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Taylor & Francis Group

Journal of Physical Education, Recreation & Dance

ISSN: 0730-3084 (Print) 2168-3816 (Online) Journal homepage: www.tandfonline.com/journals/ujrd20

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Lori M. Klein, Bryar Fancher & Christopher B. Merica

To cite this article: Lori M. Klein, Bryar Fancher & Christopher B. Merica (2026) Blending Orienteering and Geocaching: A Practical Approach to Implementing Outdoor Education in High School Physical Education, Journal of Physical Education, Recreation & Dance, 97:9, 9-18, DOI: 10.1080/07303084.2026.2721275

To link to this article: https://doi.org/10.1080/07303084.2026.2721275

Published online: 26 Oct 2026.

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Blending Orienteering and Geocaching:

A Practical Approach to Implementing Outdoor Education in High School Physical Education

Lori M. Klein, Bryar Fancher, and Christopher B. Merica

On average, school-age youth in the United States spend nearly 90% of their waking hours indoors (Environmental Protection Agency, 2025). In addition, an increasing number of youth have reported preferring to spend most of their time indoors, often contributing to increased levels of sedentary behavior, which can lead to an array of health issues including obesity, attention deficit disorder, and depression (Battista et al., 2016; Dankiw et al., 2020, 2023; Moorman et al., 2007). In contrast, time spent outdoors can encourage physical activity, increase concentration, improve stress-management skills, spark creativity, and enhance problem solving (Dankiw et al., 2020; Moorman et al., 2007). Due to the amount of time per day youth spend on school campuses, schools are identified as a key intervention point to increase physical activity during the school day and promote student interaction with nature and outdoor environments (e.g., local parks, playground equipment, recreation fields; Cottrell & Cottrell, 2020).

Of the school subject areas, physical education is identified as an ideal arena to foster opportunities for students to be engaged with outdoor activities and learn how to interact with the natural environment (Stratton & Dyson, 2025). For example, the 2024 SHAPE America National Physical Education Standards include grade-span learning indicators that determine learning outcomes related to outdoor education pursuits (i.e., Standard 1.12.3; Standard 2.12.3; SHAPE America – Society of Health and Physical Educators, 2024). Furthermore, an increasing number of youth have expressed a genuine interest in and enjoyment from participating in outdoor education activities as part of their physical education experience (Moorman et al., 2007). Given the uptick of American adults

engaging in outdoor activities (Romboy, 2024), it is important to foster youth enjoyment and competence at an early age to promote lifelong participation, such as through school-based outdoor education (Bunting, 1989; Cottrell & Cottrell, 2020).

Outdoor Education

Outdoor education is often taught within physical education at the middle or high school level where students engage in recreation-based activities in an outdoor environment, such as orienteering, climbing, and kayaking (Stratton & Dyson, 2025). In physical education, these types of activities can be used to facilitate learning in each of the four learning domains (i.e., psychomotor, cognitive, affective, social) and the selection of activities is often dependent on the geographical region of the school or educational program. For example, surfing may be popular in coastal communities while snowshoeing may be favored in mountainous, snowy regions. For the purposes of this article, the intention is to focus on how outdoor education can build the skills and content knowledge of students related to navigating the outdoor environment. Specifically, the authors chose orienteering and geocaching which are two outdoor pursuits that are accessible in any geographical region or community setting (urban, rural), and are growing in popularity among high school students (Battista et al., 2016). It is unclear exactly when orienteering and geocaching made their debut in the high school physical education curriculum, but literature discussing the topic has been increasing over the years (Gallery, 1983; Schlatter & Hurd, 2005; Senison-Hall, 2011; Parkes, 2024).

Orienteering

The combination of orienteering and geocaching poses a unique instructional unit in curricula for instructors to capitalize on student connection with the regional landscape while using technology (Battista et al., 2016; Schlatter & Hurd, 2005). Orienteering is an activity wherein participants begin by learning skills in reading maps and become familiar with utilizing a compass properly (Senison-Hall, 2011). The goal is for participants to use their map and compass to find certain controls as quickly as possible. Orienteering is viewed as a sport that positively impacts health because of its unique combination of physical activity, social-skill development, and decision making (Gryniuk et al., 2024). Currently, orienteering is integrated into some school settings and youth programs through Orienteering USA (2022), which exists to encourage the adolescent and adult populations to participate in the activity.

Geocaching

Geocaching is another outdoor education activity that is often referred to as the modern version of orienteering as it can involve the use of a map and compass in addition to a global positioning system (GPS) receiver (Battista et al., 2016). Geocaching is an activity where participants use a GPS and satellite data to look for caches (e.g., Tupperware with a small trinket or logbook) hidden outside (Schlatter & Hurd, 2005). Geocachers use *Google Maps* (Google Maps, n.d.) or the *Geocaching App* (Geocaching LLC, 2024) to access data that will direct them within a few feet of the cache location. Beginner-level caches typically are hidden in areas that do not require a significant amount of exertion. However, more advanced caches can occasionally be buried or intentionally require a greater deal of physical exertion depending on the location. The difficulty level of a cache location ranges from 1–5 (easy to very difficult) and is typically labeled on the website or app that is being used. Official caches or treasures on the *Geocaching App* (Geocaching LLC, 2024) are waterproof containers that hold small, inexpensive items and a logbook. The traditional approach is for the geocacher to leave an item of equal or higher value as the one they take from the cache, and to sign the logbook. Geocaching has been highlighted within high school physical education settings as a practical way to integrate the use of technology to engage students for the purpose of cultivating social skills, teamwork, fitness, and multidisciplinary learning (Steffen & Stiehl, 2010). Battista et al. (2016) found that students who normally exhibited low levels of participation in traditional physical education activities reported geocaching as appealing due to the integration of technology and were more likely to engage in the activity because of the increased opportunities to socialize with classmates.

High school students in physical education have reported an overwhelmingly positive response to participating in orienteering and geocaching, and have emphasized the desire to integrate such content in their physical education classes (Battista et al., 2016; Senison-Hall, 2011). However, there is a dearth of available curricular resources for physical educators to showcase effective implementation strategies for a blended orienteering and geocaching unit in physical education (Lorger & Braičić, 2019). Thus, the purpose of this article is to provide physical education teachers with a blended orienteering and geocaching unit for an outdoor education class or as a unit to incorporate in their physical education course. Specific strategies for implementing the unit will be presented, as well as example lesson plans aligned with the SHAPE America National Physical Education Standards (2024) and accompanying signature assessments.

Overview of Unit Goals

The example orienteering-geocaching unit provided in this article includes original lesson plans developed by the authors. The unit addresses all four SHAPE America National Physical Education Standards and learning domains and aligns best with the grade-span learning indicators for Grades 9–12 (SHAPE America, 2024). Additionally, the unit could be adapted to meet the learning indicators for middle school students. Table 1 showcases the standards, grade-span learning indicators, unit learning objectives, and learning domains that can be addressed at the high school level. By using Table 1 and the suggested lessons (see Table 2), at the end of the unit students will be well equipped to demonstrate varying degrees of locomotor movements and navigation skills to locate specific objects and controls. Students will also acquire skills in the application of technology related to orienteering and geocaching together with tactics and strategies to enhance navigation abilities. Furthermore, students will develop skills to work with others to think critically, problem-solve, and employ effective communication while considering various

Lori M. Klein (lklein@uidaho.edu) is a PhD student in the Movement Science Department at the University of Idaho in Moscow, ID. Bryar Fancher is an undergraduate student in the Movement Science Department at the University of Idaho in Moscow, ID. Christopher B. Merica is an assistant professor in the Movement Science Department at the University of Idaho in Moscow, ID.

Table 1.
Unit Goals

SHAPE America National Physical Education Standards and Grade-Span Learning Indicators	Learning Objectives	Physical Education Learning Domain
Standard 1: Develops a variety of motor skills. **1.12.1** Demonstrates activity-specific movement skills in a variety of lifetime sports and activities. **1.12.3** Demonstrates activity-specific movement skills in a variety of outdoor pursuits.	Students will be able to demonstrate navigation devices (e.g., global positioning system [GPS], maps, and compasses) to walk, jog, and/or run to reach specific locations in geocaching and orienteering lessons.	Psychomotor
Standard 2: Applies knowledge related to movement and fitness concepts. **2.12.1** Demonstrates knowledge of tactics and strategies within lifetime sports & activities. **2.12.15** Analyzes and applies technology as tools to support a healthy, active lifestyle.	Students will be able to describe the etiquette, rules, safety considerations, tactics and strategies of both geocaching and orienteering (i.e., using a map and compass). Students will also be able to apply the use of technology (e.g., *Google Maps* or the *Geocaching App*) to effectively participate in geocaching and orienteering.	Cognitive
Standard 3: Develops social skills through movement. **3.12.2** Exhibits proper etiquette, respect for others, and teamwork while engaging in physical activity. **3.12.7** Thinks critically and solves problems in physical activity settings, both as an individual and in groups.	Students will be able to work effectively in teams, respect others' emotions, support peers, think critically, and collaborate to solve problems while safely locating caches and orienteering controls.	Social
Standard 4: Develops personal skills, identifies personal benefits of movement, and chooses to engage in physical activity. **4.12.2** Selects and participates in physical activities that meet the need for social interaction. **4.12.9** Reflects on movement experiences during physical education to develop understanding of how movement is personally meaningful.	Students will be able to identify benefits of geocaching and orienteering and describe how these activities are personally meaningful to them and how the activities meet social interaction recommendations through an exit slip, self- assessment checklist, or journal prompts.	Affective

personalities and backgrounds. As teachers prepare to implement these lessons, the amount of preparation time may vary from 30 minutes to two hours depending on previous orienteering and geocaching teaching experience. Although there is no formal training to teach geocaching, many resources exist through *Geocaching.com*, at https://education.geocaching.com/(Geocaching LLC, 2024). Professional development and training opportunities for orienteering education can also be obtained through Orienteering USA (2022), at https://orienteeringusa.org/resources/training/.

Detailed Lesson Examples

Lesson 1: Introduction to Orienteering and Geocaching

The first lesson will focus on the background of geocaching, the overarching rules of the activity, the equipment, etiquette, and a demonstration of how to use a GPS. This lesson will also introduce the background and basics of orienteering to show the connection between the two activities and serve as a primer for Lesson 3. The lesson will begin by posing a question to the students about their current knowledge of geocaching, then the students will find a partner to discuss their initial thoughts. The whole class will engage in a discussion about geocaching and the benefits of the activity to gain an understanding of students' current knowledge. The materials needed to successfully complete this lesson include iPads, phones, or computers. Following the lecture and discussion portion of the lesson, the students will be introduced to the technology available (e.g., iPads, phones, or computers) and how to input the coordinates into *Google Maps* (Google Maps, n.d.). To complete this task, the educator should ensure that the application is downloaded prior to class. They then distribute the technology and have students open *Google Maps* where they will practice typing the coordinates provided by the teacher into the application. The coordinates given should be to a local landmark or school in the area for practical application reasons. The students will not go to these locations during this lesson but will use the coordinates for practice. Once the students become comfortable with inputting the coordinates, the instructor will present an introduction to orienteering and the benefits of the activity.

The main role of the teacher in this lesson is to facilitate a lecture and discussion on geocaching, guide the coordinate input practice task, and introduce the activity of orienteering. Prior to this lesson, the teacher will create a cache, set up the cache location, and establish coordinates on *Google Maps* (Google Maps, n.d.). A Tupperware container can be used for the cache and a couple pieces of paper can be used to create a logbook. The logbook should contain a place for participants to write their names and the date they discovered the cache. To set up the cache location, the educator places the cache where it is mostly covered, with a part still visible. After the cache is created and placed, the coordinates should be saved. The coordinates can be saved by opening *Google Maps* and holding a finger

Table 2.
Example Lessons and Goals

Example Lessons	Goals	Teacher Role	Resource Considerations
Lesson 1: Introduction to Geocaching and Orienteering	Students learn the background and rules of geocaching, how to use a global positioning system (GPS), and background of orienteering (history, etiquette, safety/environment considerations, equipment, where students can participate).	Lecturing and leading discussion with students, download app (*Geocaching App* or *Google Maps*)	*Google Maps* can be used if the instructor would like to set their own caches. The *Geocaching App* would be used if the instructor prefers to utilize the official caches in their region.
Lesson 2: Geocaching Activity Day	Students find five caches and write their name in the logbook, answer a question, get a hint, and get the coordinates for the next cache. If the instructor creates their own cache, they place a puzzle piece in each cache. Students will be able to create a puzzle to show that they found each cache.	Going over the rules and checking for understanding about what they need to collect and do at each cache and stay in the same area so that students can come back and check in after each cache.	—
Lesson 3: Orienteering Introduction	Students review the background of orienteering (history, etiquette, safety/environment considerations, equipment, where students can participate) and will learn and practice how to read a map.	Lecturing and leading discussions with students. The teacher needs to print orienteering maps for each student and will guide them through the steps of map reading. Teacher will circulate as students practice to ensure student comprehension.	*orienteeringusa.org* has grant opportunities for materials and equipment to use for lessons
Lesson 4: Orienteering Activity Day	Pace counting, compass use/map reading, mini-course to practice with pace counting and compass reading.	The teacher will set up a mini-course prior to class. They will demonstrate pace counting and compass use on a map of the location with controls, allowing students to practice.	—

down on the phone or tablet screen. A location marker will pop up, and the coordinates will be provided. On the bottom right corner of the screen, clicking "Save" will store the location and coordinates on *Google Maps* to be referenced in the future.

After the initial discussion about the history, equipment, and etiquette of geocaching, the teacher should break the class into groups of three to five students for the next task to practice inputting the coordinates. Depending on the school's technology policy, teachers will either have students download the *Geocaching App* (Geocaching LLC, 2024) or *Google Maps* (Google Maps, n.d.) on one group member's phone or a school iPad. *Google Maps* would be used if the teacher decides to set out their own caches versus using the official caches connected to the *Geocaching App* (Geocaching LLC, 2024). The teacher will then bring students outside for the last portion of class (10–15 minutes) to practice finding one cache.

Lesson 2: Geocaching Activity Day

The goal of Lesson 2 is for students to be provided with opportunities to engage in discovering caches spread out in an area, such as a community park, school playgrounds, or wooded area. To begin the lesson, students will be divided into four groups and will be given an iPad to use for navigation and a clipboard with an assessment sheet to track their progress (see Figure 1 for assessment example). The task will then be explained to students, describing that five caches were prepared using Tupperware containers and that each includes a paper-lined logbook with the coordinates for the next cache. The assessment given to the students includes the cache number, coordinates, a hint for finding the next cache, and a question for students to answer that will verify they have reached the correct location. At the end of the activity, the students will participate in a class discussion where they share their strategies, reflect on what worked well, and improvements

Table 3.
Example Geocaching Lesson Plan

Physical Education Unit: Geocaching & Orienteering	**Lesson Theme:** Geocaching Activity Day	**Lesson Length:** 50 minutes **Grade Level:** 11th and 12th Grade **Number of Students:** 20–25
Time	**Lesson progression stage**	**Task description**
5 min.	Set induction	• Students walk with the teacher outside; students will engage in a non-verbal communication activity called "Silent Line Up" in which must line up without talking in order of birthdate. • Example: January 1 starts on the left side, while those closest to December 31 are on the right side of the line. • *Set Induction:* Students gather; teacher prompts questions about communication and teamwork. The teacher discusses goals and objectives for the lesson and discusses the importance of communication in outdoor education activities.
10 min.	Navigation input	• Students are divided into groups of about 3–5. • Students are provided with an iPad or a trusted student can use their phone, if given permission. • The teacher provides students with an assessment; students write down the cache number, coordinates, a hint for finding the next cache, and the answer to the question that will verify they have reached the correct location. • Students input the first set of coordinates into the application of the teacher's choosing (*Google Maps* or *Geocaching App*).
30 min.	Cache hunting	• Students use the first set of coordinates from the teacher to locate their first cache; when they locate the first cache, the coordinates to the next cache will be provided there; students locate five caches. • The teacher will know that students have completed the task through the assessment.
5 min.	Closure	• Students gather in a half circle; the teacher prompts discussion questions. Example questions include: ○ *"What communication strategies worked well when trying to locate the caches?"* ○ *"What challenges did you come across as a group and what did you do to problem-solve?"* ○ *"Did everyone in the group feel their voice was heard? Why or why not?"* • The teacher informs the students of the expectations for the next class; students practice using a compass and learn how to count paces for orienteering.

for next time. As a possible modification, students could use their own phones or school laptops for navigation, depending on the school's policy and available technology or Wi-Fi.

The teacher's role in this lesson is to prepare and set five caches in the designated places that align with their coordinates (refer to Lesson 1). To begin the lesson, the teacher will divide their students into groups that include a student who they know to be a responsible leader and others who will work well together. The teacher should stay in the starting location where the lesson began because students will need to check in and may have navigation questions. If the students require more supervision, the teacher should instruct students to check in following the discovery of each cache. Finally, in the last few moments of the lesson, the teacher will pose questions that promote critical thinking about the purposes of geocaching. Example questions can include, "What communication strategies did your group utilize to work effectively?" or "What was challenging about locating the caches and how did your group problem-solve?" (see Table 3 for a sample lesson plan).

Lesson 3: Compasses and Pace Counting

The goal of Lesson 3 is to give students experience in counting their paces for orienteering and learning how to use a compass to find controls on a map. To prepare for this lesson, the educator creates maps of the location with north lines included to help students learn how to use a compass (i.e., red lines across the map; see Figure 2). First, cones are spaced 50 yards apart so students can determine their pace count. To find pace count, students will count the number of paces it takes to walk that distance, counting one pace each time

Locating Geocaches Assignment

Team Member Names:

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

Directions:

With your teammates, locate the caches using the coordinates provided. When you get to the cache, sign the logbook, answer the question, and write down the coordinates to the next cache on this handout. Then head to the next cache and repeat.

Cache Number	Cache Coordinates	Response to Logbook Question
Ex. #7	63.5888° N, 154.4931° W	*What is your favorite thing about [insert location (city or town)]?* The number of opportunities to be outside.

Figure 1.
Lesson 2 assessment example: Locating geocaches

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their left foot hits the ground. A pace is generally considered one natural step, approximately 30 inches. An example of the activity can be found here, https://www.youtube.com/watch?v=8DZw3xK0W1A (Overmatch Consulting, n.d.). Next, the students should count their pace walking at a faster speed, either jogging or running. The class is split into two groups: one group will start with the pace-counting activity, while the other group will focus on learning how to use a compass. During the compass portion, the educator passes out maps and has students analyze the features of the map. They discuss with them the key navigation concepts such as catching features (e.g., landmarks indicating you have gone too far), collecting features (e.g., directional landmarks), handrails (e.g., linear features that can be followed), and attack points (e.g., proximity landmarks). At the end of the lesson, a discussion highlighting the practical applications of compass reading and pace counting will prepare the students for the following lesson to use their knowledge and skills.

Prior to the lesson, the teacher should print maps (see Figure 2) and bring cones and compasses for half of the class because the lesson may be more successful in smaller groups. Another option is to provide materials for all students. It is important that students are guided through compass reading and understanding maps. The teacher can walk them through the features of the map and the steps of utilizing a compass to successfully locate a control, and check for understanding by asking questions. Once students have had multiple opportunities to practice the first step of facing the correct direction, the teacher can have all students attempt to find a control. At the pace-counting station, the teacher can demonstrate a single pace and count once every time the left foot hits the ground. The teacher will show students where and how to record their paces while walking, jogging, and running. Lastly, it is important to acknowledge the significance that pace counting and compass reading hold in orienteering. At the end of the lesson, the teacher can facilitate a discussion

Orienteering Course Assessment

Directions: Use the map and your compass to locate each control. When your group locates a control, write down the letter from each point next to the corresponding control number and write down each group member's step count.

Blue Cone Course		Write the letter from each point here	Write down the step count.
Start			
1	Bush		
2	Stairs		
3	Stairs		
4	Building Corner		
5	Railing		
6	Door		
Finish			MVPA:

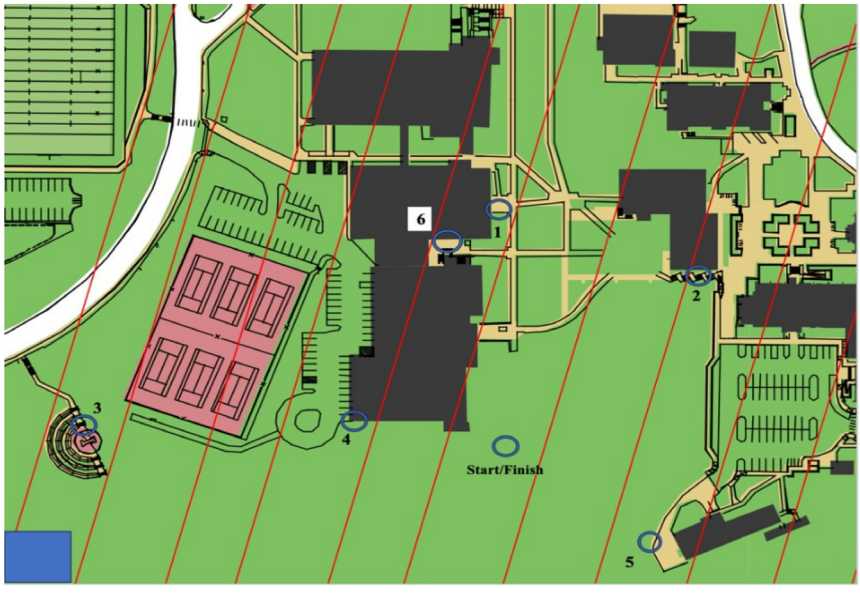

Figure 2.
Lesson 4 assessment example: Locating orienteering controls


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to help students understand how these skills will be used in the next lesson.

Lesson 4: Orienteering Activity Day

This lesson serves as the main activity day for orienteering where students will complete two to three orienteering courses, each consisting of six control points to locate. To prepare, the maps from the previous lesson will be used and numbered control points can be added to indicate the order in which students should find them. Cones will be placed at each control location and each cone will have a letter for students to write down (see Figure 2). Students will know they have completed the course accurately in the correct order if the letters spell out the correct word by the end of the course. In addition to navigating the course, students can track their steps between each control and record their moderate-to-vigorous physical activity levels on the assessment sheet (see Figure 2). Depending on the class, the courses can be completed individually or in small groups.

The teacher should use an indirect teaching style for this lesson to promote student autonomy and self-actualization because students will work independently in small groups while the teacher remains stationed at the starting point to provide support and answer questions as needed. The teacher's role is to set up the course prior to the students' arrival for the lesson. The teacher must ensure that the proper letter is attached to the corresponding control. The teacher will also reiterate the reasoning behind the activity and connect certain terms from the previous lessons such as catching features, collecting features, handrails, and attack points. The teacher will answer questions and assist students as they work together to find controls and figure out the word on their assessment handout.

Pedagogical Considerations

Logistically, it is essential to communicate with students early and often during the unit to establish expectations about the location where the activities will take place (Stratton & Dyson, 2025). Outdoor education activities are not typical for many students in physical education; thus, it is important to emphasize the proper attire needed that is unique to each activity—such as proper footwear for traversing trails or wearing long-sleeve shirts and/or pants in wooded areas that may have insects or poisonous plants—and to explain the environmental considerations leading up to the activity days (e.g., weather, terrain, distance or duration of activity). Other considerations to reduce risk include (1) leaving itinerary information with a contact about where the class is going and when it will return, (2) anticipating trail difficulty and student levels of fitness/ability, and (3) emphasizing to students the importance of respecting wildlife and the environment (Steffen & Stiehl, 2010).

Transportation may be necessary to complete specific outdoor education activities; thus, it is crucial for the teacher to discuss with administrators the most suitable options for areas to go off-campus with students for orienteering and geocaching. Ideally,

transportation time to and from the activity site would take no more than 20 minutes because the lessons are approximately 30 minutes. Lessons should be adapted to the allotted time that the instructor is provided as this varies for each school. In addition, the authors recommend developing waivers for students' guardians to sign to allow them to participate and provide detailed information about the off-campus activities, such as location, required attire, behavioral expectations, and any other critical information. Furthermore, it is recommended that students obtain parent or guardian permission to download applications on their phone (Mears et al., 2012). If the teacher decides to use iPads or another form of technology that belongs to the school, this would not be necessary.

Students need to develop trust, practice communication, and strengthen their problem-solving skills with their peers for outdoor education activities to be successful (Forgan & Jones, 2002). Prior to beginning an orienteering and geocaching unit, the authors recommend the implementation of cooperative games and team-building activities that help students get to know one another, create the feeling of trust between peers, and foster communication between students that will translate to the activities they will be participating in within the unit when they work together in small groups. Cooperative games and team-building activities should emphasize the process of completing the activity, not the product (outcome) of the activity (e.g., celebrating only those who finish the activity first or fastest; see the "Silent Line Up" activity described in Table 3). If the teacher has available time within their curriculum, implementing activities that include the first five stages of adventure education is an impactful way of developing a classroom community that is prepared to participate in outdoor education activities. The first five stages of adventure education are: (1) acquaintance activities (e.g., name games), (2) ice breakers and deinhibitizers, (3) communication (e.g., discuss styles, verbal/non-verbal, body language, and communication roles in a team), (4) problem-solving activities, and (5) trust activities (Stratton & Dyson, 2025). For more information on adventure education and accompanying activities for each stage, the authors recommend reviewing the adventure education textbook written by Prouty et al. (2007).

Final Considerations

Physical educators and instructors can utilize this sample unit within their class or in an after-school program/club. The initial portions of each activity are separate so that students can become more comfortable and confident in their understanding of the activities. If the budget is limited and access to the required equipment is minimal, grant opportunities and resources include Orienteering USA (e.g., Wilson Community Growth Grant and Iain Wilson Award Application; Orienteering USA, 2022), Navigation Games (e.g., additional lesson plan resources; Navigation Games, n.d.), and the OUSA Youth Mapping Program (e.g., recruit certified orienteering professionals to develop maps; Orienteering USA, 2022). All these programs aim to expand opportunities for youth participants and engagement in orienteering.

The previously described lessons are meant to provide a framework for physical educators to integrate geocaching and orienteering into their curriculum. However, if they cannot be realistically integrated into an existing course, another suggestion is to provide opportunities to engage students in activities after school or develop an orienteering and geocaching club. Schools that are in urban areas should consider using parks in the area to set up orienteering controls and caches using *Google Maps* if there are not official caches nearby on the *Geocaching App* (Geocaching LLC, 2024). A recommendation for schools in rural areas is to take a class trip to a local park, where hiding places are slightly more challenging for students. Depending on space, the class size can be adjusted and the cache containers can be any object of choice. There are ample opportunities within this framework for creative adjustments to meet the specific needs of teachers who desire to integrate orienteering and geocaching into their curriculum.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

ORCID

Lori M. Klein http://orcid.org/0009-0003-9329-9565
Christopher B. Merica http://orcid.org/0000-0003-2153-1612

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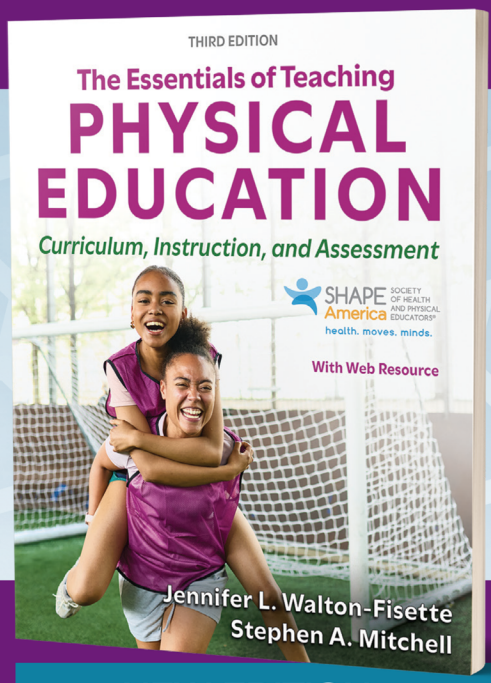

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