

Perceptions of Primary School students about the self-made material of Physical Education class

Percepciones de los estudiantes de Educación Primaria sobre el material autoconstruido en la asignatura de Educación Física

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Abstract

In recent years, the use of self-made materials in Physical Education class has increased significantly. The main reasons may be due to the numerous educational opportunities they provide to students. Furthermore, the low budget allocated to most Department of Physical Education increases the need for making these inexpensive materials. The aim of this study is to examine the perception manifested by Primary School students about the use of these materials in their of Physical Education class and see if there are any differences associated to gender or students previous experience with them. The sample comprised 131 students (43 boys and 88 girls), aged 9 to 12 years ($M = 10.59$; $SD = 0.74$), all of them belonging to two Primary Schools in the North of Spain. These students completed a questionnaire *ad hoc*, i.e. specifically designed for this research, consisting of two parts: the first one, considered sociodemographic variables items such as age, gender, school grade, etc. and the second one was composed of 10 items assessing the level of familiarity the students had with these self-made materials, valued how the students perceived the effort put into them construction, and recorder how interested they were in the environmental values they promoted. We performed descriptive analysis (M and SD), Cronbach Alphas, Kolmogorov-Smirnov, U de Mann-Whitney and Kruskal Wallis. The results showed a good internal consistency of the questionnaire and received high marks in how fun and interesting using these materials was for students. These high results might be explained because the students found the material to be a novelty and looked forward to using them again in the future, unlike what usually happens with conventional materials.

Keywords

Physical Education; Primary School; self-made materials; gender.

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Resumen

En los últimos años, el uso de los materiales autoconstruidos en las clases de Educación Física está aumentando notablemente. Los principales motivos pueden ser las numerosas posibilidades educativas que proporciona a los estudiantes, unido al escaso presupuesto destinado a los Departamento de Educación Física y su mínimo coste de construcción. El objetivo de este estudio fue examinar la percepción que manifiestan los estudiantes de Educación Primaria acerca del uso de estos materiales en la asignatura de Educación Física y si muestran diferencias en relación al género o a la experiencia previa. Participaron 131 estudiantes (43 hombres y 88 mujeres), con edades comprendidas entre los 9 y los 12 años ($M = 10.59$; $DT = .74$), todos/as ellos/as pertenecientes a dos colegios de Educación Primaria del Norte de España. Los estudiantes cumplieron un cuestionario *ad hoc*, es decir, realizado expresamente para esta investigación, compuesto por dos partes: la primera de ellas, contenía ítems relacionados con variables sociodemográficas, como edad, sexo, curso, etc. y la segunda estaba compuesta por 10 ítems vinculados con el nivel de conocimiento hacia el material autoconstruido, el esfuerzo percibido que supone su construcción, el interés por este material y los valores medio ambientales que fomenta. Se realizaron análisis descriptivos (M y DT), Alfa de Cronbach, Kolmogorov-Smirnov, U de Mann-Whitney y Kruskal Wallis. Los resultados revelaron una buena consistencia interna del cuestionario y unos valores medios elevados en la diversión y el interés que suscita el uso de estos materiales. Estos resultados quizá se deban a lo novedoso que resulta su construcción y posterior uso, a diferencia de los materiales convencionales.

Palabras clave

Educación Física; Educación Primaria; Material autoconstruido; género.

Introduction

In recent years, numerous publications have included the analysis of the different educational possibilities that provide the use of recycled materials in Physical Education classes, as well as the countless resources that these give teachers in order to work the motor skills on any of the stages in school (Trigo, 1992; Jardi & Rius, 1997; Davison, 1998; Lichtman, 1999; García & Ruiz, 2001; Méndez-Giménez, 2003; 2008; Fernández-Río, 2010; Fernández-Río & Méndez-Giménez, 2012, 2013; Méndez-Giménez & Fernández-Río, 2012, 2013). This new educational trend relies on the pedagogical potential that is to involve the pupils in the construction and use of their own materials on Physical Education. Its use allows a higher variety of activities and new learning skills for the teacher and, as a result, a more active engagement of the students (Méndez-Giménez, 2003; 2008).

Featured authors in this field, such as Jardi & Rius (1997), determine the self-made material as "a type of unconventional material, i.e. not subject to the traditional tours of fabrication and sale, built by the students and the teacher from waste materials and/or commercial low cost". Therefore, the use of this type of materials is conditioned in many cases by the shortage of resources at the time of performing the different sporting or leisure activities, or even by the wide possibilities that recycled materials offer, serving as an alternative, in sports or games. In some way, "the materials are not essential for the game, but they are very valuable to increase the interest of students in the activity" (Palacios, Toja & Abrales, 1999).

Previously, we have explained that this material provides numerous pedagogical and educational possibilities to students, that's why Clara & Mauri (2010) indicate that the materials are the intermediaries of the activity, given that they are able to combine theory and practice, enabling the work of the own contents of the subject in Physical Education, being able to be used in a variety of situations and allowing to adapt them to the needs of each student. Another aspect that we can highlight is the opportunity to work, to some extent, the common aims with other subjects, allowing an interdisciplinary work that connects the various areas, making it this way in powerful tools of education.

In this way, to include this type of materials is justified in a multitude of studies, for the numerous educational opportunities that delivers on all of the students, to develop creativity, imagination and promote education in values, as can be respect for the environment. As shown by Fernández-Río and Méndez-Giménez (2012), the use of these materials is an effective tool to promote quality learning, supported in active methodologies that have their basis in the constructivist theory of learning.

But the inclusion of this material is due not only to the benefits, but also to their effort to combat the scarce or null budgets devoted to the Department of Physical Education. We all know that the economic situation which the country is facing currently is quite different from the one we had some years ago. That's why the acquisition of materials specific to the subject of Physical Education has been reduced substantially. In this way, Martin (2007) indicates us that this type of recycled materials can help to overcome the economic difficulties that this department is going through, and, at the same time, they can awaken in the students a critical sense for what they consume, offering new points of view.

As regards the construction and/or use of these materials in Physical Education, it is interesting to highlight the values that Fraile (2001) encourages, and emphasizes:

1. Environmental education: from the manufacture of alternative materials, you can stimulate respect for the natural environment nearby, increase control of waste and encourage its reuse.
2. Education for Peace: You can encourage attitudes of respect and dialogue through the experience and experimentation in the practice of sports, as well as the acceptance of different skill levels and the development of attitudes of non-violence.
3. Consumer education: through proposals with self-made materials it can be stimulated the understanding that the practice of sports is not conditioned by the use of certain brands or by the expenditure of large amounts of money.
4. Health education: it is intended that the students come to appreciate the effects that the usual practice of sporting activities produces on health conditions and the quality of life.
5. Education for equality of opportunities: regardless of race, sex, religion, social class, ability or physical condition. It is necessary to establish mechanisms to address the children who have a disability, discrimination between different sexes and between minority cultures.
6. Civic and moral education: Promotion by the rules of the game and tolerance, as well as respect for the proposals and playful creations of others.

In previous paragraphs, the attention has been focused on the benefits that these materials produced with respect to its use in the subject, but it is also important to highlight a series of measures that the teacher must take into account at the time of its construction, therefore, the materials to be used in the area of Physical Education must have a multifunctional character, be devoid of danger and should not be very sophisticated. In this way, Galera (1996) determines that the characteristics that must possess the self-made materials are the following: versatile, adaptable, manageable, safe, easy to maintain, low cost, enough quality to guarantee their duration and aesthetical.

The present investigation proposes to check if there are different perceptions about the self-made materials among students of Primary Education in the subject of Physical

Education. Equally, an attempt will be made to compare whether the perceptions of the students vary depending on the sex or the experience with this type of materials. And lastly, we intend to explore whether this type of materials promote in the students values, such as respect for the environment and recycling.

Material and method

Participants

A total of 131 students have collaborated in this study. Primary School (43 boys and 88 girls) aged between 9 and 12 ($M = 10.59$; $SD = 0.74$). All of them belonging to two educational centers in Principado de Asturias.

Procedure

At first, a questionnaire was developed specifically for this study, addressed to the students of 4th to 6th degrees in Primary School. Subsequently, there was a small pilot study on 30 students and in this way to make sure the correct understanding of the different items that formed the questionnaire. After correcting the minor typos found, we proceeded to contact the Head Teachers to request their collaboration with this research. From the educational centers, were very receptive and proceeded to request the relevant authorizations to work with under-age students. Finally, the researcher went personally to the educational centers to perform the pass of questionnaires, these were conducted individually within the classroom, with an approximate driving time of 15 minutes, without the presence of the teacher of Physical Education. At all times they were insisted to respond with sincerity, relying on the anonymity and confidentiality of all of their replies.

Instrument

A questionnaire *ad hoc* was elaborated, i.e. expressly for this research, consisting of two parts: the first part featured a series of items related to social and demographic variables of interest for the study, which are: age, sex, the degree, the sports they play, the hours they devote to these practices, and experience or not with self-made materials in Physical Education. The second part included 10 items linked to the level of knowledge about self-

made material and possible games that can be performed with it, their interest to build their own material, the perceived effort that involves building it, their interest in using it more often, the degree of fun when playing with it and their perception on whether this material helps to recycle and take care of the environment. The questionnaire was evaluated using a Likert scale of 5 points (1="strongly disagree", 2="disagree", 3="indifferent", 4="agree", 5="strongly agree"). Some examples of items are: "I know what the self-made material is and I can give an example", "I would be willing to build this material outside of the classes," "I would play with self-made material in the playground or on the street" or "I think it is fun to play with this type of material". In the analysis of data from the pilot study the reliability indices (Cronbach Alphas) obtained a value of 0.81.

Data Analysis

The data relating to the questionnaire of the students were entered and analyzed using the Statistical Package for Windows "Statistical Package for the Social Science" (SPSS) version 19.0. To do this, the responses of all subjects (n=131), formed a single group of analysis. Descriptive analyses were performed (Mean and Standard Deviation) and Cronbach Alphas. It requested the Kolmogorov-Smirnov test to assess the normality of all variables, obtaining values of Sig. < 0.05 in almost all of them. This data indicates that the criterion of normality was not met in their distribution. Therefore, in the subsequent analysis non-parametric tests were used. For the comparison of the results in terms of the variables of segmentation, the corresponding contrast statistical for separate measures were used (U Mann-Whitney and Kruskal Wallis).

Results

Mean and standard deviation of the items in the questionnaire

The reliability of the questionnaire was Cronbach Alphas 0.78, indicating a good internal consistency of the same. Table 1 shows the average and the standard deviations in relation to the knowledge that students have on the self-made material and games that can be performed with this, his interest in him and the values that can promote their use.

Table 1: Medium (M) and standard deviation (SD) of the 10 items of the questionnaire

	M	SD
1.I know what self-made material is	3.02	1.91
2.I would like to build my own material	4.16	1.10
3.Building it would require a lot of effort	3.20	1.66
4.I would like to work more often with this material	4.13	0.88
5.I know games with self-made material	2.98	1.83
6.It is fun to play with this material	4.33	0.80
7.I am willing to build material out of classes	3.90	1.14
8.I would play with this material in the playground or on the street	3.08	1.46
9.I believe that with this material we can help to recycle	3.70	1.42
10.I believe that with this material we help to take care of the environment	3.50	1.46

The highest values we can observe in the item number 6, "It is fun to play with this material" and the number 2 "I would like to build my own material", which represent the result of building this type of materials and that denote a high interest in doing so (scores above 4).

While the minimum values are in the response to questions 1 and 5, "I know what self-made material is" and "I know games with self-made material". With these results, we can see that there is a high percentage of students that do not know exactly what self-made material is and therefore, are not aware of any type of game using it, perhaps because of the absence of its use in Physical Education. It is also displayed a wide variety of views on these two items, represented in their standard deviations: 1.91 and 1.86, respectively.

Analysis in relation to sex

In order to know if there were significant differences in function of sex, it was requested the U test of Mann Whitney, the Z scores and asymptotic bilateral significance. Significant differences were obtained (sig. < 0.5) in more than half of the items employed. On the first question, "I know what self-made material is", the difference is greater and it is due to the fact that in the mixed-sex school, all students had built these materials, therefore, all male pupils had experienced it. Whereas the students of female school in general, and with few exceptions, had not built this material. The rest of the items that obtained mixed results were the following: "Building it I would require a lot of effort", "it is fun to play with this material", "with this material we can help to recycle", and "we help to take care of the environment". It should be noted that the differences in all of the above items are possibly due to the same reason: the number of male students is much lower than that of female

students. This is because one of the schools in which the study was carried out was entirely female.

Analysis based on experience or not with self-made materials

Table 2 contains the descriptive statistical in each one of the items in the questionnaire of the students depending on the group experience vs. non-experience during the school year with self-made materials.

Table 2: Mean (M) and Standard Deviation (SD) differentiating the students who have or not have experience with the self-made materials.

	Group has built material (N=62)		Group has not built material (N=69)	
	M	DT	M	DT
1.I know what self-made material is	4.75	.650	1.38	1.06
2.I would like to build my own material	4.33	.908	4.00	1.23
3.Building it would require a lot of effort	2.00	1.265	4.34	1.07
4.I would like to work more often with this material	4.26	.893	4.00	.85
5.I know games with self-made material	4.54	.808	1.48	1.14
6.It is fun to play with this material	4.66	.680	4.02	.77
7.I am willing to build material out of classes	4.28	1.019	3.53	1.13
8.I would play with this material in the playground or on the street	3.38	1.518	2.80	1.34
9.I believe that with this material we can help to recycle	4.64	.775	2.80	1.30
10.I believe that with this material we help to take care of the environment	4.28	1.157	2.77	1.34

In relation to the group that has experience with self-made material, we can observe the highest averages in questions 1, 5, 6, 9 and 10. All of them have a relationship with the knowledge that students have on this material, whereas the lowest score is in question 3, which has to do with the effort required to build it.

As regards the second group, which has not built this material, we can see the highest values in questions 3 and 6, followed by the items 2 and 4. These results show the high expectations that students have before this type of material and the effort they perceive it would be necessary to built it. While items 1, 5, 9 and 10, reflect lower values, since those are the ones which show more direct relationship with the knowledge and the consequences of the use of self-made material.

To compare statistically the values between the learners who have built materials and those who have not, the U test of Mann-Whitney independent tests was employed. We found significant differences in most of the items, primarily on issues related to the construction,

experience and consequences of the use of self-made material that show the differences between the students that have built material and those who have not.

Discussion

The objectives of this research were three: 1) to examine the perceptions of the students of Primary Education as regards the use of self-made material, 2) to compare if the perceptions of the students vary depending on the sex or the experience they may have with this type of materials in the Physical Education class, and 3) to explore whether this type of materials encourage in the students some values, such as respect for the environment and recycling.

Therefore, in the analysis of the data obtained have been studied different categories, such as the experience or not with self-made material, the differences between the sexes and the environmental values that promotes. These subcategories have direct relationship with the objectives of this research. To do this, we will begin the discussion with the analysis of the perception of the total sample of students with respect to these materials.

Assessment of the questionnaire (total sample)

The mean scores lowest rates can be found in the items relating to the construction and the knowledge of games with self-made material. As can be seen, a large number of pupils do not build materials in Physical Education classes. These results coincide with a study by Ramirez & Bolivar (2012), in which the 79% of Teachers of Physical Education do not consider essential the use of alternative materials for the development of motor skills in the classes. Possibly the reason for this thought is due to the level of university training in relation to this material, which is with few exceptions, usually zero.

On the other hand, the highest average values can be found in the items number 6, ("It is fun to play with this material") and number 2 ("I would like to build my own material"). There are various studies that state this kind of answers have to do with the impact of this material on the students, corroborating that the interest is high. Among them are the studies of Méndez-Giménez, Martínez-Maseda & Fernández-Río (2010) and Méndez-Giménez,

Fernández-Río & Méndez-Alonso (2012) made on the students of Primary and Secondary School, In which high levels of interest were observed. Enjoyment and motivation with the use of this material, as added Fernández-Río & Méndez-Giménez (2013), enables the involvement of students in their own teaching-learning process and can acquire the own contents of the subject in Physical Education.

Another aspect to emphasize is that it is fun to play with them, this may be due to the high expectations that they create in the own students to build themselves the material for later use. In this same line, Trigo (1992) argues that the proposal to use new objects to interact with causes interesting mental reactions in those who feel challenged, awakens their imagination and inventiveness, generates new expectations of adventure and discovery, and ultimately, allows them to develop the capabilities to investigate and create.

With this we can express that students who have experience with this material feel a desire to interact with it again, as the study of Ramirez & Bolivar (2012) states, 86% of students investigated show greater interest in Physical Education classes, mainly due to the novelty and significance that the whole process of construction and use represents for them.

Value in function of sex

As has been shown, the scores for each of the items in the questionnaire are flocking clearly in favor of boys. All of them had built various materials in their Physical Education classes and one of the schools was fully composed of women who, for the most part, had never used these resources before.

Other studies that have been carried out on this subject, in which the number of men and women was very similar, showed that the differences found between the sexes were minimal and inconsistent. Méndez-Giménez (2008) explains that in the field of coeducation are reflected differences between genders in terms of level of skill, knowledge, previous practice and motivation toward their learning, data that are smoothed in units of alternative sports, in comparison with the units of traditional sports. The address these units of traditional sports

with innovative material, may make possible an experience less discriminatory with respect to the use of space, time and the involvement during the tasks proposed.

In the study of Méndez-Giménez et al. (2010), in relation to the different perceptions observed in function of sex in the construction materials, girls only valued significantly higher than boys the fact to build their materials for the subject. The authors pointed out the possibility that females were more identified with the aesthetic issues of building materials and, therefore, assessed this aspect in greater esteem.

Value based on experience or not with self-made material

On the basis of the scores obtained, it can be pointed that the students who have built material in their classes know what this concept means, and also know several games to play with it, in comparison to those which had not used it. At the same time, the first group understands that through its proper use they are recycling, and might be helping to the conservation of the environment. In some way, this approach is generating some degree of awareness "through the use of common and useless materials whose destination is usually rubbish, these can be recycled and used conveniently for physical-sport building" (Méndez-Giménez, 2008).

Therefore, there is a variety of educational arguments that support the use of these materials on the subject of Physical Education. In relation with the transversality of the curriculum and with emphasis on the educational values that we can address from this proposal, Fraile (2001) has found that from the own production of alternative materials and exchange of implements and mobiles between students we can encourage respect for the natural environment nearby, increasing the control of waste and promoting the reuse or recycling. Once used this material, teachers should teach students to deposit it in the container that is appropriate for the cycle to continue. In line with the arguments stated above, it can be said that students recognize that with the materials built they work on values such as the protection of the environment.

After studying the experience they have with this material, students indicate that they would be willing to build them outside of the Physical Education classes, in their recesses or extracurricular activities. Méndez-Giménez (2008) suggested that this perspective allows you to increase the time of active participation and enables the extension of the practice in the extracurricular period, as each one has their own material. This increases the time of relationship between the subject and the object, is directly related to the level of motivation, because the lack of means generates inactivity, boredom and discipline problems. In another of the studies of Méndez-Giménez et al. (2010), it was reported that the students of 6th degree of Primary Education not only found the willingness to use the material in the playgrounds, but also took it to practice and the number of spontaneous activities using it was very high, observing very original games that had not been taught in class by the teacher.

In line with the effort that students invest in the construction, we can see that those who have experienced with it know that the construction is not difficult. Since this material can be adapted to the students and to the level of development of this, both in difficulty, size, shape, weight, including children with disabilities. As regards the level of entertainment, all students find it fun to play with this material, some because they already know what it feels like and others because the innovative material creates in the students very positive expectations in use. In both groups these resources give rise to a great deal of interest.

In conclusion, we have been able to prove that the students who have more contact with self-made material have a more positive valuation of it. In different ways, they would like to work with it more often and have more fun. This has a lot to do with the predisposition and influence of teachers. According to investigations by Deci, Eghrari, Patrick & Leone (1994), they indicate that when teachers provide their students with significant reasons for engaging in the tasks proposed, its intrinsic motivation toward them increases, with the consequent benefits derived from them. Therefore, the self-made materials can be useful in achieving this important educational objective.

Assessment of the environmental values that develop these materials

As regards the values that are promoted with the construction and use of the self-made materials in Physical Education, scores opt for the students that show experience with this material. This study is consistent with the work done by Méndez-Giménez & Fernández-Río (2013), noting that the highest scores of the students were related to the importance of alternative material in the development of attitudinal aspects, as coeducation, respect for the material, development of creativity and promoting environmental education. Within the last aspect, it is stressed the respect for the environment and the increase of the awareness of recycling and waste-collecting. They also underline the usefulness that this material can offer in the non-formal time, offering numerous positive impacts in the fields of leisure and health.

It should be noted that this study is limited in terms of the sample selected and that therefore there can be no conclusive results applicable to all students of Physical Education in Principado of Asturias. Therefore, the data obtained are indicative and in order to ratify these results, it would be necessary to carry out a more detailed work.

Conclusions

The impellers of the use of self-made material in Physical Education highlight the educational potential that offers the compromise of students in the process of collection, fabrication and use of their own materials. To do this, some authors such as Gil Madrona & Garralón del Busto (2011), emphasize several advantages about it, as the increase in the time of participation, the adaptation of the material to the development of the pupil, the economic savings or the development of creativity and interdisciplinarity. But, at the same time, they also indicate some disadvantages that must be overcome, as extra safety during the process of construction and use, the request for additional time to build the materials or the need for large spaces in the educational center for storing the resources generated.

To summarize the above, we can point out that the students who have experience with self-made material know games with it, and know what it consists of. They would be willing to build it and use it outside the classroom, and they recognize that the effort involved in its manufacture is little. They also testify the fact that through the construction of this material we can recycle and help to take care of the environment, which is something very positive, as opposed to those who have not experienced with it. Therefore, this type of material provides a

series of benefits that must be taken very much into account, and even more considering the present situation, where budgets into the Departments of Physical Education are minimal. Therefore, the audacity and inventiveness of the teachers are extremely important to avoid the shortages of material that may happen.

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