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Improving the Accuracy of Outdoor Educators' Teaching Self-Efficacy Beliefs Through Metacognitive Monitoring

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Abstract

Accuracy in emerging outdoor educators' teaching self-efficacy beliefs is critical to student safety and learning. Overinflated self-efficacy beliefs can result in delayed skilled development or inappropriate acceptance of risk. In an outdoor education context, neglecting the accuracy of teaching self-efficacy beliefs early in an educator's development may impede one's likelihood of being effective. Metacognitive monitoring interventions are a possible approach to help emerging outdoor educators accurately calibrate their teaching self-efficacy beliefs. Thus, the purpose of this study was to examine the effects of a metacognitive intervention on the accuracy of emerging outdoor educators' teaching self-efficacy beliefs. Results indicate metacognitive monitoring appears to significantly improve the accuracy of emerging outdoor educators' teaching self-efficacy beliefs. In contrast, control group participants appeared to consistently overestimate their likelihood of success across all domains of teaching outdoor education, thus further demonstrating the need for interventions to help emerging outdoor educators calibrate their teaching self-efficacy beliefs.

Keywords

metacognition, accuracy, outdoor educator, teaching self-efficacy

Accuracy in emerging outdoor educators' *teaching self-efficacy beliefs* is critical to student safety and learning in outdoor education. An instructor with inflated teaching

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self-efficacy beliefs may overestimate his ability to safely teach whitewater kayak skills amid river hazards and not only risk his own safety but also the safety of his students. Similarly, an instructor who overestimates her ability to successfully facilitate conflict resolution may fail to choose effective strategies or understand the group dynamic and cause emotional or psychological damage. Research has shown that "inflated self-efficacy has led to the unwise escalation of commitment to a course of action . . . even if that action will result in a bad outcome" (Ng & Earl, 2008, p. 42). Teaching self-efficacy beliefs are malleable in the early stages of skill development and become fairly stable and resistant to change once established (Bandura, 1986). As such, neglecting to attend to the accuracy of teaching self-efficacy beliefs early in an outdoor educator's development can result in undesirable consequences in the context of an outdoor educator's practice (cf. Martin & Priest, 1986).

Historically, outdoor education programs and research have neglected the notion of accuracy and viewed an *increase* in self-efficacy as a positive outcome from participation (Hattie, Marsh, Neill, & Richards, 1997; Jones & Hinton, 2007; Kimbrough, 2007; Paxton & McAvoy, 1998; Propst & Koesler, 1998). This one-dimensional perspective on self-efficacy seems appropriate considering increases in self-efficacy are related to well-being (Bunting, 2000), success, and confidence (Propst & Koesler, 1998). In addition, increases in self-efficacy have been found to influence motivation (Bandura, 1986), indicating that the more an individual believes she will be successful, the more she would persist toward achieving her desired goals.

Research asserts that a *slight* overestimation is acceptable because it may increase persistence; however, other research indicates when self-efficacy beliefs become overinflated, the consequences have been found to be negative (Vancouver, 2012). When looking at the relationship between self-efficacy and performance of specific individuals (as opposed to overall group performance), increases in self-efficacy may cause a decrease in performance (Schmidt & DeShon, 2009; Vancouver & Kendall, 2006; Vancouver, Thompson, Tischner, & Putka, 2002; Yeo & Neal, 2006). This research refutes the common belief that, when it comes to self-efficacy, "more is always better." Therefore, the purpose of this study is to examine the effect of an intervention to improve the *accuracy* of emerging outdoor educator's teaching self-efficacy beliefs.

Teacher Self-Efficacy Beliefs

Grounded in Social Cognitive Theory, self-efficacy beliefs are considered a foundational component of human agency (Bandura, 2012). They are beliefs about one's ability to "organize and execute the courses of action required to produce given attainments" (Bandura, 1977, p. 3). In essence, self-efficacy beliefs are future-oriented perceptions of competence that influence the approach or avoidance of tasks (Bandura, 1986). In the context of teaching, self-efficacy beliefs can direct educators' behaviors and have been found to predict the level of teachers' aspirations and goals (Mujis & Reynolds, 2002), their likelihood of experimenting with new teaching strategies (Allinder, 1994), and their persistence amid setbacks (Tschannen-Moran, Woolfolk

Hoy, & Hoy, 1998). "The idea that teachers' self-beliefs are determinants of teaching behavior is a simple, yet powerful idea" (Henson, 2002, p. 4).

In general, self-efficacy beliefs are concerned with what people believe they can do with their skills and abilities amid uncertain conditions, ambiguous information, or unpredictable circumstances (Maddux & Gosselin, 2003); these conditions are analogous to the settings in which outdoor education often occurs (Martin, Cashel, Wagstaff, & Breunig, 2004). Tschannen-Moran and Woolfolk Hoy (2007) explain teacher self-efficacy can direct teacher behaviors and also emphasize, "[self-efficacy] is based on a self-perception of competence rather than *actual* level of competence" (p. 946). As such, unchecked enhancement of outdoor educator self-efficacy beliefs should be approached with caution and attendance to the accuracy of outdoor educator self-efficacy beliefs should be of utmost importance.

Formation and Accuracy of Teacher Self-Efficacy

Whether accurate or faulty, teacher self-efficacy beliefs are informed by four sources: (a) self-assessments of prior performances (known as enactive experiences), (b) verbal persuasion, (c) vicarious experience (watching the performance of others), and (d) physiological information (feelings of stress or calm during performance; Bandura, 1986). Research findings indicate self-assessments of prior teaching experiences are the most influential sources of development (Tschannen-Moran & Woolfolk Hoy, 2001). Self-assessments can be problematic because, generally, individuals' self-assessments of performance are *over*estimations of actual performance (Dunning, Heath, & Suls, 2004; Mabe & West, 1982). Overestimation of performance is very pronounced in novices and likely present in outdoor educators-in-training because by definition, they are still relatively new to teaching in the outdoors.

Although no research has been conducted on the accuracy of pre-service outdoor educators' self-efficacy beliefs, traditional classroom-based teachers-in-training self-efficacy beliefs have received attention in the literature. Research findings on traditional teachers-in-training self-efficacy beliefs and self-assessments indicate they both tend to be overestimations of actual competence and are less frequently underestimations or accurate estimations of competence (Cakir & Alici, 2009; Mulholland & Wallace, 2001). These findings are unfortunate because teachers-in-training would benefit from accurate self-assessments because this would allow them to appropriately devote preparation time to develop skills they are lacking (cf. Thiede, Anderson, & Therriault, 2003; Wheatley, 2005).

The cognitive process which helps an individual understand their strengths, weaknesses, and competence is known as metacognition (Flavell, 1979). The notion of metacognition is not new to the field of outdoor education. Paul Petzoldt, founder of the National Outdoor Leadership School (NOLS) used to say "know what you know and know what you don't know" (Wagstaff, 2005, p. 6). Essentially, Petzoldt was talking about having a metacognitive awareness or knowing about what knowledge and abilities an individual possesses.

Paradoxically, the better one becomes at a skill the better he becomes at accurately assessing his own prior performance and predicting future performances (a self-efficacy belief). Generally, until this competence develops an individual is less capable of accurate self-assessments and will tend to overestimate his abilities (e.g., Hodges, Regehr, & Martin, 2001). Amid this paradox, however, it is possible to help individuals calibrate the accuracy of their self-assessments and self-efficacy beliefs through exercises which encourage metacognitive processes. These exercises are known as monitoring interventions (e.g., Tobias & Everson, 2009).

Monitoring Interventions, Self-Efficacy, and Performance

Pajares and Kranzler (1995) observed incongruence in individuals' self-efficacy beliefs and competence and suggested a need for instructional interventions which increase students' abilities to *calibrate the accuracy of their self-efficacy beliefs with their actual performances*. Monitoring interventions may be an effective means of calibration in outdoor education contexts (Schumann & Sibthorp, 2014). Monitoring interventions can improve performance and have lasting effects on participants' accuracy of self-assessments and subsequent self-efficacy beliefs (Nietfeld, Cao, & Osborn, 2005). Discussing the implications of their monitoring intervention, Nietfeld et al. (2005) contend that as their intervention progressed over the span of exercises during a college semester, self-efficacy beliefs appeared to become accurately informed beliefs of competence when typically, self-efficacy beliefs would have been overinflated. Collectively, components of successful monitoring interventions include (a) predictions of performance (a self-efficacy belief), (b) postdictions (or self-assessments) of performance, (c) feedback on the accuracy of the predictions and postdictions, and (d) incentives for accuracy (Hacker, Bol, Horgan, & Rakow, 2000; Nietfeld et al., 2005; Schraw, Potenza, & Nebelsick-Gullet, 1993).

Additional structural components of monitoring interventions include time, self-explanations, and incentives for accuracy. Calibrating overestimations or underestimations of competence takes time (e.g., Hacker, Bol, & Bahbani, 2008). Monitoring interventions involve multiple monitoring exercises over repeated events. This allows individuals to see patterns in their monitoring accuracy, making it more difficult to dismiss miscalibrated beliefs as isolated anomalies. Second, encouraging students to self-explain (Chi et al. 1989) their monitoring performance can help to improve understanding, subsequent performance, and transfer of learning to similar contexts (Tajika, Nakatsu, Nozaki, Neumann, & Maruno, 2007). Self-explanation involves generating comments about one's performance; these explanations sometimes extend beyond initial perceptions (Chi et al. 1989). Finally, when accuracy for predictions and self-assessments is incentivized, calibration improves (Hacker et al., 2000). In outdoor education training contexts, incentives for performance are inherent. Because high performance on trainings lead to employment opportunities or recommendations for advancement, a trainer simply needs to inform students that accurate self-assessments (not over or underestimations) are desired.

Therefore, the intent of this study is to examine the following research question:

Research Question 1: Can the accuracy of teaching outdoor education self-efficacy beliefs be improved through the application of a metacognitive monitoring intervention?

Method

Participants and Setting

Established in 1965, NOLS combines the development of outdoor leadership, education, and technical skills with disciplines such as biology and natural history in outdoor environments. Study participants were students enrolled in NOLS instructor courses (IC) between April 2011 and July 2011. Six NOLS IC occurred in wilderness expedition-based contexts in mountain, river, ocean, and desert environments. In addition to teaching various topics while on course, students were introduced to procedures and standards of practice at NOLS. At the completion of the course, participants may have been offered employment at one of NOLS course areas across the United States or abroad.

Measures

The main variable of interest in this study was *teaching outdoor education self-efficacy* (TOESE). Self-efficacy beliefs are generally considered context-specific, meaning that beliefs in one broad area such as teaching do not apply to other unrelated areas such as athletics. Furthermore, the more context-specific a self-efficacy belief is within a domain, the more likely it is to be accurate. Accordingly, TOESE beliefs are defined as an educator's beliefs in one's capability to organize and execute the courses of action required to successfully accomplish teaching tasks in the outdoor education setting. For the purposes of this study, the Teaching Outdoor Education Self-Efficacy Scale (TOE-SES; Schumann & Sibthorp, 2014) was used to measure participants' self-efficacy beliefs specific to five outdoor education domains.

The TOE-SES domains include instruction and assessment (IA), outdoor classroom management (OCM), technical skill (TECH), interpersonal skill (INTPER), and environmental integration (ENVINT). IA is defined as the ability to effectively prepare and implement teaching strategies, gain and maintain a diverse group of students' interests, and assess student performance. OCM refers to the ability to effectively teach in the natural environment while managing student's physical comfort and the risks inherent in the outdoor environment. The TECH domain is defined as the ability to successfully and safely perform the necessary outdoor skills relevant to accomplishing a particular lesson or activity. The INTPER domain is defined as the ability to build rapport, effectively listen, understand, empathize, demonstrate sincerity, and show respect for student differences in culture, interests, and skill. Finally, ENVINT is defined as an outdoor educator's ability to effectively address ecological considerations throughout their educational practice in the effort to develop students' environmental ethic, connections to the environment, and understanding of the environments in which they travel.

As per Bandura (2006), items on the TOE-SES are scored on a scale of 0% to100% confidence; this attends to the strength of the self-efficacy belief. In addition, the scale addressed self-efficacy generality as it collectively attends to the breadth of outdoor educator practice. The TOE-SES 23 functions as a multidimensional scale with sufficient psychometric properties and internal consistencies across the five subscales: IA ($\alpha = .90$), OCM ($\alpha = .83$), TECH ($\alpha = .81$), INTPER ($\alpha = .82$), and ENVINT ($\alpha = .88$).

Procedures

Courses were split into two matched groups based on course location and course dates and then randomly assigned to a treatment or control group. The treatment group participated in a monitoring intervention. The treatment group included three courses and the control group included three courses. At the beginning and end of both the control and treatment courses, participants completed the TOE-SES. At the conclusion of each course, each of three course instructors completed an instructor form of the TOE-SES scoring it for each individual student. Each instructor was asked to indicate a confidence level (0%-100%) in their ability to accurately evaluate the particular student. This allowed for a weighted composite instructor score for subsequent analyses. Thus, accuracy is defined as conformance to the instructor team score, for purposes of this study. It should be noted that NOLS IC staff are accomplished senior instructors, and it is likely that their internal metrics are well calibrated given their extensive experience.

The treatment and control groups had several opportunities to teach during the NOLS IC (up to 4 times each). Prior to teaching a topic, students in the treatment group completed a monitoring intervention worksheet (Schumann, Sibthorp, & Hacker, 2014). Students were instructed to predict their performance in the upcoming lesson regarding each of the five domains of outdoor education. Below each domain were two prompts to cue the students into the domain. The students rated their performance in each domain on a Likert-type scale (9 = *Excellent*—comparable with senior NOLS Instructor, 4 = *Acceptable*—comparable with a first year NOLS instructor, 1 = *Novice*—below a basic level of proficiency). A sample prompt from the OCM domain on the prediction worksheet reads, “How well will you manage your students’ protection from the environment?”

Once the lesson concluded, the students turned over the monitoring worksheet and completed a self-assessment of their performance in each of the five domains. Finally, the student’s mentor, or another instructor if his or her mentor was not present, evaluated the actual performance on an instructor form containing the five domains. The instructor presented the observation to the student and encouraged the student to compare these data with their predictions and self-assessments of performance. This comparison between self and instructor evaluations served as monitoring information for the student (i.e., was the student score an over or underestimation of performance). Ultimately, this information indicated the accuracy of their self-assessments and self-efficacy beliefs and was intended to help students calibrate their beliefs over time.

Table 1. Discriminant Function Analysis—Structure Matrix.

Teaching outdoor education self-efficacy domains	Function coefficients
Instruction and assessment	.059
Outdoor classroom management	.313[a]
Technical skill	.492[a]
Interpersonal skill	.429[a]
Environmental integration	.480[a]

[a]Denotes predictors contributing to the significant difference between the treatment and control group.

Participants kept their worksheets in a prestapled booklet and had an opportunity to discuss their monitoring accuracy if they desired midcourse. The midcourse check-ins occurred on all NOLS ICs (treatment and control).

Data analysis. A 2 × 2 multivariate profile analysis was used to test the research question: Does the accuracy of TOESE beliefs improve with the application of a monitoring intervention? Group membership (treatment or control) served as the between subjects effect. The within-subjects effect had two sources: A student self-assessed TOE-SES score and a corresponding instructor generated TOE-SES score. The instructor score was a weighted composite of the three course instructors' scores according to the instructors' confidence in his or her ability to accurately evaluate the student. The hypothesis that the accuracy of TOESE beliefs would depend on group membership was assessed through the interaction of group and source. Discriminant Function Analysis was used to follow-up a significant omnibus test.

Results

Forty-four of the IC students agreed to participate in the study. They were 51% female and 49% male; they averaged 26 years in age. Prior to initial analysis, the data were cleaned and screened for univariate outliers. Four respondents contained incomplete data and were removed from the analysis. Ultimately, the treatment group contained 22 (n = 22) participants and the control group contained 18 (n = 18). Both groups reported similar demographics and pretest scores.

The group by source interaction was significant, $\Lambda = .72$, $F(5, 34) = 2.63$, $p < .05$, and a Discriminant Function Analysis was used as a follow-up. Only one factor was extracted and interpreted ($R_c = .53$, $p < .05$). Coefficients loading higher than .30 were considered part of the function for interpretation purposes (Tabachnick & Fidell, 2001). The treatment group demonstrated greater accuracy in self-efficacy scores than the control group on OCM, TECH, INTPER, and ENVINT. The discriminant function structure matrix is presented in Table 1.

Figure 1 is a plot of the functions centered on the mean. The figure reveals that the treatment group self-efficacy beliefs were significantly more accurate in relation to their instructors' assessments as noted by the smaller distance between the centroids

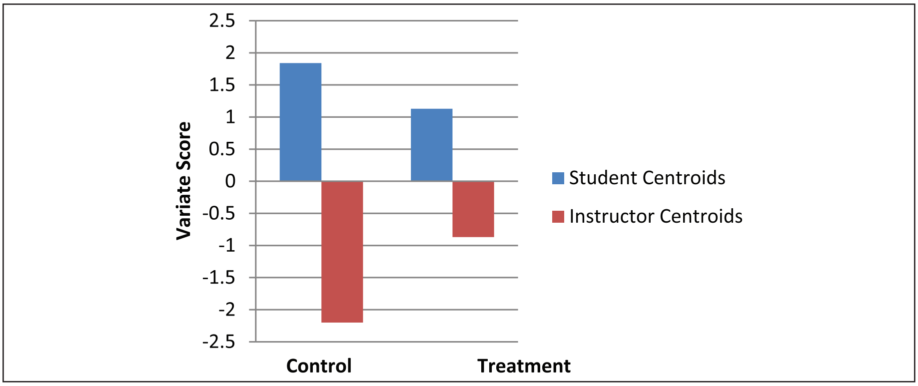

Figure 1. Variate centroids by group.

Table 2. Means and Standard Deviations of Variates.

Group	Variate source	*M*	*SD*
Control	Student	24.34	1.25
	Instructor	20.31	2.61
Treatment	Student	23.64	2.91
	Instructor	21.63	1.68

compared with the control group. In other words, as a result of enhanced accuracy in the OCM, TECH, INTPER, and ENVINT self-efficacy domains, the treatment group were overall better calibrated in their self-efficacy beliefs than the control group at course end. Means and standard deviations of the variates are presented in Table 2.

Although, given the significant interaction, it is difficult to interpret the significant ($p < .05$) main effects, the treatment group students were generally rated higher at course completion by both themselves and their instructors than students in the control group. In addition, instructor ratings in the control group were significant lower than the students' own reports of self-efficacy.

Exploratory Data Analysis

In an effort to further understand the nature of emerging outdoor educator's teaching self-efficacy beliefs and the potential of monitoring interventions, raw mean scores were examined across self-efficacy subscales in relation to groups (treatment and control) and sources (students and instructors). The means and standard deviations for student and instructor evaluation scores on TOE-SES 23 domains are presented in Table 3.

The means for both the control and treatment group student scores across TOE-SES subscales were all higher compared with instructor scores. Control group scores were

Table 3. Means and Standard Deviations for Student and Instructor TOE-SES 23 Domains.

	Group	*M*	*SD*
Student IA	Control	88.06	6.36
	Treatment	81.95	11.99
Instructor IA	Control	79.41	11.51
	Treatment	74.20	9.82
Student OCM	Control	90.26	6.59
	Treatment	87.44	10.74
Instructor OCM	Control	81.77	11.85
	Treatment	82.94	5.39
Student TECH	Control	90.90	5.44
	Treatment	88.31	11.94
Instructor TECH	Control	75.02	10.38
	Treatment	79.07	7.02
Student INTPER	Control	89.69	6.94
	Treatment	86.57	11.32
Instructor INTPER	Control	76.95	11.79
	Treatment	80.39	6.32
Student ENVINT	Control	83.76	9.77
	Treatment	78.75	12.48
Instructor ENVINT	Control	76.16	12.82
	Treatment	78.45	10.44

Note. TOE-SES = Teaching Outdoor Education Self-Efficacy Scale; IA = Instruction and Assessment; OCM = outdoor classroom management; TECH = technical skills; INTPER = interpersonal skills; ENVINT = environmental integration.

generally higher than the treatment group. TECH was the most poorly calibrated by the control group whose mean was 15.88 points above the instructor mean, followed by the control groups' interpersonal scores which were overestimated by 12.74. The most accurate self-efficacy beliefs were the treatment group in the ENVINT domain, which was near perfectly accurate at .30 points above the instructor mean. Finally, instructor means in the OCM, TECH, INTPER, and ENVINT subscales for treatment group participants were higher than control group participants. Although not statistically significant in this small sample study, this trend in means indicates that at the end of the intervention, treatment group participants may have been more *competent* in these four domains of outdoor education practice than the control group.

Discussion

The purpose of this study was to examine the influence of a monitoring intervention on the accuracy of emerging outdoor educators' teaching self-efficacy beliefs. The present study did not seek to increase self-efficacy beliefs but rather, improve the accuracy of those beliefs compared with instructor observations. Results indicate that a monitoring intervention improved the calibration of TOESE beliefs. It should be noted, however, these effects were likely varied across individuals, and in some cases, the effect was negligible while others were more strongly impacted by the intervention. These results are consistent with previous findings in metacognitive monitoring intervention research (Nietfeld et al., 2005). Compared with the control group, it appears that the treatment groups' self-efficacy beliefs were transformed into more accurate beliefs regarding their likelihood of success in future outdoor education contexts.

Participants in this study were in the early stages of developing their TOESE beliefs thus, making them particularly susceptible to change. This susceptibility is primarily due to the lack of previous experiences and self-assessments (Bandura, 2012). At most, treatment group participants completed three monitoring interventions; some completed as few as one. It appears it did not take much to reduce any overestimation, perhaps due to the limited number of previous self-assessments. In addition, the instructors providing feedback were likely revered as experts, making the instructor assessment an influential source of self-efficacy development. In a sense, monitoring intervention feedback from the instructor may have served as a "wake-up-call" which was helpful in de-biasing participants' self-assessments.

The outdoor education domains which contributed the most to an overall difference in teaching self-efficacy belief accuracy included TECH, ENVINT, INTPER, and OCM. Because of the potentially unfortunate consequences associated with inflated self-efficacy beliefs in TECH (cf. Martin & Priest, 1986), these results are particularly encouraging. Treatment group participants may ultimately make safer decisions, as future outdoor educators, based on accurate self-appraisals of TECH. In addition, given that outdoor education occurs in natural landscapes, the relatively high influence of the ENVINT domain was also encouraging as this is a unique characteristic of outdoor education that sets it apart from other disciplines of education.

Interestingly, exploratory data analysis revealed that TECH scores for the control group were the most *inaccurate and overestimated* compared with all other outdoor education domains. Grossly inaccurate beliefs in TECH might be devastating, recognizing that teacher self-efficacy beliefs influence the likelihood of experimenting with new teaching strategies (Allinder, 1994) and persistence amid setbacks (Tschannen-Moran et al., 1998). These findings point to the importance of attending to the accuracy of teacher self-efficacy beliefs.

Wheatley (2005) explains that educators who possess an accurate sense of their strengths and weaknesses are more likely to devote time to areas needing improvement and are less likely to waste time in areas where their strengths exist. If at the end of the course the treatment group indeed possessed a more accurate sense of their competence, it is possible that these outdoor educators-in-training may ultimately improve their performance, safety, and effectiveness as a result of developing the skills they accurately believed they were lacking (Thiede et al., 2003).

Simply stated, the emerging outdoor educators-in-training who participated in the monitoring intervention were overall better at "knowing what they know and what they don't know" (Petzoldt in Wagstaff, 2005) which may ultimately make them safer and more effective outdoor educators in the future.

Future researchers may benefit from examining not only the accuracy of self-efficacy beliefs but also the improvement of performance over time as this is a likely long-term effect of improved accuracy in self-assessments and efficacy beliefs (cf. Thiede et al., 2003). In this study, a performance assessment was not conducted at course start, thus the present findings cannot conclude that in addition to self-efficacy belief accuracy, performance also improved. However, this conclusion may have merit as exhibited by the overall higher instructor-based scores for the treatment group in four of the five teaching outdoor education domains (TECH, OCM, INTPER, and ENVINT).

Future researchers might examine the degree of overestimation of TOESE beliefs. What kinds of consequences have resulted from overestimation of teaching self-efficacy beliefs in outdoor education contexts, either positive or negative? If as Bandura (1986) contends, a slight overestimation in self-efficacy is ideal, what might be a desirable degree of overestimation?

The results of this study should be of particular relevance for individuals who train outdoor educators. A goal of outdoor educator training programs should not only be to teach future educators relevant skills but also to ensure that educators-in-training have an accurate sense of competence in those skills. If staff trainers can successfully facilitate the calibration of their trainees' outdoor educator self-efficacy beliefs, this may ultimately help direct the trainees toward areas needing skill development.

The conditions implemented in the present study include prediction of performance, self-assessment of performance, incentives for accuracy, comparison with an external observation, and self-explanation of errors in calibration (Hacker et al., 2000; Nietfeld et al., 2005). The unique component of a prediction of performance may be one component that sets a monitoring intervention apart from current practice as it allows students to see how accurate their efficacy beliefs are. Another distinguishing characteristic may be the opportunity for students to quantifiably examine calibration accuracies between self-assessments and instructor scores; or to put simply, are they off the mark in their own self-assessments? Staff trainers might consider each of these as conditions to implement into existing practice. The monitoring exercises took no more than 5 min before and after educators-in-training delivered a lesson, yet it was effective in reducing inflated self-efficacy beliefs.

Finally, amid improved calibration of beliefs, the monitoring intervention group appeared to keep a healthy slight overestimation of teaching self-efficacy beliefs which is desirable (Bandura, 1987) because it can result in an appropriate amount of tenacity while stopping short of obstinacy. Indeed, many great accomplishments have resulted from a belief in one's likelihood of success amid uncertainty and the present intervention may be a means for trainers to help educators-in-training develop an appropriate level of resolve in their outdoor educational endeavors.

Conclusion

Unchecked self-efficacy enhancement in outdoor educators should be approached with caution due to the consequences in outdoor education contexts. In some cases, outdoor education research and practice has placed value on the increase of self-efficacy beliefs. Although a slight overestimation in self-efficacy beliefs can be beneficial and increase persistence; recent research offers that efforts to simply increase self-efficacy beliefs can result in overinflated beliefs, improper selection of behaviors, and decreases in performance or failure (Vancouver, 2012). Instructional interventions which increase students' abilities to better calibrate the accuracy of their beliefs with their actual performances are needed (e.g., Pajares & Kranzler, 1995). Because teacher self-efficacy beliefs become relatively stable once they are established, intervention to calibrate the accuracy of these beliefs is important early in outdoor education training. Metacognitive monitoring is a strategy to effectively intervene reducing inaccurate self-assessments and self-efficacy beliefs.

Results of this study indicate a monitoring intervention was able to improve the accuracy of emerging outdoor educators' teaching self-efficacy beliefs. Demonstrating the need for interventions to reduce inflated self-beliefs, the educators-in-training who did not participate in the monitoring intervention appeared to consistently overestimate their likelihood of success across all domains of teaching outdoor education. Essentially, those who participated in the monitoring intervention were better at knowing what they know and what they do not know. This is an important step in the process of becoming a safe and effective educator; if one can identify where they are off the mark, he or she can chose to do something about it; conversely, ignorance may only increase the chances of repeated mistakes or lack of improvement. The present study demonstrates that a monitoring intervention can be a useful approach to support emerging outdoor educators as they hone a complex set of skills to effectively and safely teach in the outdoors.

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