistep process was utilized to develop and validate the "Survey of Self-efficacy for Teaching Outdoor Education." A review of curricula from a variety of OE programs determined the initial OE survey content. This survey included 37 items in four different sections (OE skills, group dynamic skills, models and theories, and ropes course facilitation). The initial survey was sent through e-mail to a panel of experts to test content validity.

The panel of experts was compiled using predetermined criteria set by the researchers to assemble a group that had sufficient

breadth of knowledge to be able to establish content validity. To be included in the panel, experts had to have expertise in the field of OE, expertise in the field of PETE with experience teaching OE at either the high school or the higher education level, or expertise in the field of physical education with experience teaching OE at the high school level. Ten individuals with expertise in OE and physical education made up the panel of experts. The panel included individuals working in the field, in higher education, and in high school; located on both the east and west coast of the United States; ranging in age from 29 to 65 years; and included both identified genders (three females and seven males). In total, four individuals from the panel had expertise in the field of OE, four had expertise teaching PETE and experience teaching OE, and two had expertise teaching OE at the high school level.

A modified Delphi method (Dunn, Bouffard, & Rogers, 1999) determined which survey items would ultimately be included in the survey. It was determined that all items with a *V* coefficient greater than .77 would be included in the final version of the survey (Dunn et al., 1999). Written feedback collected from members of the panel of experts also contributed to adjustment and placement of final survey items.

Original organization of the survey included a section asking participants to rate their self-efficacy to teach high and low ropes activities in an OE curriculum. Panel members suggested that limited exposure in these activities was not enough to prepare PETE students and future physical education teachers to be able to teach these topics. Panel experts agreed that ropes course facilitation typically requires specific training and certifications and should be left as a “direct service component of OE.” Therefore, high and low ropes survey questions were eliminated from the survey, except for those related to debriefing.

The initial survey included frontloading and debriefing as it relates to participation in high and low ropes activities, but debriefing was considered by experts to be an important component in an OE program in general and not just as it relates to participation on ropes courses. Therefore, debriefing remained in the survey, but was moved to the models and theories section. The final version of the survey included 21 items in three different sections. See Appendix 1 for representative survey items.

Data Analysis

Data were recorded into Excel (version 16, Microsoft Inc., Redmond, WA) by the researchers with a spot check performed once all data were entered. Nine surveys were selected at random and checked to determine accuracy in recording the final version of the survey data. Data entries for all nine surveys were determined to be accurate.

Values used for data analysis were calculated for both strength and level of self-efficacy. Level indicates participants have a belief that they can teach a specific task (anything rated above 0%) or cannot teach a specific task (rated item 0%), whereas strength indicates the intensity of the participants belief that they can teach a specific task (how well do the students believe they can teach the task as rated on a scale from 0% to 100%). A level score of self-efficacy was determined by totaling the number of items each participant rated as higher than 0% for each of the three sections separately. A strength of self-efficacy score was determined by calculating the sum for each of the three sections (Dellinger et al., 2008). Ultimately, participants had a level score and a strength score for each of the three sections of the “Survey of Self-efficacy for Teaching Outdoor Education” (OE skills, group dynamic skills,

and models and theories). Surveys that were incomplete (were missing data in any of the three sections for both pretest and posttests) were not included in final analysis. Sixteen surveys were excluded due to missing data, leaving 95 usable surveys. Due to the nature of the survey and timing of the survey, some students may have inadvertently missed sections. There was no pattern in the missingness of data.

To determine if significant changes occurred in self-efficacy scores from pretest to posttest, a series of Wilcoxon signed-rank tests were employed. Analyses were run in Stata (version 12; Statacorp, College Station, TX) and significance was set at .05. Effect sizes (*r*) were calculated using *z* and dividing it by the square root of the total sample size as described in Field (2009) to determine degree of change. The degree or level of effect was interpreted as follows: .1 = small effect, .3 = medium effect, and .5 = large effect (Cohen, 1992).

Results

The following results were reported by section, for both level and strength, and differentiated between male and female respondents. See Table 2 for a full report of all level and strength scores in addition to effect size for each section of the survey.

The level of self-efficacy to teach OE skills scores increased between pretest (Mdn = 11, *M* = 9.81) to posttest (Mdn = 11, *M* = 10.98), $z = -3.59$, $p < .01$, $r = .47$ for males. Similarly, females increased the level of self-efficacy scores from pretest (Mdn = 10, *M* = 8.03) to posttest (Mdn = 11, *M* = 10.89), $z = -4.21$, $p < .01$, $r = .70$. The strength of self-efficacy scores to teach OE skills also showed a significant increase for males from pretest (Mdn = 54, *M* = 53.21) to posttest (Mdn = 94, *M* = 92.68), $z = -6.67$, $p < .01$, $r = .87$, as well as females from pretest (Mdn = 33.5, *M* = 38.25) to posttest (Mdn = 94.5, *M* = 90.25), $z = -5.23$, $p < .01$, $r = .87$.

The self-efficacy to teach models and theories had similar outcomes. Males’ level of self-efficacy to teach models and theories scores increased from pretest (Mdn = 4, *M* = 3.68) to posttest (Mdn = 4, *M* = 4.00), $z = -2.84$, $p < .01$, $r = .37$. Similarly, females’ level of self-efficacy scores increased from pretest (Mdn = 4, *M* = 3.39) to posttest (Mdn = 4, *M* = 4.00), $z = -2.97$, $p < .01$, $r = .50$. The strength of models and theories self-efficacy score also showed a significant increase for males from pretest (Mdn = 21, *M* = 21.76) to posttest (Mdn = 36, *M* = 34.46), $z = -6.49$, $p < .01$, $r = .85$, as well as females from pretest (Mdn = 17.5, *M* = 17.67) to posttest (Mdn = 36.5, *M* = 35.22), $z = -5.22$, $p < .01$, $r = .87$.

Males and females both saw a significant increase in strength of self-efficacy scores to teach group dynamic skills. Males’ strength of self-efficacy scores for group dynamic skills increased from pretest (Mdn = 53, *M* = 49.73) to posttest (Mdn = 56, *M* = 54.22), $z = -4.76$, $p < .01$, $r = .62$, and females’ strength of self-efficacy scores increased from pretest (Mdn = 48, *M* = 47.58) to posttest (Mdn = 54, *M* = 53.22), $z = -3.28$, $p < .1$, $r = .55$ for teaching group dynamic skills.

Although there was a significant change in the strength of group dynamic skills self-efficacy for males and females, there was not a significant change of level of self-efficacy among males and females. Males did not see level of self-efficacy scores to teach group dynamic skills increase from pretest (Mdn = 6, *M* = 6.00) to posttest (Mdn = 6, *M* = 6.00), $z = 0$, $p = ns$, $r = 0$. Similarly, females also did not see level of self-efficacy scores to teach group dynamic skills significantly increase from pretest (Mdn = 6, *M* = 5.94) to posttest (Mdn = 6, *M* = 6.00), $z = -1.41$, $p = ns$, $r = .24$.

Table 2 Data Analysis Report for the “Survey of Self-Efficacy for Teaching Outdoor Education”

Level	Pre OE skills	Post OE skills	Change OE skills	Effect size OE skills	Pre group dynamics	Post group dynamics	Change group dynamics	Effect size group dynamics	Pre models and theories	Post models and theories	Change models and theories	Effect size models and theories
Female (<i>N</i> = 36)												
Median	10.00	11.00	1.00	0.70	6.00	6.00	0.00	0.24	4.00	4.00	0.00	0.50
Mean	8.03	10.89	2.86		5.94	6.00	0.06		3.39	4.00	0.61	
Male (<i>N</i> = 59)												
Median	11.00	11.00	0.00	0.47	6.00	6.00	0.00	0.00	4.00	4.00	0.00	0.37
Mean	9.81	10.98	1.17		6.00	6.00	0.00		3.68	4.00	0.32	
Strength												
Female (<i>N</i> = 36)												
Median	33.500	94.50	61.00	0.87	48.00	54.00	6.00	0.55	17.50	36.50	19.00	0.87
Mean	38.250	90.25	52.00		47.58	53.22	5.64		17.67	35.22	17.56	
Male (<i>N</i> = 59)												
Median	54.000	94.00	40.00	0.87	53.00	56.00	3.00	0.62	21.00	36.00	15.00	0.85
Mean	53.212	92.68	39.47		49.73	54.22	4.49		21.76	34.46	12.69	

Note. OE = outdoor education.

Overall, there was a large effect of the program on most of the self-efficacy domains. One exception was level of models and theories for males, where the program had a medium effect. The program also had little to no effect for both males' and females' level of group dynamic skills, but it is interesting to note that the program had a large effect for both males and females' strength of group dynamic skills.

Discussion

Based on the results described in the previous section, participation in the OE program positively affected the self-efficacy of PETE students to teach OE. The self-efficacy scores for students consistently increased from pretest to posttest as a result of the program. Data analysis and results reported self-efficacy in terms of both strength and level as previously defined in the "Data Analysis" section; therefore, this discussion will focus on these two separate measures of self-efficacy. In addition, data were reported separately for both males and females in all categories. Data analysis was completed separately by gender to explore potential similarities and differences among genders, which could potentially lead to a richer discussion. Although the results indicated minimal statistically significant differences across gender measures, the medium effect versus large effect for males and females, respectively, for level of models and theories was intriguing. This difference added to the discussion and considerations for future research.

There was a significant effect of the OE program on self-efficacy of PETE students. Strength of self-efficacy to teach OE skills, models and theories, and group dynamic skills all had a large effect size. This was true for both males and females in these categories. Level of self-efficacy to teach OE skills also had a large effect size among males and females. For models and theories, a large effect size was observed for level of self-efficacy among females, and a medium effect size was observed for level of self-efficacy among males. Small effect was observed for level of self-efficacy of females for teaching group dynamic skills, and no effect was observed for level of self-efficacy of males for teaching group dynamic skills.

A possible explanation for the small effect (females) and no effect (males) of level of self-efficacy for teaching group dynamic skills is the generality of this category. Many PETE students had been exposed to concepts including leadership, followership, problem solving, respect, initiative, and communication skills in other coursework in the PETE program, as well as in other school and sport-based experiences. Though the reasons for the gender differences are unclear, this is the only statistically significant difference, which brings about the question, why is this so? Perhaps this is a question worthy of future research.

A large effect size may indicate that participation in the OE program does improve self-efficacy in these group dynamic skills, whereas minimal to no effect size on level can possibly be attributed to having some confidence from prior exposure to these group dynamic skills in the PETE curriculum. In other words, level scores reveal that most PETE students had some confidence to teach these constructs prior to participation in the OE program, but the program did increase the strength of the self-efficacy the participants possessed.

These results are not surprising, as the PETE program in this study is intentional about spiraling the curriculum. By revisiting topics throughout the curriculum, the goal is to reinforce the subject matter. As subject matter is revisited, the logical progression is to

increase complexity, relate new subject matter to old subject matter, and ultimately apply the material to meet course objectives. Throughout the PETE curriculum and within this OE course, subject matter is reinforced.

For strength of self-efficacy to teach OE skills, the large effect size for both males and females may be mainly attributed to the fact that many students had not been exposed to, or had minimally been exposed to, the hard skills such as canoeing, map and compass, and back country camping prior to the OE program. Having opportunities to learn and refine these skills in multiple hands-on learning environments in the program may have created the large increase in self-efficacy for the students.

The same reasoning can be discussed for large effect of level of self-efficacy to teach OE skills. In both instances, PETE students moved from no or little experience with these skills, to learning and practicing the skills between the pretest and posttest. Therefore, students gained some confidence, and in many cases a much higher intensity of confidence, due to the OE program.

For models and theories, the strength of effect of self-efficacy to teach for both males and females was large. Similar to teaching OE skills, this may be due to being exposed to these models and theories in the OE program, with little to no prior knowledge for many PETE students. The notable difference in this category is that for level of self-efficacy, males showed a large effect size, and females showed a medium effect size. The reason for this is harder to understand, and perhaps clues can be gleaned from trying to learn more from future research. For example, males started with less confidence and gain more, females showed fewer increases in confidence due to the OE program, or is there another reason for this gender difference?

The impact of the OE program on PETE student self-efficacy to teach was significant for males and females in nearly all measurements. For both level and strength in confidence to teach OE skills and in confidence to teach models and theories, there was a statistically significant change from pretest to posttest. For strength in confidence to teach group dynamic skills, there was a statistically significant difference from pretest to posttest for males and females. The only area where there was not a significant difference from pretest to posttest was for level of confidence to teach group dynamic skills.

These findings indicate students who came in with no confidence to teach in these areas showed a change in confidence through their opportunities to learn and apply their knowledge during the program, in all areas. As future teachers, the goal is that they ultimately can apply their knowledge in a variety of settings. Therefore, practice applying it in this course, and the subsequent self-efficacy gained to teach it, is an important starting point. The lack of a statistically significant change in level of group dynamic skills indicates that their prior experiences influenced their self-efficacy entering the program. Many students came in with prior knowledge and confidence to teach group dynamic skills; thus, there were few students who reported initial pretest scores of 0% confidence. However, the statistically significant difference in strength of self-efficacy to teach group dynamic skills indicates the program positively impacted the intensity of their confidence in this area. Ultimately, in considering both effect size and statistical significance, the OE program appears to be an impactful experience for PETE students. The opportunity for students to learn new skills and add to prior knowledge through the OE program improved self-efficacy to teach OE skills, group dynamic skills, and models and theories.

These results are relevant to the learning process for PETE students, in that explicitly including self-efficacy growth

opportunities in the PETE curriculum is worthy of consideration. If PETE students believe they can teach the required tasks in a variety of settings, they may be better prepared to apply the content knowledge and pedagogical content knowledge PETE programs emphasize in the curriculum. This could be true of OE, and also other areas as curriculum is spiraled and scaffolded. As self-efficacy to teach has been linked to the potential for greater persistence, confidence, and other worthy traits (Bandura, 1997; Fahlman et al., 2013) that are likely to contribute to PETE candidate growth and learning, why would not PETE programs do more to enhance opportunities to improve self-efficacy in the PETE curriculum?

It is important for PETE students to experience these gains in self-efficacy, as it can potentially lead to improved teaching of these concepts. OE is considered a key part of a high school physical education curriculum as described in the National Standards & Grade Level Outcomes for K-12 Physical Education (SHAPE America, 2014). For this reason, it is important to examine OE programs in PETE curricula to determine if the current iteration of these programs does in fact lead to these increases in self-efficacy that may potentially influence PETE student future teaching effectiveness.

Conclusion

Based on the results, there are several implications for PETE students related to preparation to teach OE. This study relates to that of Sutherland and Stuhr (2014), who concluded that a similar undergraduate course provided PETE students with sufficient content knowledge and pedagogical content knowledge to teach this material. In terms of confidence to teach, our results concur with Propst and Koesler (1998), who found that self-efficacy was positively connected to potential success, confidence, and development of the outdoor leadership process. Therefore, our results indicate that a well-planned and executed OE program designed for PETE students will improve their confidence to teach the skills and concepts included in the program.

It is important to recognize that teacher candidates may overestimate their abilities due to their lack of practical teaching experience (Siwatu, 2011). Although the results indicate an increase in confidence to teach OE concepts at the high school level and research supports that increased self-efficacy may contribute to future teaching competencies (Fahlman et al., 2013), perception of confidence does not guarantee actual ability to teach. Furthermore, although there is evidence that self-efficacy may be best improved as a teacher candidate, many other factors during these years contribute to pedagogical abilities (Henson, 2002; Housego, 1992; Hoy & Woolfolk, 1990). Although self-efficacy does not guarantee teaching effectiveness and other factors during the PETE experience contribute to the development of the PETE student, self-efficacy appears to have an important role in the potential to become an effective teacher.

Note that the ability to mitigate risks may be similarly underdeveloped. For example, in this program, students learned concepts of risk and adventure and were put in environments where they had to manage risks but that does not necessarily mean they have the tools to mitigate risks effectively as teachers later. This is worth considering because of the unique environment created by the nature of OE activities, which inherently include a certain amount of risk (Horwood, 1999). Thus, although students may increase self-efficacy to mitigate risk, they may not yet have all the tools to effectively do so.

This study also indicates that congruency across the PETE curriculum may have a positive impact on student self-efficacy to teach some of these concepts. It appears that many of the participants entered the OE program with some confidence due to prior knowledge acquisition for certain items. Thus, receiving content knowledge in multiple settings is likely to have a positive impact on PETE students' self-efficacy to teach the content.

Limitations

Since participants were from one university, the results may be limited. The characteristics of the students in the PETE program tended to be primarily white and from the northeast region of the United States. Although participants were from a large PETE program with students from all areas of the state and around the region, it is a fairly homogeneous population. Measuring programs outside of this one, including those with greater diversity, may offer additional information. Although this is a limitation, the results may have value applicable to similar PETE programs.

Future Research

With limited research specifically studying the impact of an OE program on PETE students, this study would benefit from being repeated, both in this program and in other programs. As mentioned in the "Limitations" section, applying this study to other OE programs may tell us more about the impact on self-efficacy in a variety of these programs, particularly those programs required in PETE curricula. Furthermore, studying multiple years of students in the same PETE curriculum and finding similar results will increase the reliability of the instrument.

In addition, the question of long-term self-efficacy remains unanswered. As described by Green (1990) and Cain and McAvoy (1990), ongoing participation in outdoor activities and learning opportunities leads to ongoing development. Conversely, Propst and Koesler (1998) noted a drop in self-efficacy after prior participants in an OE course became less involved with outdoor leadership. However, they also noted that the courses in their study that enhanced self-efficacy had a statistically significant effect one year later. Repeating this study after the passage of a specific amount of time may answer questions about the strength and level of self-efficacy to teach after exiting the OE program. Also, because this study focused on PETE students, studying this population not only later, but specifically once they become teachers, may also provide valuable information about delivery of OE content in a high school setting.

Finally, studying the impact of an OE program on other areas besides self-efficacy to teach may improve understanding of the impact of the program. What are other benefits of the OE program; what is the overall impact of an OE program on PETE students? Self-efficacy to teach is a critical area to measure, and learning more about how that relates to teacher effectiveness is a topic worth exploring.

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Appendix 1

The following is a selected sample of the “Survey of Self-efficacy for Teaching Outdoor Education”:

This survey will list a variety of skills and topics related to teaching outdoor education.

You are asked to indicate how confident you are in your abilities **to teach** this skill or topic.

Your assistance in completing this survey is greatly appreciated and should take no more than 10 minutes.

All responses are confidential and your participation is voluntary.

Demographic Information

Age: _____

Gender: ☐ Male ☐ Female ☐ Non-binary ☐ Prefer not to say

Sample scale:

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
No confidence at all			Somewhat confident				Completely confident				

Questions **1–11** are based upon your level of confidence **to teach** the following outdoor education skills at the high school level.

1. Canoeing

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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2. Map and compass

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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10. Backcountry camping

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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Questions **12–17** are based upon your level of confidence **to teach** the following group dynamic skills while facilitating outdoor education activities at the high school level.

12. Leadership

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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14. Problem solving

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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17. Communication skills

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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Questions **18–21** are based on your level of confidence **to teach** about and incorporate the following models and theories at the high school level.

18. Outward Bound Process Model

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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20. Concepts of Risk and Adventure

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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21. Debriefing outdoor education experiences—Definition of debriefing—To bring closure to an experience and get students to think about how ideas or activities can impact the future

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Other _____ %
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