

**Information and Communication Technologies (ICT) in physical education. A
theoretical review**
**Tecnologías de la Información y la Comunicación (TIC) en Educación Física. Una
revisión teórica**

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Abstract

In this review we tour the treatment of the Information and Communication Technologies (ICT) in the field of physical education by the professed and the students. For this purpose we review the existing lines of research on the topic and how the most remarkable works of different authors, with special attention to the situation in the autonomous community of Galicia. Finally the main problems related to the use of these technologies in classrooms are analyzed. All this in order t to shed light on a very topical issue regarding the education of our youth. Studies show that ICTs are increasingly present in the field of physical education, but much remains to be done to make an effective use of them in education.

Key words: Information Communication Technologies; Physical Education.

Resumen

En esta revisión bibliográfica se hace un recorrido por el tratamiento que tienen las Tecnologías de la Información y de la Comunicación (TIC) en el ámbito de la educación física por parte del profesado y del alumnado. Para ello se analizan las líneas de investigación existentes sobre el tema así como los trabajos más notables de reciente publicación de diferentes autores, con especial atención a la situación en la comunidad autónoma de Galicia.

Por último se tratan los principales problemas relacionados con el empleo de estas tecnologías en las sesiones de educación física. Todo ello con el fin de arrojar luz sobre un tema de gran actualidad en lo referente a la educación de nuestros jóvenes. Los estudios demuestran que las TIC cada vez están más presentes en el asignatura de educación física, pero todavía queda mucho trabajo por hacer para lograr un uso realmente efectivo de ellas en el ámbito educativo.

Palabras clave: Tecnologías Información Comunicación, Educación Física.

Introduction

Traditionally the relationship between the Information and Communication Technologies (ICTs) and physical education was very low, most of its application in the sports world was reduced to the level of athletic performance (Educ.ar, 2010). Fortunately, today the situation is changing, and the ICTs offer a variety of advances that were used and adapted in other areas to complement the activities and knowledge that are taught to students. It is important for physical education teachers believe in the potential and the benefits that ICT can offer them, and not confined them solely to remedy for a rainy day, and that can complement, for example, study and work anatomy body human with an interactive exercise in which students, under the supervision of a teacher, demonstrate your knowledge by identifying the different muscles. Keep in mind that everything is not easy in the implementation of ICT in education because they need the development of an open by teachers who must think that there are resources everywhere that maybe are not designed for teaching mentality but none the less interesting, how the use of basketball games scenes recorded using an electronic recording device, timer or a camera mobile phone for recording choreography, etc. which can become very useful resources to use in class. As with any subject taught in the national education system, physical education teachers can use all the resources available to impart, thus achieving the objectives previously set for your students. For this ICT they are one of the "most attractive to get" tools (Tichin 2013, p.1).

Background and approaches on the use of ICT in Physical Education

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Most of today's teachers were educated in a type of primary school where the closest thing to the incorporation of new technologies into the classroom physical education was the use of a tape-recorder, a VCR or a projector slide, and always exceptional for an exhibition class by the teacher (Dols, 2011).

Today, with the emergence of new technological devices, which range from the DVD player to the whiteboard, without forgetting the big star of them all, the computer, the great educational challenge is not your occasional use, but achieve true methodological implication for curriculum development, breaking with the preconceived idea that ICT is only an external element in physical education. Dols (2011, p, 3) emphasizes that "no one is rare and the use of computers for managing school administrative center, nor that class teachers use them even looks like a success and it seems logical to expect a computer room and a language lab. But should go a step further, and have all this potential to develop into the curriculum of physical education area. "

The logo of the University of Coruña, featuring a stylized pink and white graphic of a sun or a flower.

Methodology

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The selection of items was performed using a subject search in two important databases: SPORT Discus with Full Text and Dialnet. The articles were selected based on two criteria: that its subject had an eminently practical application and that they were current (focusing only on those who had been drafted in the twenty-first century). He also tried to find articles that made reference to different countries or regions of the planet, at this point that the most advanced and cutting-edge research in the field come from Anglo-Saxon countries (most notably the United States).

The keywords used in the search were in spanish, *Tecnologías Información Comunicación, Educación Física, TIC y Deporte*; while in the English language they were used: *Information Communication Technologies, Physical Education, ICT and Sport*.

Investigation lines

At present there are a number of lines of research, collected by Cabero (2004) in the field of ICT in the educational context, and therefore in physical education. Each of these lines is focused on a specific area that we may quote then:

- The technical characteristics of equipment and certain functional attributes same (color, movement, etc.).
- Analysis of the structural attributes and how to organize them to transmit certain messages. They are accentuated by the design according to media elements structuring.
- The relevance of the symbolic attributes of the media and their interaction with psychological characteristics of students and how these symbolic systems determine the cognitive and performance products obtained in the media.
- Examine the attitudes that have receptors means facing the same as determinants of the products made and the mental effort invested in the processing and information processing.
- The analysis of the contexts and conditions that introduce in practice.
- The pragmatic about the media: that way to design, use and evaluation.
- Criteria that teachers should adopt for the implementation of ICT.
- A sociocritics perspective, concerned with the analysis of the values transmitted ICT both directly and as a disguised form of manipulation that originate from its use.

Following these lines of research, they have carried out a variety of targeted studies in the field of physical education.

First of all it should be noted the study developed by Pratt & Coiduras (2012) who conducted a study on how physical education teachers in Lleida (Spain) use ICT in their lessons within the learning project Educat 2.0. The research carried out by Adamakis & Zounhia (2013) goes a step further by trying to establish what are the basic skills in physical

education of Greek students, and from them to design applications capable of evaluating them with a simple interface design so that students themselves can use. Very similar is the study of Penz (2008) where three educators from the United States reflect on the possibilities of implementing the ICT field of physical education.

The blend of traditional teaching methods with the use of ICT in the classroom may yield excellent results. The case study developed by Pratt & Camerino (2012) demonstrates the benefits in teaching stunts in the traditional way with the creation of Internet resources in WebQuest format. The complementarity of the two methods shows the benefits of using ICT in the process of autonomous learning by students, and getting better your relationships during the session PE (Camerino, 2012). Another case study analyzed teacher education physical education in the handling and use of ICT from the perspective of students (McNeill & Fry, 2012). In it the authors focused on the impact of vodcasts (video streams) in the student learning, to do research evaluated the effect it had in learning the use of multimedia material during the sessions.



ICT can play an important role in evaluating the work students do during a physical education class. Focusing on this section Perlman; Fisette & Collier (2013) wrote that the current trend by teachers to the assessment is to document the physically active participation of students. This is possible by using, for example, heart rate monitors, accelerometers, pedometers, etc., which provide a wealth of information on the work done in the sessions that the teacher can take into account when evaluating the work done by students. In the same vein it is focused the article by Penneya; Jonesb; Nwehouseb & Campbell (2012). In it the authors attempt to collect the ways that exist to assess through ICT in physical education in Western Australia, with the aim of establishing a set of principles that can be used nationwide in all schools. Also in Australia the work done by Casey & Jones (2011) who explored the use of video technology as an aid to achieve greater involvement of the most dissatisfied with physical education for the development of classes students take place. For readers interested in the topic, publishing Mosier (2014) provides a great analysis of the leading mobile

applications and programs related to sport and physical activity, many of which easily could be introduced in physical education sessions.

Increasingly common research devoted to analyzing the digital skills of teachers, among them the by Woods; Karp; Miao & Perlman (2008) which analyzes the ability of several physical education teachers to use ICT for educational purposes. The results show that levels of perceived competence by teachers were high. Teachers themselves recognize that student learning can be greatly improved with the introduction of ICT because they facilitate individual development, and think that can be very useful in the process of evaluating their subject.

Nye (2008) explains that employ technology as a resource in a physical education class can be very stimulating for teachers and for students. But it points out that teachers should pay close attention to the way in which they manage and provide instructions for their students to use these resources in their physical education classes. Through his work he aims to guide them in making informed decisions when deciding whether to use technological resources in their classrooms. They must take into account three aspects that can help them learn in the process:

1. Pretechnology: technology resources and benefits of students.
2. Considerations of management: storage and distribution of technology resources.
3. Pedagogical considerations: teaching practices.

Similar is the objective of the article by Sobral; Faro & Edginton (2008), in which the authors describe a training program for teachers of physical education in which great emphasis on teaching is done through ICT and its potential to generate applied research in a school context. The format of the program aims principal to encourage the introduction of ICT and its use in physical education classes by teachers.

Trends of Education in the Information Society. The Galicia (Spain) situation

Educational legislation calls for the formation of competent citizens and school is one of the main agencies responsible for carrying out this task. It should train students in the new powers of information, one of the 8 basic skills included in Decree 130/2007 approving the curriculum of primary education is established in the Autonomous Community of Galicia, called "Treatment and digital competition". Annex I of the decree explains that digital competence "entails a habitual use of the available technological resources to resolve real problems in an efficient way. At the same time enabling evaluate and select new information resources and technological innovations as they become available, in terms of their usefulness to undertake specific tasks or objectives. "

An important aspect to achieve is that students be critical of the information handled, and by circulating information networks may be correct and information that may be incorrect. From school must instill that critical spirit and deepen the right information management teaching students the ability to filter information stop to stay with them really is useful. Undeniably we live in an information society, not of knowledge, so we must take advantage of facilities that this brings us to train students in physical education at a critical spirit facing the management of ICT.

Crisis of confidence and critical ideas on ICT in physics education.

One of the main barriers are the teachers in using ICT in physical education is the lack of systematized knowledge, not only about the vastness of programs and resources that can be used, but also on how to integrate ICT properly within the class. Teachers should be aware that ICT are not just another tool, so that these prove effective should be incorporated in an appropriate way in curricular projects. Hence their task is largely to create a favorable learning environment that helps students to learn. Thus, it is consistent to consider how the process main objective - learning to be active, independent, tailored, constructive, goal-oriented, diagnosis, meaningful and enforceable (McNeill & Fry, 2012).

In order to achieve goals previously Marcelo (2001) suggests that teachers should have powers, at least in three areas:

1. Technology: even though the centers have (or should) a technician, it is desirable that teachers have a good level of autonomy in the management of technological tools that will be used in their classes.
2. Teaching: pertaining to the knowledge of learning theories and principles, as well as the ability to adapt to different contexts of teaching - learning.
3. Tutorials: related to communication skills and adaptability. This competition seeks to create a pleasant environment for students and the teacher develop the tasks allocated to them during the process of teaching – learning.

Furthermore, Queralt & Coiduras (2013) write that a major problems that can lead to the use of ICT in the field of education would be an unnecessary physical abuse, which would mean that the subject lost its connotation and movement practice to the detriment of a more theoretical implication in which video presentations abuse or PowerPoint. There is an urgent need for digital literacy of teachers and of adequate implementation of ICT in the course of physical education, because, on many occasions, teacher training in this area is scarce or there are teachers who rely more on their knowledge gained self-taught in the systematized. Salvat & Quiroz (2005) indicate the conservative tendency of teachers in this regard. Draws much attention little difference between teaching methods applied in the early twentieth century with the current in the field of physical education. Subject currently consists of a series of repetitions of movements and major sports teaching. In this way there are different lines of research in emerging ICT advocates incorporate them into different curricular projects and search for and apply methodological changes to harness the full potential they offer. There is little point change show that a teacher does, for example, how one properly executed side by a video of a gymnast who teach the same wheel. In both cases it is carrying out a methodology for transmission - reception. In the letter of Salvat & Quiroz (2005) the importance and the need for teachers to receive training strengthens continuous and quality in the use of ICT as a teaching tool and its integration in new learning contexts, mediation and new communication

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strategies. Tejedor in Garcia - Valcárcel (2008) argues that now we are in a stage of crisis of confidence in the results that are producing research in the ICT education. Because, among other factors, many of the studies in this area, especially in physical education, are determined by politics, what is it to endorse the "goodness" of certain projects launched by education authorities. Here we find research as carried out by Area (2010) over the course 2006-2008, in the centers that participated in the Medusa Project (Canary Islands Government project designed to provide digital technologies to all schools in the community, in addition to train teachers for educational use), which was funded by the government.

Or the held in Galicia during the courses 2006 - 2009, funded by the Ministry of Education and Culture and the Galician Government in convening the National R + D + I 2005-2008 (reference SEJ 2005-08656), whose purpose was to analyze and evaluate the factors involved and the strengths and weaknesses that are generated when addressing educational innovation projects when it is aimed at encouraging new learning - mid learning ICT (Gewerc & Montero, 2013).

Finally, another critical mind about the use of ICT that can promote social inequalities, so says Barn (2007) in his editorial, "in this sense, with its benefits, ICT also have a whole of effects side which can be particularly damaging to the social system, as they are a powerful tool for segmentation, able to increase economic, social and cultural inequalities between sectors that are to benefit from technological development and sections of the population excluded from it ". The world today is marked by powerful economic interests and mercantilism, and the incorporation of ICT to the field of physical education is no stranger to them, being sometimes these interests that can make their technical incorporation into the matter ahead of proper planning, which take advantage of more efficiently the resources available for the benefit of educational practices and student progress.

Conclusions

It is undeniable that, gradually, ICTs are entering the subject of physical education, despite the initial reluctance that may exist by teachers or other persons or entities related to the education sector (students, AMPAS, public administrations and private, etc.).

Numerous studies show that the use of ICT in schools can significantly improve the performance of students and teachers in the field of Physical Education. However, if your introduction does not obey or educational purposes is not subject to a good educational planning, its effect on students may be negative. Because it should influence the importance of teacher training in the use and management of ICT and knowledge about them, both as a teaching technical level.

This literature review was intended to collect different ways and strategies through which ICT can be used in the field of physical education. Through it is intended to provide information to the different professionals in the education sector so that they can use ICT in their lessons in a more effective and safe for them and their students. Noting further the main problems and difficulties that may flow from its use in the school environment.

In the future, ICT will be incorporated into all curriculum subjects education at all levels of teaching, teachers depends largely a responsible and effective use is made of them.

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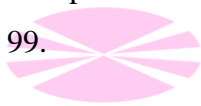
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