

IMPACT OF TECHNOLOGY IN PHYSICAL EDUCATION: A SURVEY

Gagandeep Kaur

Department of physical education

Guru Nanak College for Girls, Sri Muktsar Sahib (India)

ABSTRACT

The purpose of this study was to assess the effectiveness of the use of Technology in physical education, while also examining the teacher's responses to the innovation. Technology provided the most positive overall results, with statistically significant improvements in skill execution, technique, and knowledge learning, as well as the highest level of practice. Nonetheless, while acknowledging the utility of Technology as an instructional tool, the teacher felt overwhelmed by the demands of the technology on both his time commitments and in terms of his own technology competencies

Keywords: *athletics, physical education, skill execution, technique*

I. INTRODUCTION

Technology is a double-edged sword. Computers, contribute to sedentary leisure-time behaviors (e.g., playing sedentary computer games). On the other hand, technology has been used to promote physical activity and change exercise behavior. For years, pedometers, accelerometers, and heart rate monitors have been used as motivational tools. Newer technologies and approaches being used to promote physical activity include global positioning system (GPS), geographic information systems (GIS), interactive video games, and persuasive technology. Also, experts suggest that Internet-based physical activity interventions should be used by clinicians to promote and change exercise behavior (Marcus, Ciccolo, and Sciamanna 2009). using technology in PE may have actually reinforced the "physical education - as-sport" concept by often focusing on the micro analysis of skill learning, giving the impression that this was it's only valid application in the subject. In a Sport Medicine/Exercise Physiology course, perhaps so. But the world is much more complex than that, and so is the subject known as Physical Education. Teaching physical education can be challenging for any number of reasons, from a lack of equipment to keeping students engaged. To meet these challenges, some educators are turning to technology to create more dynamic classes that work for students with a wide range of fitness levels



II. PEDOMETERS

Pedometers are probably one of the first examples that come to mind when discussing technology and physical activity. Measuring steps is one of the easiest ways to measure physical activity, and pedometers can be used by a wide range of age groups. Another benefit of using pedometers is they can be used in a variety of tasks, such as doing household chores or scavenger hunts. One issue to remember with pedometers and heart rate monitors is that target rates are different for children with different abilities and activity levels, so be sure to plan accordingly. Pedometers count and monitor the number of steps taken throughout the day. Most pedometers provide a fairly accurate count of steps taken during ambulatory activities such as walking, jogging, and running. Estimates of the distance walked and caloric expenditure are less accurate. Some newer devices also provide an estimate of the total time spent during continuous walking at a moderate intensity for durations of 10 min or more. To provide accurate step counts, most pedometers need to be attached to a firm waistband; however, some can be carried in a shirt pocket, a pants pocket, or a bag held close to the body. Studies show that some Pedometers provide a valid (bias <3%) and reliable (coefficient of variation <2.1%) measure of steps during constant- and variable-speed walking for both healthy and overweight adults when the pedometer is placed on the waistband (sides and back), in a shirt pocket, or around the neck; however, positioning the pedometer in a pants pocket or in a backpack decreases accuracy (Hasson et al. 2009; Holbrook, Barreira, and Kang 2009). Studies show that pedometer-based walking increases physical activity (Williams et al. 2008). In a synthesis of studies addressing the use of pedometers to increase physical activity, Bravata and colleagues (2007) reported that on average, pedometer users increase their physical activity by 27% over baseline levels. A key predictor of increased physical activity is setting a step goal (e.g., 10,000 steps per day) for participants. Pedometer-based walking programs are associated with significant decreases in body mass index, body weight, and systolic blood pressure (Bravata et al. 2007; Richardson et al. 2008). Thresholds for health benefits from walking have been established using pedometers. Accumulating 8000 to 9000 steps per day at a rate of no less than 100 steps·min⁻¹ is equivalent to 30 min of moderate physical activity, the health benefit threshold. For weight loss, accumulating 11,000 to 13,000 steps per day is recommended. Using criterion-referenced approaches, youth-specific thresholds for good health are being established. In the future, minimal levels of steps per day may be used to identify health risk thresholds for cardiovascular diseases, obesity, and osteoporosis. Table 3.4 presents classification of physical activity levels for adults and children based on the number of steps taken daily (Tudor-Locke et al. 2005, 2008). Additional information about the validity and

accuracy of pedometers is available (Holbrook, Barreira, and Kang 2009; Lamonte, Ainsworth, and Reis 2006; Tudor-Locke et al. 2002, 2006).

III. ACCELEROMETERS

Accelerometers record body acceleration minute to minute, providing detailed information about the frequency, duration, intensity, and patterns of movement. Counts from accelerometers are used to estimate energy expenditure. Recently, accelerometers were used to provide an objective measure of compliance with physical activity recommendations for the U.S. population (Troiano et al. 2008). Accelerometer data indicated that less than 5% of adults in the United States engaged in 30 min per day of moderate exercise, 5 to 7 days per week. This is substantially lower than the self-reported value (49%) from national surveys. Also, only 8% of adolescents reached the goal of exercising 60 min per day, 5 to 7 days per week, based on accelerometer data. The relatively higher cost of accelerometers (about \$300 per unit) compared to pedometers (\$10 to \$30 per unit) limits their use in large-scale physical activity interventions. In the future, lower-cost units may be developed and be more widely used in national surveys and community-based interventions. Detailed information about best practices and research recommendations for using accelerometers are available (see Ward et al. 2005).

IV. HEART RATE MONITORS

Heart rate monitors are used primarily to assess and monitor exercise intensity. These devices are especially useful for monitoring exercise intensity of individuals in cardiac rehabilitation programs and highly-trained, competitive athletes. Because heart rate is linearly related to oxygen uptake, it can be used to estimate the individual's exercise energy expenditure. However, estimates of energy expenditure from heart rate may be affected by factors such as temperature, humidity, hydration, and emotional stress.

V. COMBINED HEART RATE MONITORING AND ACCELEROMETRY

The prediction of energy expenditure during physical activity is improved by 20% when data from heart rate monitors are used in conjunction with accelerometer measures of physical activity (Strath, Brage, and Ekelund 2005). New devices that simultaneously monitor heart rate and body motion provide valid and reliable measures of physical activity of children, adolescents, and adults in free-living conditions (Barreira et al. 2009; Crouter, Churilla, and Bassett 2008; Zakeri et al. 2008).

VI. HEALTH TRACKING

Taking the data used by heart monitors and pedometers is vital to creating a long-term plan for advancing health. Some pedometers and heart monitors have connectivity built in, which makes the process easier. Using tracking programs or monitoring systems provides educators with tools useful in creating custom goals for the students. Using these kinds of programs allows for instant feedback that allows students the opportunity to adjust their goals and how they wish to achieve them

VII. APPS

With the explosion in mobile technology, physical educators have a wealth of tools. For example, MapMyFitness and My Fitness Pal allow for movement tracking as well as nutritional help. Some apps also assist with improving athletic activities such as basketball. Then, the students can compare what they with what the app instructs. Another idea 10/25/2017 Using Technology in Physical Education is to use Google Earth to show students distances and challenge them to walk those distances—for example, the height of Mount Everest or the distance between their home and another location.

VIII. VIDEO RESOURCES

Sites such as YouTube and Vimeo offer a wide range of tools for educators. If an educator wants to teach Something such as dance or yoga, there is a wide variety of how-to videos that can apply to any age group. Additionally, some educators create video projects where student groups create an instructional video to teach Something to the rest of the class.

IX. GAMES

There is a steady market of “exergames”, such as Wii Sports and Dance Dance Revolution. To use these for a Whole class, have a few students using the controllers (taking turns is crucial!) and have the rest of the class. Follow along with them. For these games, and any video resources, projecting the video on a wall or screen allows everybody to see what is happening.

X. CONCLUSION

Adapting to new technology can be challenging for instructors. Sometimes, physical education instructors can feel as if technology does not apply to their subject. However, by embracing technology, physical education instructors create a more varied and dynamic classroom. They are also able to appeal to the interests of many different students and ability types. Using technology to teach physical health allows educators to create more activities and show how important their goals are.

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