



# Exergames

## Using Video Games to Promote Physical Activity

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Thanks to increasingly sophisticated game controllers, such as Nintendo's Wii and dance pads originally made popular in video arcades, computer games with non-standard controllers are emerging as a new trend. More frequently, seasoned gamers are demanding more physical interaction with a game than simple use of thumbs. In addition, researchers at NMSU's Learning Games Lab are finding that such non-standard controllers, such as the Wiimotes used to play tennis or the "guitars" used in the game Guitar Hero, encourage play by those who do not normally game, such as parents and grandparents. Research in exergaming is showing tremendous promise in physical, psychosocial and academic progress of youth using exergames.

The popularity and potential for using exergames to increase physical activity for children is hard to discount. Youth ages 8-12 years play games on average 56 minutes a day. That number increases to 78 minutes daily for youth ages 13-17 years. In addition, most young people play games, with 92 percent of youth ages 2-17 years playing them [1]. Finally, low-income youth play computer games, self-reporting game play as their primary reason for using computers [2].

### **Physiological Benefits**

Only one in four children gets at least 30 minutes of physical activity each day and 75 percent get less than 20 minutes of vigorous activity each week. Changes in federal standards have limited physical education programs in an attempt to increase classroom instruction time. For example, 67.8 percent of youth did not attend physical education class daily [3].

A synthesis of research through 2006 showed that most articles demonstrated a positive health effect of videogames [4]. Newly emerging research demonstrates more variety in measurement methods, and in conclusions drawn regarding games. Players of *Dance, Dance Revolution* (DDR) have shown that use of the game at the beginning level meets the minimum requirements from the American College of Sports Medicine (ACSM) for cardiorespiratory daily requirements, but falls short in other requirements [5]. Still caloric expenditure is significant with the game, with overweight children burning more calories than non-overweight youth [6].

Particularly as a substitute for sedentary games, active games have the potential to make a difference in the physical activity levels of CYFAR audiences. Energy expenditure of children playing active videogame doubles compared to those playing sedentary games [7]. The *Wii Sports* game that accompanies Nintendo's Wii includes bowling, tennis, golfing, and boxing games. Gamers playing these Wii-based games did not use as much energy as they would bowling, boxing or playing tennis or golf, but they did burn significantly more energy than playing sedentary computer games [8].

Research documenting positive health or activity benefits in exergames is particularly promising as many exergames currently available were not designed to encourage physical activity. Rather, games like *Dance, Dance Revolution* (DDR) and *Wii Sports* were designed to encourage physical movement as a way to create more engaging gameplay. As exergames become more popular and demonstrate consumer appeal, it is likely that newly emerging games will reflect better design principles and increased physical requirements.

### **Additional Benefits**

Higher parental education yields a decrease in television time for children, but not a decrease in game play [9]. When given active games in addition to more sedentary games, youth were likely to spend *less* total time playing games, but more time active while playing [10]. Further, games can improve attendance in activity trainings [11].

In Redmond, Oregon, the dance-pad game, *In the Groove* was installed in third and fourth grade classrooms for a five-month study. The most "at-risk" students were chosen to become "Groove Masters," mentors to the other kids. Some of the results that came from the study included:

- Absenteeism dropped by more than 50 percent
- According to teachers, 85 percent of the mentors grew in social skills
- 94 percent of the students who participated showed increases in leadership skills and confidence, which increased self-esteem and improved academic performance
- 4th grade students who participated in the study improved their mile run by 13.8 percent
- Students became more enthusiastic about sports, fitness and dance.<sup>i</sup>

To increase their physical activity, adolescent girls need to feel they have access to necessary equipment, and perceive a social support structure — two needs that exergames can help meet through affordable game equipment and social environments and multiplayer games [12]. Children ages 9-12 also seem to prefer multi-player and group game play to

individual exercise [13].

Most traditional exercise options require a great deal of space (i.e. walking or running), costly equipment or environments (i.e. swimming) or an organized activity (i.e. team sports). But these are not true options for low-income or at-risk adolescents and their families who may live in neighborhoods that are unsafe for outdoor or team activities, and where specialty environments and equipment are either too expensive or just not available. In contrast, exergames are relatively low-cost (often less than \$100), require relatively little space, can be played alone or with multi-age groups, require little training or skill development and are considered highly enjoyable and very 'replayable'.

Exergames research has increased dramatically in the past year, with indications it will continue to do so. As new exergames *specifically designed to promote physical activity* are introduced, program leaders will have new opportunities to evaluate what would be effective with audiences. Further research should explore ways in which exergames serve as a transitional function to other types of activity; ways they encourage family and friends to be active together; changes in activity during certain months or in certain climates resulting from exergame accessibility; cost analyses of exergames with other family activities; and new risks resulting from exergame use. Most importantly, new research can yield specific recommendations on how to best implement and exergaming program with CYFAR audiences.

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