European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.815639 Volume 3 | Issue 6 | 2017

# EXPLORING USE OF EXERGAMES IN PHYSICAL EDUCATION CLASSES AS A WAY TO CURB OBESITY AND PROMOTE HEALTH IN CHILDREN AND ADOLESCENTS IN ZIMBABWE

**Gondo Thembelihle**[i]
Department of Physical Education and Sports,
Zimbabwe Open University, Masvingo, Zimbabwe

**Abstract:**
We now survive in a risk society especially when we look at the type of food that is consumed together with the fact that children and adolescents are inactive in most of the times is an issue that can be averted by promoting exercise and activity in the group. Computers, TV, cell phones, and computer video games are currently integral to the daily lives of our students. On the other hand, obesity has been an issue that has been lately affecting children and adolescents who spend most of their time glued to these gadgets which encourage inactivity. Straker and Abbott (2007) commented on the consequences caused by technology such as TV, computers, video games, smart phones which they said promoted sedentary lifestyles, poor physical and mental health, obesity in children and adolescents and cardiac diseases in children. There are several ways that have been employed to try and fight childhood and adolescent obesity in various aspects and this has been done due to introducing relevant technology that promotes activity. Technology has been in use in physical education for example; use of heart rate monitors, pedometers and video analysis of games. Use of information technology in teaching physical education can be of much help in physical activity if it also considers activity based technology. Use of technology should not be however looked at as a substitute to replace physical activity or physical education teachers. Technology and exergames have been noted for their ability to encourage participation in Physical Education (PE). Tracking personal progress provides a mechanism for students to become cognitively involved with their fitness through a process of critical reflection. Implications of introducing exergames which are new active video games to the school curriculum can be considered in the wake of information technology. Perhaps it is also

[i] Correspondence: email mathegondo@gmail.com

prudent to look at how these games can be used as part of the Zimbabwean PE school curriculum.

**Keywords:** exergames, physical education classes, obesity, children's health, adolescents' health, Zimbabwe

## 1. What are exergames?

Exergames are video games that combine exercise with video gaming technology by integrating player and physical body movement (Klein and Simmers, 2009). "*Exergaming is the combination of exercise and video games*" (Bogost, 2007). These interactive games, known as exergames (such as Wii Fit, Wii Sports, Dance Dance Revolution, Your Shape), incorporate exercise and body movement using balance boards, step boards, exercise bikes, or dance pads, or by using the controller as a racket to play games, such as tennis. Physical activities and body movements are the central theme of these games, which encourage exercise. Liberman (2006) and Hansen (2010) observed that exergames are appealing, engaging and provide fun for a wide demographic range of people.

These interactive gaming exercises have been advocated for and introduced in schools by developed countries. The rationale for introducing games lies with the issue of encouraging physical activity whilst enjoying video games, to offer different types of movement in children as well as to try and offer fun for learners. There is a serious crisis of obesity and activity level for children and adolescents especially in view of the hours that are spent on TV and video games. Some individuals may play these recreational exergames or choose to use them in physical education and health. Video games may provide new skills that can be played in a safe low risk learning environment (Hayes and Silberman, 2007). Traditional delivery methods of teaching may be seen to be boring and exergames may do the trick of motivating students to engage in physical activity. The exergames have to be fun and enjoyable so that they motivate and even trick the children into exercising and being involved in physical activity (Cunningham et al., 2010; Graves et al., 2010; Staiano & Calvert, 2011). Active video games are said to help children become physically active whilst increasing their daily physical activity.

## 2. Benefits of exergames

Exergames are likely to increase students' physical activity levels as learners may become more motivated to exercise because movement activities are more fun when

they are combined with playing the games (Fogel et al., 2010; Graves et al., 2010; Hansen & Sanders, 2010; Papastergiou, 2009). Exergames can therefore encourage students who otherwise would exclude themselves from traditional sporting activities. In terms of health, most arguments in the literature are for the benefits of including exergames in PE in relation to fitness and, in the long run, helping combat obesity (Papastergiou, 2009). These games can, according to several studies, provide a tool to increase physical activity levels and improve the fitness and health of young people (Fogel et al., 2010; Graves et al., 2010; Jacobs et al., 2011; Sell et al., 2010). In relation to sport, some studies argue that exergames can help students learn motor skills like balance, eye-hand coordination, and agility that can be transferred to real sports (Papastergiou, 2009). The reasons for introducing exergames are generally among others; for encouraging physical activity, offering different types of movement, and having fun.

A combination of physical activity and gaming can make games and physical activity attractive to children, parents as well as educators. Nelson and McGarthy (2007) observed that exergames are also likely to increase potential learning in class. Use of technology to motivate learners as they move their bodies to play these games is also important. Technology is likely to capture their interest causing children to increase the amount of time they spend daily engaged in physical activity. Thus, technology can be seen as a powerful tool in controlling obesity as children learn from technology and with technology. Fun and activity provided by the use of technology can make one forget they are exercising as they experience success that keeps them engaged as they develop a certain level of attainment (Sanders and Hansen, 2008). Exergames appeal to the intellectual and fitness of children of today and the current generation of students who are born in the age of internet is likely to find value and importance of physical activity through games in their daily lives. Children find video games to be rigorous, exciting and enjoyable and they are likely to willingly take part in the exergames.

**3. Barriers to use of exergames in schools**

There could however be barriers associated with the introduction and subsequent use of these games in the schools. The barriers to introducing exergames are mainly: financial, prioritizing other activities and the teachers' own knowledge. The majority of the PE teachers are generally positive to introducing exergames as a teaching aid into their subject. However, this requires developing the teachers' own knowledge of exergames. The choice of teaching content and the introduction of new activities and teaching tools also involve critically examining the games, and this, in turn, entails

didactic reflection. Simple technology devices can be used for a start so as to engage learners and enhance the learning barriers that are related with barriers of obtaining devices.

The first barrier can be related to lack of knowledge or expertise on the part of the teacher who may wish to introduce and popularize these exergames in the school curriculum. New teaching activities may affect those who may be willing to introduce exergames. Teachers themselves may not be very familiar with exergames making it difficult for them to introduce them in the curriculum. Prioritization of other activities at the expense of exergames may also take centre stage and force those who are willing to engage in exergames to concentrate more on those competition games which are bound to bring medals to the school and also raise the map of the school. The attitude towards the introduction of exergames may also be a factor that may negatively affect prioritization of these games leading to potential overuse. The teaching content when considering what exactly to teach may be a hindrance to the playing of exergames. Implications of introducing exergames to the school PE curriculum may be a burden to those who may not have the knowledge and skills to introduce them (Sheehan, Katz and Kooiman, 2015).

Another barrier can be that of financial constraints on the part of the school failing to buy these new active video games. The cost of acquiring equipment may be exorbitant and may affect the teaching of exergames. The cost of introducing an exergaming unit into the PE curriculum is of concern to the teachers and is a topic commonly discussed by researchers, teachers, schools and school districts (Hayes & Silberman, 2007; Meckbach et al., 2013; Trout & Christie, 2007; Yang, Smith, & Graham, 2008). In addition to the costs to purchase multiple exergaming consoles to avoid wasting time, there are individual games to buy which are also associated with maintenance costs. Teachers who have large groups where students have to wait for a turn can be detrimental to the implementation of exergaming programs (Lin & Zhang, 2011a). Placing the responsibility of costs on the students and their parents can be a possibility of circumventing costs. There is also likely to be the cost of occasionally updating and repairing games which can also affect the budget of those who are advocating for the introduction of exergames.

## 4. Introducing exergames in the Zimbabwean school curriculum

The idea of introducing exergaming into the PE curriculum is not to replace PE specialists but to improve upon student engagement by making PE more relevant to learners. There are ways to maximize the benefits of exergames in PE and connect them

to other school objectives. Recent research has shown that exergames can benefit students with increases in social, cognitive and emotional growth when played proximally between students (Finkelstein et al., 2011; Graves, Ridgers, Williams, Stratton, & Atkinson, 2010; Haddock et al., 2012) and when played remotely over the internet (Kooiman & Sheehan, 2013; Kooiman & Sheehan, 2014; Kooiman & Sheehan, 2015b). Exergames should not be feared or viewed with suspicion but can be embraced for the potential they add to PE curriculum (Kooiman & Sheehan, 2015c) and the connections they allow between learners. Exergames can be tailored to meet students' needs leading to development of self-awareness and positive attitudes towards physical activity. This is also likely to result in high levels of student engagement since a wide variety of exergames can be introduced to provide a diverse learning experience.

On the student level, exergaming may promote the feeling that each player can control his or her own fate. Peer feedback, social interaction, and environmental factors related to exergaming may affect the self-efficacy and self-esteem of the player (Krause & Benavidez, 2014; Song, Peng, & Lee, 2011). Positive outcomes may prompt exergamers towards beneficial intrinsic motivation to move (Staiano & Calvert, 2011). These positive effects may be the result of student trial and error or from watching, others involved in an activity (Bandura, 1989) as exergamers learn from each other and from the exergame's virtual environment.

Research can contribute by problematizing the use of various exergames as a teaching tool in order to show whether and if so how the games can be used in a learning situation. The most important factor when introducing any teaching tool into schools and PE is thus a thorough reflection on its educational value, and not, as some research claims, its value primarily for individual energy expenditure (Quinn, 2011; Papastergiou, 2009; Staiano & Calvert, 2011). However, this also requires developing teachers' own knowledge of exergames, where the choice of teaching content and the introduction of new activities and teaching tools involve critically examining the games, which, in turn, entails thorough didactic reflection.

## 5. Delivery methods

The independence of the delivery method affords the teachers more freedom to provide extra attention to those students who need it, while not crowding those who exhibit greater independence. Most importantly in terms of learning and behavior modification, students may have many opportunities to take an active control over their own learning by making connections to their past experiences using technology. Arguments, mainly in popular literature, against using exergames in PE are that they

involve neither teamwork, nor play, nor social interaction as "real" sports potentially do (Quennerstedt et al., 2008). The ability of exergames to be tailored to the individual needs of the students in terms of competence provides the students with a great deal of autonomy and control over their learning. Being able to progress at their own pace allows students to choose when they are ready for a greater challenge or when they need additional practice to gain more confidence at the current skill level may also be a source of motivation for students. For those students who are not very physically active in outside of the PE classroom, positive experiences with exergames can be the element that encourages more active pastimes. Technology and exergames have been noted for their ability to encourage participation in PE. Since some of these exergames have tracking systems tracking personal progress can provide a mechanism for students to become cognitively involved with their own fitness through a process of critical reflection.

## 6. Conclusion

Several countries have increasingly fore-grounded exergames as a possible activity for use in school PE and as perhaps improving young people's knowledge, skills, attitudes, and behaviors in relation to health and physical exercise. Using IT currently occupies an important role in education and is increasingly used as a learning tool in many subjects. Therefore, use of these exergames in PE can advance a student's knowledge of their health, wellness and fitness. Therefore, introduction of exergames may be seen as a modern way to exercise or encourage physical activity. Exergames allow students to access PE standards and curriculum in new and exciting ways which seemed improbable only a few short years ago. It is time for educators to take notice of how stimulating, beneficial, and educational exergames can be when included as part of a curriculum for students taking PE at a distance (Sheehan and Kooiman, 2015). Furthermore, Sheehan and Kooiman (2015) concluded that as a part of the curriculum, exergames offer the student a current, relevant, and interesting way to engage the content of the course. This new genre provides one more choice for students taking an e-course in PE as they explore movement activities and develop a lifelong desire to move.

## References

1. Bandura, A. (1989). Perceived self-efficacy in the exercise of personal agency, the Psychologist: Bulletin of the British Psychological Society, 2, 411-424

2. Bogost, I. (2007). Persuasive Games: The Expressive Power of Videogames. New Jersey: MIT Press.
3. Cunningham, C., Cunningham, S., Entsuah, J., Gerstner, B., Higgins, C., Hirsh, M., & Wildsmith, J. (2010). *Benefits and effects of interactive gaming exercise as compared to traditional exercise techniques: An investigation of the relationship between physical activity levels and mode of activity in college students*. University of Maryland.
4. Finkelstein, S., Nickel, A., Lipps, Z., Barnes, T., Wartell, Z., & Suma, E. A. (2011). Astrojumper: Motivating exercise with a virtual reality exergame presence: Teleoperators & Virtual Environments, 20(1), 78-92.
5. Fogel, V., Miltenberger, R., Graves, R., & Koehler, S. (2010). The effects of exergaming on physical activity among inactive children in a physical education classroom. *Journal of Applied Behavior Analysis, 43*, 591–600.
6. Graves, L. E. F., Ridgers, N. D., & Gareth, K. W. (2010). The physiological cost and enjoyment of Wii Fit in adolescents, young adults, and older adults. *Journal of Physical Activity and Health, 7*(3), 393–401.
7. Graves, L. E. F., Ridgers, N. D., Williams, K., Stratton, G., Atkinson, G. & Cable, N.T. (2010). The physiological cost and enjoyment of Wii Fit in adolescents, young adults, and older adults, https://www.ncbi.nlm.nih.gov/pubmed/20551497
8. Haddock, B. L., Jarvis, S., Klug, N. R., Gonzalez, T., Barsaga, B. Shannon R. S. & Wilkin, L. D. Measurement of Energy Expenditure while Playing Exergames at a Self-selected Intensity. *The Open Sports Sciences Journal*, 2012, 5, 1-6
9. Hansen, L. & Sanders, S. (2010). Fifth grade students' experiences participating in active gaming in physical education: The persistence to game. *ICHPERSD Journal of Research, 5*(2), 33–40.
10. Hansen, L. (2010). *Examining active gaming theories and practices among 3rd - 5th graders*. Paper presented at the Games for Health, Boston, MA. Journal of Case Studies in Education Volume 4, July, 2015
11. Hansen, L. & Sanders, S. (2008). *Interactive gaming changing the face of fitness*. Florida Alliance for Health Physical Education, Recreation, Dance and Sport Journal, 46(1), 38-41
12. Hayes, E., & Silberman, L. (2007). *Incorporating video games into physical Education*. Journal of Physical Education, Recreation and Dance, 78(3), 18-24
13. Jacobs, K., Zhu, L., Dawes, M., Franco, J., Huggins, A., Igari, C., Ranta, B., & Umez-Eronini, A. (2011). Wii health: A preliminary study of the health and wellness benefits of Wii Fit on university students. *British Journal of Occupational Therapy, 74*(6), 262–268.

14. Klein, M. J. & Simmers, C. S. (2009). *Exergaming: Virtual inspiration Young Consumers*: *Insight and ideas for Responsible Marketers*, 10(1), 35-45
15. Krause, J. M. & Benavidez, E. A. (2014). Potential influences of exergaming on self-efficacy for physical activity and sport. *Journal of Physical Education, Recreation and Dance, 85*(4), 15-20
16. Kooiman, B. J. & Sheehan, D. P. Motivation to Move with Exergaming in Online *Physical Education International Journal of Physical Education, Fitness and Sports Journal* homepage: www.ijpefs.nonolympictimes.org 2014
17. Kooiman, B. J. & Sheehan, D. P. (2014). The efficacy of exergames played proximally and over the internet on cognitive functioning for online Physical Education. *American Journal of Distance Education*, 28, 280-291
18. Kooiman, B. J. & Sheehan, D. P. (2015). The efficacy of exergames for social relatedness in online physical education. Cogent Education, 2(1), 1-15.
19. Kooiman, B. J. & Sheehan, D. P. (2015). Interacting with the past, present and future of exergames: At the beginning of a new life cycle of video games? Loisir et Société/Society and Leisure, 38, 55-73.
20. Kooiman, B. J. & Sheehan, D. P. (2015c) Exergaming Theories: A Literature Review. *International Journal of Game-Based Learning*, 5(4), 1-14, October-December 2015
21. Liberman, D. A. (2006). Dance games and other Exergames: What the Research say. www.commm.ucsb.edu/sites/www.comm.uscb.edu/files/sitefiles/documments/Lieberman%20(2006)%Dance%20Games%20and%20Other%20Exergames,%20lit%20review.pdf Retrieved on March 4 2016
22. Lin, L. & Zhang, T. (2011a). Playing exergames in the classroom: Pre-service teachers' motivation, passion, effort, and perspectives. *Journal of Technology and Teacher Education, 19*(3), 243-260.
23. Meckbach, J., Gibbs, B., Almqvist, J., Öhman, M., & Quennerstedt, M. (2013). Exergames as a teaching tool in physical education? *Sport Science Review, 22*(5-6), 369-385.
24. Nelson, J. Palonsky, S. & McGarthy, M. (2007). Critical issues in education: Dialogues, and dialectics. Boston, MA: McGraw-Hill.
25. Papastergiou, M. (2009). Exploring the potential of computer and video games for health and physical education: A literature review. *Computer & Education, 53*, 603–622.
26. Quennerstedt, M., Almqvist, J., Meckbach, J., & Öhman, M. (2013). Why do Wii teach physical education in school? Sweedish *Journal of Sport Research 2*

27. Quinn, M. (2011). Introduction of active video gaming into the middle school curriculum as a school-based childhood obesity intervention. *Journal of Pediatric Health Care, 27*(1), 3–12. DOI. http://dx.doi.org/10.1016/j.pedhc. 2011.03.011.
28. Sanders, S. & Hansen, L. (2008). Exergaming: New directions for fitness education in Physical Education. [Policy Brief] Tampa; University of South Florida, College of Education, Daid, C. Anchin Centre; 2008.
29. Sell, K., Clocksin, B., Spierer, D., & Ghigiarelli, J. (2011). Energy expenditure during non-traditional physical activities. *Journal of Exercise Physiology, 14*(3), 101–112.
30. Sheehan, D. P., Katz, L. & Kooiman, B. J. Exergaming and physical education: A qualitative examination from the teachers' perspectives Journal of Case Studies in Education Volume 4, July, 2015
31. Song, H. Peng, W., & Lee, K. M. (2011). Promoting exercise self-efficacy with an exergame. *Journal of Health Communication, 16*(2), 148–162.
32. Staiano, A. E. & Calvert, S. L. (2011). Exergames for physical education courses: Physical, social and cognitive benefits. *Child Development Perspectives, 5*(2), 93–98.
33. Straker, L. & Abbott, R. (2007) Effect of careen based media on energy expenditure and heart rate in 9 – 12-year-old children. Pediatric exercise science, 19(4), 459-471
*34.* Trout, J., & Christie, B. (2007). Interactive video games in physical education. *Journal of Physical Education, Recreation & Dance, 78*(5), 29-45.
35. Yang, S., Smith, B., & Graham, G. (2008). Healthy video gaming: Oxymoron or possibility. *Journal of online education, 4*(4).