

# The Contribution of Nintendo Wii® in children's motricity

Henrique Gil

Age.Comm - Instituto Politécnico de  
Castelo Branco  
Castelo Branco, Portugal  
[hteixeiragil@ipcb.pt](mailto:hteixeiragil@ipcb.pt)

Tânia Santos

ESE – Instituto Politécnico de  
Castelo Branco  
Castelo Branco, Portugal

Samuel Honório

ESE – Instituto Politécnico de  
Castelo Branco  
Castelo Branco, Portugal  
[samuelhonorio@hotmail.com](mailto:samuelhonorio@hotmail.com)

**Abstract** — The increasingly visible sedentarism in the children of our current society is a problem that has been worrying the Childhood Educators. Taking into account the advancement of technology and the fact that children in today's activity rooms are considered as Digital Natives, we intend to introduce the Nintendo Wii® into the motor activities developed by children in order to verify their contribution to children's motor skills. To this end, the objectives of this study focused on the promotion of digital resources in activities related to motor expression; the analysis of the effect of the practice of motor activities performed with Nintendo Wii® and the identification of changes in children's motor development, namely in the analyzed variables, balance, laterality, body notion and global praxia, resulting from practice in the environment virtual. The present investigation was developed in the Supervised Practice in Pre-School Education, in a group of children between the ages of 4 and 5 years. In this investigation the qualitative and quantitative paradigm was combined. A mixed qualitative approach was also developed, combining action research and exploratory case study, due to the uniqueness of the study. For the collection of data, several instruments and techniques were used: participant observation, field notes, audiovisual media, BPM, semi-structured interview and questionnaire surveys. The implementation was developed in seven sessions, in which the children of the experimental group used the Nintendo Wii® and its accessories (Wii Remote and Balance Board). After the due analysis of all the collected data, we can conclude that the Nintendo Wii® contributes significantly in the children's motricity, that is, in the improvement of motor skills. It is noteworthy that the accomplishment of motor activities with the Nintendo Wii® generated in the children spontaneous collaborative spirit; healthy competition, because what mattered was the accomplishment of motor activities and not exactly the gain of points, and the punctuation emerged as a motivating element in terms of people, giving rise to greater feelings of self-esteem.

**Keywords** — *Chil motricity; Information and Communication Technologies; physical education; Nintendo Wii®.*

## I. INTRODUCTION

The present investigation was developed in the context of

the conclusion of the Master's Degree in Pre-School Education and Teaching of the 1st Cycle of Basic Education, in order to investigate the contribution of Nintendo Wii® in children's motricity. This was done at the Alfredo Mota Nursery School in Castelo Branco, in a group of 5-year-olds, but only 11 children belonged to the sample due to the limited time of supervised practice. It should be noted that this small group of 11 children was divided into experimental groups (those who performed motor activities with Nintendo Wii®) and the control group (those who did not perform motor activities with the Nintendo Wii®). With regard to data processing, this research had a mixed approach (both quantitative and qualitative).

## II. CHILD MOTRICITY IN THE FIRST YEARS OF LIFE

The first years of life, from birth to six years, are essential for children's motor learning. These years are critical because as it refers [1] the child acquires several acquisitions of autonomy of the body, as it is the case of the postural control, locomotion and manipulation of objects.

Authors like [2] and [3] mention the importance of developing fundamental motor skills, as they are fundamental in the relationship that children have with the world around them. Developing these skills will enhance the development of other skills.

As referred [4], the child has a natural need for movement and exercise, from birth to a later age. Having said this, the educator has an essential role in the motor development of the children and therefore must be attentive to the needs that each child has and should not neglect the difficulties they present, but rather stimulate and encourage the carrying out of motor activities so that overcome these same difficulties. The child being stimulated to perform motor activities will acquire, over time, a higher performance in motor development, particularly

strength, strength, balance, flexibility and greater concentration.

According to [5] it is incumbent upon the educator "... to take advantage of contexts, situations and materials ... that allow to diversify and enrich the specific opportunities for

motor activity.”

### III. THE INTRODUCTION OF ICT IN PRE-SCHOOL

Nowadays, the rooms of activities embrace children who were born in an era where ICTs are completely implanted in their routines. These children are called "Digital Natives". It is important for educators to have the notion that current society is constantly changing and that the children occupying their classrooms are "Digital Natives" and therefore require more exigency in the type of activities they carry out in the activity rooms and that ICT are part of your tastes. With this, it is fundamental that they build activities interconnected with ICT, in order to capture the attention of children, managing to keep them interested and motivated in the course of activities.

ICT enables a rapid response to all children's curiosity, because as it refers [6] it allows access to a "(...) range of knowledge that, exploited by the teacher / educator can contribute to a wider vision and to a better understanding of the world. "

There are several authors who disagree with the use of ICT before the age of seven, considering that the use of technological resources may be detrimental to their growth [7]. However, [8] states that ICTs, when used properly, can develop cognitive and social skills and should be used as one of many resources in learning. Activities that are developed based on ICT should be seen as new opportunities in an educational context

### IV. PHYSICAL EDUCATION AND TECHNOLOGIES - NINTENDO WII®

In recent years, education has undergone changes due to the fact that it tries to keep up with the technological changes that have been increasingly felt. As previously mentioned, the activity rooms are constituted by 'Digital Natives' and these have other knowledge and needs [9].

Still, in a 'technological' society there are still those who consider that video games are harmful to the health of the players, since they were seen as a sedentary activity, they did not allow the players to perform corporal movements, being destined only to the push of buttons '.

The evolution of the technologies allowed the players to begin to make movements with the body while they played, thus allying the physical-motor activity with the playfulness. These games that enable physical activity are also a contribution to combat overweight and childhood obesity. They should be encouraged as they allow children to improve their self-confidence and manual coordination.

According to [10], video games may have the potential to be used as complementary in the rooms of activities, if used in the correct context. For they can not be seen as a substitute for "traditional" physical activity [11].

In short, if digital technologies are used sparingly and are not seen as a substitute for physical activity, they can contribute to cognitive and motor development, in the latter case sensor technologies are rewarding to develop motor skills, such as: the Nintendo Wii®.

### I. PROBLEM AND OBJECTIVES OF THE INVESTIGATION

We believe that ICTs can have benefits at various levels of development, one of them being the engine. Considering the problem of the sedentarism that is increasingly present in childhood, when we selected this theme for our investigation, it was our intention to perceive how ICT, more specifically Nintendo Wii®, could contribute to children's motor skills, using the realization of motor activities with the use of the movement console. In this perspective, we posed the following problem question: "What is the contribution of Nintendo Wii® in the field of Physical Education in children of Pre-school Education?".

In order to answer this problem question we have outlined the following objectives: a) to promote the introduction of digital resources in activities related to motor expression; b) analyze the effect of practicing motor activities performed with the Nintendo Wii®; c) identify changes in motor development, namely in the analyzed variables, balance, global praxis, laterality and body notion, resulting from practice in the virtual environment.

### V. METHODOLOGY

This research was based on a mixed (qualitative and quantitative) approach to data processing, as it provided a detailed description of the context and an analysis of statistical data.

It also materialized in a mixed methodology, in which it combined action research and exploratory case study. This evidence is due, first, to the fact that it was carried out in the Supervised Practice, with the observation and involvement of the researcher, having an active role in the interaction with the subjects and, secondly, because no studies involving the Nintendo Wii® in the field of Pre-School Education.

This study had a sample of only 11 children belonging to the group of 22, constituents of the activity room. The parents/tutors also participated, as they answered the questionnaire surveys and some kindergarten teachers belonging to the Alfredo Mota Kindergarten Association, taking into account that they answered the semi-structured interviews.

### VI. ANÁLISE DE DADOS

The analysis of the data was performed in more detail after the conclusion of the Supervised Practice. For the analysis of the statistical data we used the SPSS program, rather, the Wilcoxon and Mann-Whitney non-parametric tests.

The investigation was carried out in seven intervention sessions, in which only 6 children from the experimental group performed motor activities with the Nintendo Wii® and its accessories: Wii Remote (Fig.1) and Balance Board (Fig.2).



Figure 1 - Wii Remote e Nunchuk



Figur 2 - Balance Board

The remaining 5 children, belonging to the control group, did not use the movement console, in order to verify significant differences in the motor development among the children of each of the groups. It is noteworthy that the 11 children performed some psychomotor tasks of the Vitor da Fonseca Psycho-Mechanical Battery before and after the intervention sessions, with the purpose of analyzing later the changes in their development.

Based on the data collected through the field notes, we find that the first attempts were the ones that showed the greatest difficulties on the part of the children. It should be noted that as the sessions progressed, the children improved their motor movements (Figure 3).



Figur3 3 - Child performing trunk-to-left and hip-rotation movements in Hula Hoop game.

It is noteworthy that a spontaneous collaborative spirit emerged among the children (Figure 4), because they helped each other whenever there were any difficulties in performing motor activities. Punctuation has emerged as a motivating element in personal terms, giving rise to greater feelings of self-esteem. So we could say that there was healthy competition, because what mattered to the children was the execution of the motor tasks.



Figure 4 - Children to help each other while performing motor tasks with the Nintendo Wii®.

This research was an added value, because it was allied with several motor activities to playfulness, which the children performed pleasantly.

#### A. Statistical Data

In relation to the quantitative data, evaluations were initially carried out for some BPM tasks, at the beginning and at the end of the investigation, for two groups: experimental and control. The balance, the laterality, the notion of the body and the global praxis were the psychomotor factors evaluated through the aforementioned instrument. The non-parametric

SPSS (Wilcoxon and Mann-Whitney) tests were used to compare the two groups (GE and GC) to determine possible significant differences between the variables under study, showing their performance with the use of Nintendo Wii®.

According to the statistical data we can see that the results were favorable in the experimental group.

#### B. Questionnaire surveys of Parents/tutors

The data collected through the responses obtained from the parents, we find that they both appreciate ICTs and seem to neglect them whenever they are seen as instruments or resources to be used in an educational context. They consider that the physical-motor activity in Pre-School Education is fundamental, but they do not consider that the use of Nintendo Wii® is important, since the physical-motor activity must be carried out in "traditional way", favoring the activities carried out in the air free. Thus, parents are of the opinion that the use of ICT in the pursuit of physical activities does not have any benefits for children's development. Some of the justifications of the respondents regarding this aspect will be presented below:

*"It's a different way of practicing physical exercise, providing moments of socialization in different context and environment."*

*"ICTs are beneficial to a child's growth, but they should be used sparingly, keeping in mind that traditional games are equally important because virtual reality makes it all easier."*

*"No. At this age I think it is more beneficial to traditional physical exercise, without, however, neglecting that it can be known to the child that activity (Wii®)."*

*"No. Because in my opinion physical activities in a "traditional" way, in a group and especially in the open air brings more advantages to the child of preschool age, in terms of physical, psychic and social development."*

O facto de os pais serem, de certa forma, contra as TIC poderá possivelmente estar ligado com o facto de pensarem que estas servem somente para brincar e o tempo excessivo, por vezes, que passam nos computadores ou tabletes, em casa, é suficiente. Não têm conhecimento das potencialidades que as TIC podem oferecer. Contudo, consideram eventualmente e com algumas dúvidas que a *Nintendo Wii®* poderia ser utilizada como complemento de algumas atividades físico-motoras.

#### C. Interviews with the Kindergarten Educators

In the data obtained through the answers collected from three kindergarten educators of the Association for Kindergarten Dr. Alfredo Mota, it is verified that the importance and the potentialities of Nintendo Wii® seem not to be completely perceived and contextualized. This evidence may be related to the fact that two of the educators were not present when using the movement console, lack of experience and lack of practical use of the console. Having said this, they are of the view that the activities should be carried out in a 'more traditional' way, ie without any influence of ICT.

However, the cooperating educator, who can experience and experience the sessions in which the children used the Nintendo Wii®, already has a more positive opinion. Considering that the activity in the educational context was interesting and motivating, being able to capture the attention of the children, keeping them always engaged in carrying out motor activities with the Nintendo Wii®.

#### VII. CONCLUSIONS

It is noteworthy that the results obtained in this investigation are confined to the subjects of the sample, and it is not our intention to make any kind of generalization. With the present investigation, we managed to have children perform a variety of motor activities with the Nintendo Wii®, thus promoting the introduction of digital resources in motor activities. The children during the games used pleasurable body movements, combining physical exercise and playfulness.

One of the evidences that children always surprise us is the spontaneous collaborative spirit found among children during the sessions. It is therefore gratifying to observe a healthy competition, since the children wanted to perform the motor games and not properly the points gain. It is also worth noting the improvements in self-esteem on the part of the children, mainly in one that was more inhibited, initially, in the accomplishment of the motor activities and that with the course of the sessions managed to disinhibit and to perfect the movements required by the respective games that realized in Nintendo Wii®.

Based on the statistical tests (Wilcoxon and Mann-Whitney) it was verified the change in the motor development of the children, as the group that performed motor activities with the Nintendo Wii® (experimental group) obtained improvements in all the psychomotor factors studied (global praxis, laterality, notion of the body), with the exception of the balance.

Taking into account the data collected through the questionnaire surveys of the parents and the interviews of the three kindergarten teachers, we consider that in future studies the collaboration of parents and early childhood educators in the introduction of ICT, in this case specifically the Nintendo Wii®, in motor activities, with the purpose of showing the potential that this console of movement offers. It is essential that both parents and educators observe and recognize that the Nintendo Wii® has many potential as a complement to motor activities. Evidence of this is when weather conditions do not allow for outdoor activities. It is also essential that educators conduct more training and workshops related to digital technologies, in order to take advantage of the potential they offer, and can use them in activities developed in the rooms of activities.

This investigation allowed to conclude that the Nintendo Wii® contributes to an improvement in children's development, as evidenced by the statistical tests, and the experimental group presented favorable results.



## References

- [1] Neto, C., *Motricidade e Jogos na Infância*, Rio de Janeiro: Sprint, 1995.
- [2] Gallahue, D. L., & Ozmun, H. C., *Compreendendo o Desenvolvimento Motor: bebês, crianças, adolescentes e adultos*, São Paulo: Phorte Editora, 2003.
- [3] Peres, C., Serrano, J. & Cunha, A., *Desenvolvimento Infantil e Habilidade Motoras*, Viseu: Tipografia Guerra, 2009.
- [4] Eckert, M., *Desenvolvimento Motor* (3ª ed), São Paulo: Editora Manole, 1993.
- [5] Educação, M. d., *Orientações Curriculares para a Educação Pré-Escolar*, Lisboa: Ministério da Educação, 2016.
- [6] Amante, L., *Infância, escola e novas tecnologias*. Em F. A. Costa, H. Peralta & S. Viseu, *As TIC na educação em Portugal: concepções e práticas* (pp. 102-123), Porto: Porto Editora, 2007.
- [7] Moreira, A., *Crianças e Tecnologia, Tecnologia e Crianças*. In PONTE, João Pedro (org). *A formação para a Integração das TIC na Educação Pré-Escolar e no 1º Ciclo do Ensino Básico* (pp. 09-17), Porto: Porto Editora, 2002.
- [8] Magalhães, H. E., *A criança e os videojogos: Estudo de caso com alunos do 1.º Ciclo do Ensino Básico*. Tese de Mestrado, Minho: Universidade do Minho, 2009, Acedido a 14 de maio de 2016, em <https://goo.gl/4vVSZo>
- [9] Pearson, E., & Bailey, C., Evaluating the potential of the Nintendo Wii to suport disable students in education. *ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007*, (pp. 833-836), 2007. Acedido a 15 de outubro de 2017, em <http://www.ascilite.org/conferences/singapore07/procs/pearson-poster.pdf>
- [10] Coimbra, S. M., *Videojogos: As representações dos pais sobre a prática dos filhos*, Castelo Branco: Escola Superior de Educação, 2012.