

Meeting PETE Students in Their World: Tracking Physical Activity through Technology

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Common terms that are used in everyday conversation in the 21st century include mobile devices, smartphones, and applications (or apps). Over half of the adults in the United States own a smartphone, and the largest percentage of users are between the ages of 18 and 34 years old (The Nielson Company, 2011). Preservice teacher candidates, for the most part, fit into this demographic. Considering that candidates are using these technologies as a part of their everyday life, perhaps physical education teacher education (PETE) professionals should engage candidates through the use of such technology in ways that are pedagogically sound. One piece of technology that could be considered a reasonable place to start is an activity-tracking device.

Activity-tracking devices come in all shapes and sizes. Many PETE programs currently integrate these types of technology into the curriculum. For example, candidates may borrow a pedometer to monitor their own physical activity levels for a semester. Others may be required to buy a heart-rate monitor to document daily minutes in their target heart-rate zone, or check out a global positioning system (GPS) device to use while teaching an orienteering lesson in the local K-12 schools. However, this process can be very costly for the PETE program and the candidates. Due to the incredible pace at which technology advances, newer versions of activity-tracking products are readily available. This has presented an opportunity for PETE programs to consider a more efficient and cost-effective approach that yields similar results. The most current devices record a wide variety of data points (i.e., physical activity, sleep patterns, energy expenditure, nutrition habits, and mood). The data is immediately accessible to the user in easy-to-read charts or

dashboards and can be shared with other users instantly.

For years, research has been able to document the positive effect of monitoring devices (McCaughy, Oliver, Dillon, & Martin, 2008). As activity-tracking devices continue to evolve, PETE professionals should consider evolving as well. For this reason, coupled with the importance of infusing technology into standards-based PETE programs (Bechtel, 2010) and role-modeling physical activity (Heidorn, 2013), it is imperative that PETE professionals consider ways to thread current technologies throughout the curriculum. While this task can seem overwhelming, the purpose of this article is to present PETE professionals with a practical approach to tackling the issue of integrating cutting-edge technology into the curriculum in a meaningful way.

What Are Activity-tracking Devices?

Activity-tracking devices can measure distance, movement, energy expenditure, speed, nutrition habits, sleep patterns, mood levels, and other variables. The PETE program is an ideal setting for teaching students how to track healthy behaviors. Tracking healthy behaviors is an effective strategy when developing short- and long-term goals to maintain or improve overall fitness. In the past, preservice candidates have tracked activity patterns by recording the amount of steps they take (with a pedometer or accelerometer), time spent in their target heart-rate zone (with a heart-rate monitor), or caloric intake in a nutrition log (paper- or computer-based) and have used this data to drive decisions for healthful living. Currently, the activity-tracking industry continues to create new and engaging ways to bring these types of data to smartphones, tablets, and other devices. Just some of the many

products are Fitbit, Jawbone Up, Moveable Movband, Mapmyfitness app, Moves app, Nike+ Fuel Band, Polar Loop, and Omron Activity Monitor. Each of these products has unique features that provide specific data with respect to the user's activity patterns (Table 1).

At this time, only a limited number of activity monitors have been examined in research settings. Of the tracking devices studied, step-count differences continue to be found among different devices (Steeves, Tyo, Connolly, Gregory, Stark, & Bassett, 2011), and devices often over- or underestimate levels of physical activity (light, moderate, and vigorous; Crouter, Churilla, & Bassett, 2006). However, most devices and apps studied to date are fairly accurate when it comes to measuring the step count (Grube, Leonard, & Lowell, 2013; Takacs, Pollock, Guenther, Bahar, Napier, & Hunt, in press). Therefore, tracking devices and apps can and should be used as an effective teaching tool to help candidates understand the relationship between healthy patterns and enjoying a lifetime of physical activity.

What Activity-tracking Device Should PETE Programs Consider?

Ultimately, the product chosen to track activity patterns should align with the outcomes of the PETE program. The technology should aid existing instruction, instead of creating a lesson to fit a particular type of technology (Juniu, 2011). For example, if PETE professionals are teaching candidates to collect and analyze data on the amount of active steps taken by each candidate in a particular lesson, it would make sense to have each candidate use the same device. Using the same device ensures reliable data for the particular lesson. If a candidate is collecting his or her own individual data

Table 1.
Examples of Activity-tracking Monitors

Activity-tracking Device	Description	Cost
Fitbit	Fitbit offers a variety of devices designed to track activity, sleep, and caloric intake. Fitbit devices can be clipped onto clothing or worn on the wrist. Data can be synced through a USB cable or downloaded wirelessly. The data is available in multiple reports for individuals or groups.	\$99.95–129.95
Jawbone Up	The Up wristband tracks activity, sleep, mood, and caloric intake. To use this activity monitor, the free complimentary app (UP) must be downloaded. The band syncs through the headphone jack on a smart device. Data is stored, recorded, and can be shared with groups. Other apps (i.e., Mapmyfitness, IFTTT, Strava, etc.) work seamlessly with the Up band.	\$129.99
Mapmyfitness	This app provides mapped routes, standard splits, personal goal tracking, a nutrition log, a journaling option, and the ability to add "friends" and create "groups."	Free–\$5.99/month
Movable MOVband	This wrist-worn accelerometer tracks all types of movement. The band comes with software that syncs activity data from the MOVband to a free online account through a USB port. This device tracks the progress of individuals or groups. Reports can be generated for each individual or the group.	\$29.99 (Group pricing available)
Moves app	This free app can be downloaded using a smartphone. This app is always working in the background. As long as the phone is with the person (i.e., pocket, backpack, or purse), it will track activity. It can also recognize and track different types of activity, count calories, and provide a "storyline" of the places visited throughout the day.	Free
Nike+ FuelBand	This wrist-worn accelerometer syncs wirelessly with the free Nike+ FuelBand app or through a USB port. The premise of this device is to set a daily activity goal and attempt to reach it. Results are generated and available through a device or computer and can be shared with friends or a group.	\$149.00
Polar Loop	This activity tracker is worn as a bracelet. It monitors activity levels at low, medium, and high intensities. It can also count calories and steps. It can sync with a USB cable or wirelessly to a mobile app. It is compatible with a Polar Heart Rate Sensor. It is one of the few monitors that can be worn while swimming.	\$109.95
Omron Activity Monitor	This device is worn on a clip or strapped to the arm. It can track the time spent in activity, steps, distance, calories burned, and pace. Data can be downloaded to a computer and shared with friends. A personal dashboard can be accessed, but is sold separately.	\$49.99

over a 10-week period, it would make sense to have the candidate use a product that makes the most sense for him or her.

For example, some candidates may play intramurals while others may be training for a triathlon. Still others may prefer

swimming laps at the local recreation center. Different products or devices can be better suited for different activities.

Since candidates may choose from many types of activity, providing choices can make activity-tracking assignments more meaningful for each individual.

Physical education teacher education professionals should “try out” new products or devices as often as possible. There are hundreds of free health and wellness apps available for downloading. The web site www.thepegeek.com provides an extensive summary of the most recommended activity-tracking products. Further, some companies may be willing to offer a sample product for trial if the PETE faculty is considering adopting it for a course. If PETE professionals are willing to explore new technologies, they will be more likely to make informed programmatic decisions that are well suited for the intended outcomes.

Last, PETE professionals should include the preservice candidates in the process of selecting and/or providing feedback on products. By surveying those who use the devices most frequently, PETE faculty will learn about the usability of each product. Table 1 provides a list of some of the more popular activity-tracking monitors and describes some of the key features and pricing for each.

A word of caution should be given when considering the plethora of apps and devices available. Many of the current activity-tracking devices have an app component. While most candidates own a smartphone and have access to apps, not all do. For candidates who own a smartphone, each will have a preference with respect to the operating system (i.e., iOS or Android). Currently, not all apps or devices are compatible with all operating systems. This is an important consideration when making bulk purchases for a “class set” or requiring students to purchase a certain device. Regardless of the approach, all candidates should be able to have access to the technology needed to complete all assignments.

Where Do PETE Programs Begin?

After identifying the purpose and product, PETE faculty should strategically sequence experiences that incorporate

technology throughout the curriculum. According to Bechtel (2010), technology should not be confined to a particular course in a PETE program but should be threaded throughout the program. A “one-and-done” approach does not constitute best practice. Further, when candidates experience assignments or projects with little value, they do not see the importance and can become frustrated — especially if they are required to purchase a product or device. There should be multiple learning experiences infused throughout the curriculum, each building on the other. In doing so, ultimately preservice candidates will begin to envision how technology can be

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infused into the K–12 setting. The following section provides strategies related to infusing the use of activity-tracking devices throughout a PETE curriculum.

Strategies for Implementation

In the first semester of the program the preservice candidates can be introduced to health-related fitness concepts and practice and prepare for selected FITNESSGRAM® assessments. After participating in the fitness assessments, each candidate can be required to set

goals and plan for his or her personal fitness program. All candidates can then be required to download a free app (e.g., mapmyfitness) on a smart device. Mapmyfitness is available on both iOS and Android systems. If a small portion of the candidates does not own a smart device, they can complete a similar assignment using a pedometer or accelerometer. The course instructor can also download the app, become “friends” with each student, and create a group (i.e., fitness tribe). Members of the group can share routes, provide feedback on training plans, organize events, and measure progress. When a candidate completes a “workout,” it syncs to the “dashboard” and alerts group members that a workout has been completed. Upon receiving the student’s “workout,” the instructor and other group members can periodically make comments on productive workouts, healthy eating, or personal records.

At the end of the semester each candidate can analyze his or her personal fitness data and create a presentation (e.g., PowerPoint or video-based) documenting the implications of his or her activity patterns. Each subsequent semester for the remainder of the program the same Fitnessgram assessments can be given, and goals can be revised and refined. In the candidates’ final semester some may find themselves in school-internship placements where K–12 students are allowed to bring their own device. The preservice candidates can implement a model similar to the one they were taught throughout the PETE program. The candidates can then collect, analyze, and report on the data to the cooperating teacher and an administrator of the school.

This example is just one of many ways an activity-tracking device can be threaded throughout the program. There are an abundance of other products that have a variety of unique functions that may better align to particular program outcomes.

Summary

A standards-based PETE program should prepare future educators for teaching in the 21st century. For this to

occur, PETE professionals will need to continue to integrate current technologies throughout the program. The process of selecting appropriate products to support program outcomes can prove to be overwhelming at times. However, pedagogically appropriate experiences using the most up-to-date technology add relevancy to PETE programs. Perhaps most important, it connects preservice candidates' learning experiences to the digital world in which they live.

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