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The Utility of Wearable Devices and Applications for Enhancing PETE

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Personal Disclosure

While examples of different wearable devices and software applications are mentioned in this presentation, this is not an endorsement of any product or brand.



About Me

Dr. Nicole J. Smith is an Associate Professor in the Department of Kinesiology. She Coordinates the Kinesiology Physical Education option and leads the [Physical Activity Research in Kinesiology P.A.R.K. research program](#). She aims to increase physical activity in the population. She does this by preparing teachers to implement evidence-based programs and by engaging in research to understand factors that influence physical activity in school settings. She publishes and presents work on topics including the utility of heart rate monitor systems; school-based physical activity opportunity, high school physical education, the System for Observing Fitness Instruction Time, and physical activity policy. She recently led an applied research project to describe mask adherence and distancing at park and commercial center locations in Fresno County (SOMAD: Fresno County). She formerly coordinated Discovering Obstacles to Physical Education: Do PE! A project funded by Active Living Research (\$50K) and was Project Manager for the Physical Education Academy, a component of the Healthy Eaters Lifelong Movers project funded by the Colorado Health Foundation (\$3.1M) and implemented in 25 schools in southeastern Colorado.

Description

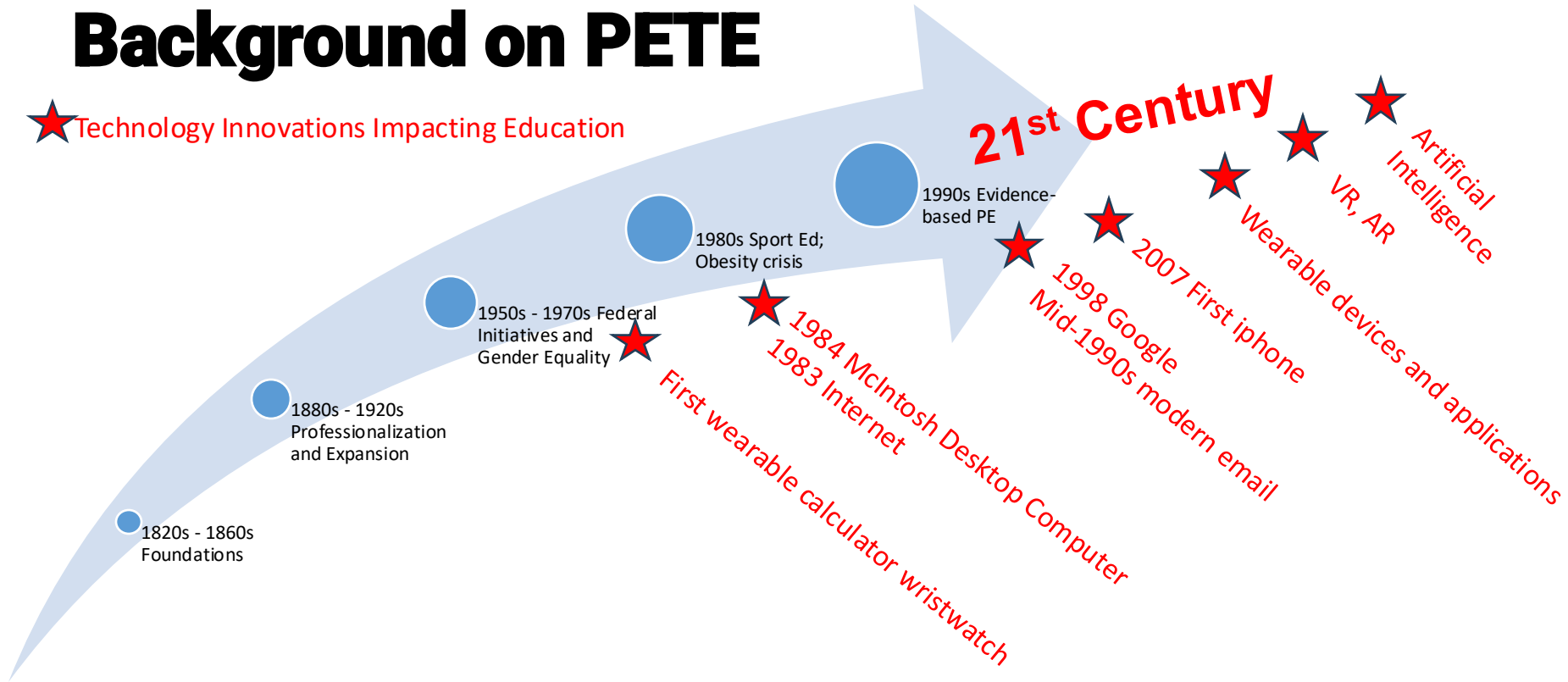
The Standards for Beginning Physical Education Teachers illustrate that technology should be used to plan, implement, and assess student learning in physical education. Wearable devices and applications are increasingly available and have tremendous potential to enhance teaching and learning in physical education. However, PETE faculty can benefit from professional development that increases knowledge, self-efficacy, outcome expectations, and skill for implementing wearable devices and applications in PETE methods courses. Therefore, this presentation session is intended for PETE faculty. The purpose of this presentation is to describe the utility of wearable devices and applications for enhancing Physical Education Teacher Education programs in the 21st century. Wearable devices and applications with the ability to track variables tied to physical activity, fitness, and social-emotional status will be described. Examples of how these tools can be used to enhance student learning at the individual and group level will be presented.

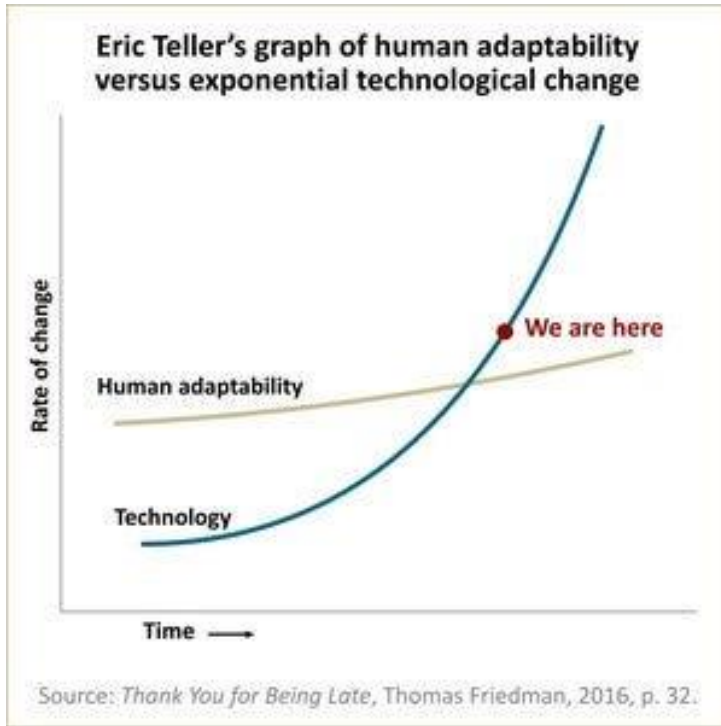
Learning Objectives

- Identify wearable devices and software applications that can be used to enhance teaching and learning in PETE methods courses.
- Explain how wearable devices and software applications can be used to evaluate process and outcome variables at the individual and class level.
- Construct a plan for using wearable devices and software applications to enhance teaching and learning in their own program.

Background on PETE

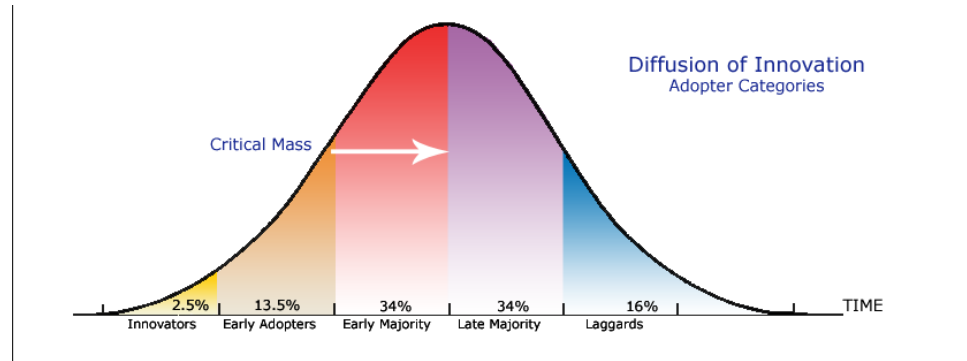
★ Technology Innovations Impacting Education





The Problem

We are no longer able to adapt to technology innovation at a rate consistent with the release of new innovations. What is worse, according to Roger's Diffusion of Innovation Theory, the majority of Physical Educators most likely will not adopt without ongoing support.



Credit: <https://images.app.goo.gl/f4pdhXfHzQbgZrNK8>

It's time for another paradigm shift....



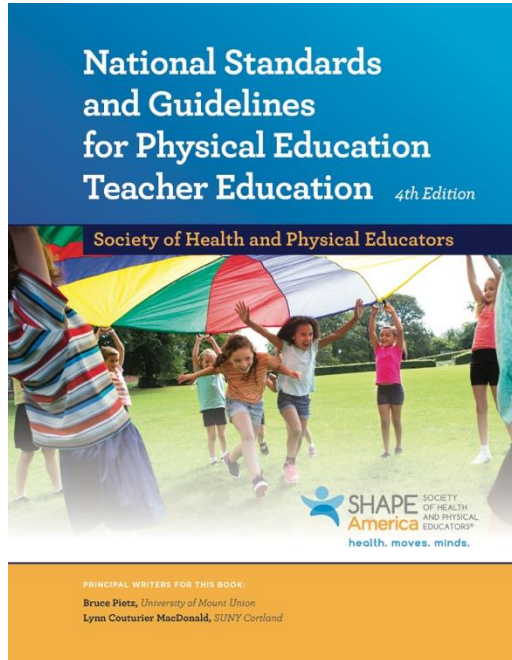
Types of Wearable Devices

Type of Wearable	Example Devices	PE Application
Heart Rate Monitors	Polar H10, Apple Watch, Garmin	Monitor intensity zones, personalize effort
Step Counters / Accelerometers	Fitbit, Apple Watch	Track activity levels and patterns
GPS Trackers	Garmin, Catapult, Apple Watch	Measure distance/speed in outdoor activities
Pedometers	Omron Pedometer, Yamax	Simple activity tracking for younger students
Motion Sensors / IMUs	Vert, PlayerTek, MyoMotion	Measure movement quality, jump height, agility
Sleep & Recovery Trackers	Whoop, Fitbit, Garmin	Teach recovery, readiness, holistic wellness
Sweat / Temp Sensors	Gatorade Gx Patch, TempTraq	Hydration, overheating, heat illness prevention
Blood Oxygen / Respiratory	Garmin, Whoop, Oura Ring	Assess aerobic fitness, monitor recovery

Software Applications for PE

Application Name	Purpose
Polar GoFit	Heart rate tracking in real time for class management
Heart Zones	Zone-based heart rate monitoring & assessment
SPARK App	Curriculum support with videos, lessons, assessments
FitnessGram	Standardized fitness testing & reporting
Google Forms / Sheets	Formative assessment, fitness logs, goal tracking
Onform	Video analysis for skill development
SworKit Kids	Activity prompts and guided fitness for children
PE Games App	Quick access to games and activities
TeamBuilder	Strength & conditioning programming and progress tracking
MyJump / Dartfish	Biomechanical analysis & vertical jump testing

Integration of Technology in the Standards



- **Standard 1: Content and Foundational Knowledge**
- **Standard 2: Skillfulness and H-R Fitness**
- **Standard 3: Planning & Implementation**
- **Standard 4: Instructional Delivery and Management**
- **Standard 5: Assessment of Student Learning**
- **Standard 6: Professional Responsibility**

The Utility...Enhancing Student Learning



Standard 1: Content and Foundational Knowledge

Candidates demonstrate an understanding of common and specialized content, and scientific and theoretical foundations for the delivery of an effective preK-12 physical education program.

Wearable Devices:

- **Heart Rate Monitors** (e.g., Polar H10, Apple Watch): Aid in teaching physiological concepts by providing real-time data on heart rate responses during physical activity.
- **Instructional Applications:**
- **Coach's Eye:** Facilitates biomechanical analysis, helping candidates understand and teach movement mechanics.

Standard Two:

Skillfulness and Health-Related Fitness

Candidates are physically literate individuals who can demonstrate skillful performance in physical education content areas and health-enhancing levels of fitness.

Wearable Devices:

- **Accelerometers** (e.g., Fitbit): Track movement patterns, assisting candidates in monitoring and improving their own physical activity levels.

Instructional Applications:

- **SworKit Kids:** Provides guided fitness activities, enabling candidates to engage in and model diverse physical exercises.

Standard Three:

Planning and Implementation

Candidates apply content and foundational knowledge to plan and implement developmentally appropriate learning experiences aligned with standards through effective use of resources, accommodations, modifications, technology, and metacognitive strategies to address diverse student needs.

Wearable Devices:

- **GPS Trackers** (e.g., Garmin): Assist in designing outdoor activities by mapping routes and measuring distances.

Instructional Applications:

- **SPARK App**: Offers curriculum support with lesson plans and assessments, aiding in the development of comprehensive instructional strategies.

Standard Four:

Instructional Delivery and Management

Candidates use effective communication and pedagogical skills and strategies to enhance student engagement and learning.

Wearable Devices:

- **Heart Rate Systems**

Pedometers: Simple tools to encourage and monitor student participation in activities.

Instructional Applications:

- **PE Games App:** Provides a repository of activities and games, facilitating dynamic and engaging lesson delivery.

Standard Five:

Assessment of Student Learning

Candidates select and implement appropriate assessments to monitor student progress and guide decision making related to instruction and learning.

Wearable Devices:

- **Motion Sensors/IMUs** (e.g., Vert): Measure specific movements like jump height, providing objective data for skill assessment.

Instructional Applications:

- **FitnessGram**: Standardized fitness assessment tool to evaluate and track student fitness levels over time.

Standard Six: Professional Responsibility

Candidates demonstrate behaviors essential to becoming effective professionals.

Wearable Devices:

Oura, Fitbit, Whoop to monitor and monitor and regulate their own personal health behaviors (i.e., role modeling)

Instructional Applications:

- **Google Forms/Sheets:** Facilitate the collection and analysis of student data, promoting reflective practice and data-driven decision-making.

Process Assessment

How a student performs a skill, their technique, effort, or behavior during an activity

Wearable Devices

- **Heart Rate Monitors**

Use: Assess **effort** and **engagement** during activity.

Example: Students maintain heart rate in a target zone during moderate-to-vigorous activity, demonstrating proper pacing in a cardiovascular endurance lesson.

- **Motion Sensors / IMUs**

Use: Assess **movement quality** (e.g., jump mechanics, posture).

- *Example:* Use devices like **Vert** to analyze vertical jump technique in a volleyball unit.

Software Applications

- **OnForm or Dartfish**

Use: Capture and review video for **form and technique**.

Example: Students review themselves throwing a ball and annotate points of performance (e.g., stepping with the opposite foot, trunk rotation).

- **Google Forms or Checklists**

Use: Self or peer-assessment of skill performance using rubrics.

- *Example:* Students use a form to rate their or a partner's dribbling skills based on SHAPE benchmarks.

Outcome Assessment

The result or product of learning—fitness scores, performance data, knowledge

Wearable Devices

- **Accelerometers / Pedometers**

Use: Track **step counts** or **activity time**.

Example: Document daily MVPA (moderate-to-vigorous physical activity) goals during a fitness unit.

- **Fitness Trackers** (like Fitbit or Apple Watch)

Use: Log **progress over time** in cardio, strength, or flexibility.

- *Example:* Assess improvement in resting heart rate, weekly active minutes, or number of workouts completed.

Software Applications

- **FitnessGram**

Use: Standardized assessment of **fitness components** (PACER, curl-ups, etc.).

Example: Students complete baseline and post-program PACER tests to measure aerobic capacity growth.

- **Heart Zones App / Polar GoFit**

Use: Generate **real-time reports** showing heart rate trends and exercise intensity.

- *Example:* Teachers track how many minutes each student spent in their target heart rate zone during a circuit training unit.

Building an Integration Plan

Standard 1: Content Knowledge

Use heart rate, step count, and HRV to teach physiological and motor learning concepts.

Standard 2: Skillfulness and H-R Fitness

Require students to utilize wearables and applications beyond the pedagogy lab.

Standard 3: Planning & Implementation

Plan lessons that incorporate tech to differentiate instruction and support student engagement.

Standard 4: Instructional Delivery

Use real-time data from wearables to manage activity, group students, and provide feedback.

Standard 5: Assessment of Student Learning

Track effort, time in target HR zones, and fitness gains for formative and summative assessments.

Standard 6: Professionalism

Reflect on the use of tech, engage in PD, and model ethical, effective use of wearable technology.

Challenges and Considerations



- **Cost and Access**

Devices and apps can be expensive; limited school budgets.

- **Equity and Inclusion**

Not all students/faculty have access to tech or devices.

- **Faculty Knowledge and Confidence**

Lack of training or comfort with new tools.

- **Data Management and Privacy**

Sensitive data raises FERPA/COPPA concerns.

- **Technical Issues**

Syncing, battery life, and connectivity challenges.

- **Curriculum Fit**

Tech must be tied to standards, not used as a novelty.

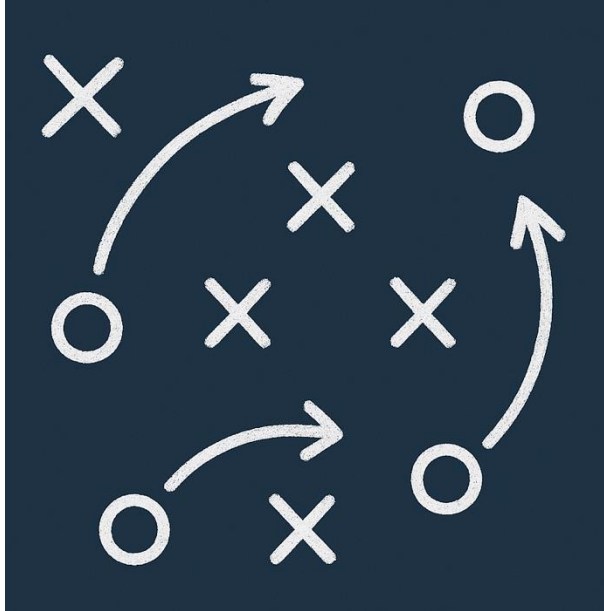
TRAITS OF INSTRUCTIONAL TECHNOLOGY ADOPTERS

Openness to Change / Innovativeness	Willing to try new tools and approaches
Pedagogical Alignment	Adopts tech that improves student learning
Growth Mindset	Views tech integration as a learning process
Self-Efficacy with Technology	Believes in ability to use new technologies
Collaborative and Connected	Engages in professional learning communities
Student-Centered Thinking	Chooses tech that supports students
Strategic and Reflective	Plans for sustainability of technology use

Facilitators of Change



Strategies



Start Small

Use free or low-cost apps and pilot with a small group.

Promote Equity

Create device loan programs or use shared wearables.

Offer PD:

Provide hands-on training and peer coaching for faculty.

Protect Data

Use platforms with strong privacy policies; follow FERPA/COPPA.

Prep for Tech Issues

Have backup activities and test tech before use.

Conclusion & Call to Action



- Need a paradigm shift
- Opportunity for meaningful outcomes
- Innovations are rapidly advancing
- Obstacles are real
- Facilitators known
- We need to identify Goals as a Profession
- Next revision of PETE Standards is forthcoming!
- Prepare now!

Thank you!

- Questions
- Comments
- Reflection Points

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