

THE USE OF ALTERNATIVE MATERIALS IN PHYSICAL EDUCATION CLASSES: A CASE STUDY

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Abstract

The lack of material resources is a big problem to physical education teacher's of public education. The goal of this study was to understand how the use of material resources is organized in the pedagogical practices of physical education and to identify the material resources used by the teachers. In this case study we interviewed and observed the classes of 03 teachers from the same school. The 3 teachers use the construction of alternative materials to solve the problem of shortage of material resources, results that reflect a unusual reality, suggesting changes in the teacher intervention.

Palabras clave: School Physical Education - Alternative Material Resources - Educational Planning

Introduction

The activity of planning is present in everybody's life. The day is programmed, the schedules is set, a trip is planned, the purchase of a property, the professional career. In these planning practices, we seek to achieve our goals. In several activities, it is essential that planning is systematic to become more efficient. Thus, we complement the imagination and mental plans, putting on paper everything you want to do.

When we turn to the school environment, the need to plan becomes more apparent, as the educational work involves the development of a "project." To Machado (1997), developing a project defines all the ways that the school intends to go to achieve its goal. When designing, some solutions to possible future problems are also proposed, i.e. there is an anticipation of events. In this perspective,

the word "project" means something thrown forward, meaning both what you want to accomplish and what will be done to achieve that goal.

When we refer to education, word associated with the act of driving a socially prefigured purpose, we assume the existence of collective projects. Silva (2000) emphasizes that these projects are determined by searching the whole, the overcoming of personal expectations towards the collective, creating a mutual responsibility between the participants. It is with the aid of the project that one builds the plans specific to each component of the school curriculum.

The educational planning involves a process of reflection and decision, consisting of several steps to allow greater control and organization of events. It can become more effective when developed in conjunction with other teachers, because it avoids repetition or absence of certain themes. Moreover, as noted by Vasconcellos (1995), the involvement of students will make the process of teaching and learning more meaningful.

The definition of space and materials to be used in every class, everyday task of all teachers, regardless of their area of expertise, is one of the planning stages. In Physical Education, material resources should be considered outstanding on the specific situation. Classes normally held in open courts and patios and are subject to variations in weather. This inconsistency, sometimes used to justify the cancellation of classes and activities, only highlights the importance of an even more elaborate planning, because, in it, it will be provided activities and alternative spaces, where there is the impossibility of using conventional means such as a court.

In examining books and pedagogical propositions in the area, one can see the emphasis on material resources. Freire (1997), for example, describes activities in which the use of balls, bows, sticks, ropes and even material made from bottles and cups are necessary to provide the student exchange with the environment and assign new meanings to the toy. It is important that these materials are varied as to weight, type, color and size, requiring from the student constant adjustments and knowledge previously acquired. Batista (2003) also exemplifies the description of some activities, the use of various materials to work on balance, ball skills and group activities. Venancio and Carreiro (2005) describe activities such as gymnastics and wrestling, in which the use of materials is essential. Thus, we can

say that the teacher will be able to do a better job, if the school in which they work offers spaces and adequate material resources.

In the Brazilian social reality, there is a large amount of schools, mainly public, which do not have adequate space or sufficient quantity of material. According to Soler (2003), the space for Physical Education classes often comes down to the courtyards and classrooms. This poor distribution of space happens right in the construction of a school, when it is not among the priorities the allocation of space for the Physical Education classes (BATISTA, 2003). These observations can be supplemented with data provided by the National Institute of Studies and Research (INEP), which indicated that in 2006, out of 159,016 (public and private) elementary schools in Brazil, only 44,763 had a sports field (BRAZIL, 2006), which represented 28% of the total, approximately. Compared to the indicators of 1999, presented by Matos (2005), there was an increase in the number of schools that have courts. However, the growth is still insufficient.

Given this situation, many professionals argue that without material resources, there are no conditions for the preparation and implementation of appropriate classes (Soler, 2003) and often exclude certain activities from their education program (Freire, 1997). For these reasons, upon starting the internship in public school education in the city of Sao Paulo, it was expected to be found an environment in which the lack of material resources was striking. It was also believed that this situation could be used by teachers to justify the preparation of less diversified lessons, the neglect of certain content or even lack of student participation in the proposed activities.

However, the observed reality caused great surprise: there was one teacher who, due to the lack of materials, looked for strategies to overcome the difficulties by using alternative resources. The teacher confirmed the statements of Benedict (1998), for whom the lack of physical infrastructure and equipment cannot justify the uncompromising teaching job because, even in relatively simple conditions, one can teach good Physical Education classes. Would the teacher's behavior be an exception?

By establishing contact with two other Physical Education teachers from the school, the original question was answered: they also made use of alternative materials in the classroom. However,

other questions arose. Where does the behavior of these teachers come from? What materials did they use? How were the materials built? Is the use of different resources the result of a collective planning or part of individual initiatives?

Based on all these questions, this study aimed to:

- 1 - Understand how to organize the use of material resources in the teaching practice of Physical Education in the school presented, and
- 2 - Identify the material resources used by teachers during lessons.

Methods

This research followed a descriptive qualitative approach. The model used was a case study in order to obtain as much information and allow a wide and detailed knowledge of evidence of the practice of physical education teacher in the face of possible difficulties is the scarcity of material resources. Although this type of study does not allow generalization of the data (Gil, 1999), we consider it appropriate for the research design, because the analysis of that reality could bring specific data relevant to the work of other professionals.

A non-probabilistic and intentional sample was restricted to three teachers at a state school in Elementary School I, located in the neighborhood of Perus, São Paulo, where there is middle class population in some regions and lower middle class in others. For data collection, we used semi-structured interviews, supported by script with previously developed issues and systematic and non-participant observation, in which the record of the events happened in an informal and spontaneous way, with the researcher as a viewer (Lakatos, MARCONI, 1999).

Before starting the data collection, an information letter and a consent form were given to the school principal and to the subjects, so that they acknowledged the objectives and procedures of the study. They not only agreed, but also helped promptly. In the interview and observation, mechanical devices were used, after consent of the surveyed teachers. During the interview, the use of a voice recorder was essential so that no information was lost, allowing a literal transcription. In the observation, a camera was used to record the material.

The interviews were conducted at the school. The three

participating teachers are fixed, being a female, hereby called P1 and two male, P2 and P3 respectively. P3 has worked at the selected school for nearly five years, the oldest among the three. P1 and P2 entered the same year and have worked in the school for nearly two years. All respondents were very receptive and attentive, putting themselves available to other questions that could have arisen after the interview.

Ever since the first contact, the interviewer followed the guidelines of Lakatos and Marconi (1999), maintaining a friendly conversation with the interviewee, creating a pleasant environment and allowing spontaneous and natural responses. The collected data were studied, compiled and submitted with the application of the technique of content analysis, described by Triviños (1987).

Results and discussion

The observations took place during 18 months, a total of 89 lessons observed, as shown in Table 1. In it, the classes are separated by teacher and by grade. It also appears that in some classes, no lesson was observed. This is because P1 does not respond to class for 4th grade, P2 for the 3rd grade and P3 for 1st grade. According to P1, the division of classes and series takes place according to preferences and availability of each teacher.

Table 1: Classes observed, separated by teacher and grade.

	<i>1st Grade</i>	<i>2nd Grade</i>	<i>3rd Grade</i>	<i>4th Grade</i>	<i>TOTAL</i>
<i>P1</i>	18	20	26	00	64
<i>P2</i>	03	03	00	05	11
<i>P3</i>	00	02	04	08	14
	21	25	30	13	89

During the observation, researchers recorded the materials used by teachers as well as the implementation strategy, emphasizing alternative materials. In Table 1, data were separated by teacher and grouped by grade, in accordance with the purpose of the activity. In this framework, alternative materials appear in bold.

	<i>Grade</i>	<i>Activity / Objective</i>	<i>Materials</i>
P1	1st	<i>Fantasy Dramatization Dance</i>	stereo / cd's / tapes
		<i>Handling Locomotion Balance</i>	handkerchief / little sand bag
		<i>Games</i>	balloon / checkers / rope / vest / little sand bags / sock ball / PET bottles / rubber ball / large EVA ball / sheet
		<i>Plays</i>	stereo / arc / little sand bag / sock ball / jackets / rubber ball / handkerchief / PET bottle / string / back-and-forth / balloon / bundap bag /
	2nd	<i>Fantasy Dramatization Dance</i>	stereo / cd's / tapes
		<i>Handling Locomotion Balance</i>	mat
		<i>Games</i>	vest / rubber ball / EVA Plate / little sand bag / sock ball / PET bottle / checkers
		<i>Plays</i>	marble ball / stilt / can stilt / tennis rackets, paddle, plastic and hanger / tennis balls and racquetball / rope / balloon
		<i>Sports</i>	basketball / vest / chair / cone
	3rd	<i>Fantasy Dramatization Dance</i>	stereo / cd's / tapes
		<i>Handling Locomotion Balance</i>	handkerchief
		<i>Games</i>	EVA plates / bottle pet / rubber ball / little sand bag / sock ball / vest / rope / domino / checkers
		<i>Jokes</i>	stilt / can stilt / rope / marble balls
		<i>Sports</i>	basketball / vest / chair / big EVA ball / sheet
	P2	1st	<i>Handling Locomotion Balance</i>
<i>Jokes</i>			tire / mat / rope
4th		<i>Handling Locomotion Balance</i>	<i>skateboard / bike</i>
		<i>Games</i>	Frisbee / racquetball racquet / tennis ball / cone / vest / football ball / (beach) volleyball ball / basketball ball
P3	2nd	<i>Jokes</i>	vest / basketball ball
	3rd	<i>Sports</i>	vest / (beach) volleyball ball / basketball ball
	4th	<i>Sports</i>	vest / cone / basketball ball / (beach) volley (beach) / football ball / arcs

Table 2: Materials used in classes according to the purpose of the activities

To sort what would be considered alternative material, two criteria were followed:

1 - Construction and adaptation of equipment from recycled or low financial cost materials to replace other (official) materials: P2 used tires to replace arcs or as obstacles to the achievement of certain activities. In addition, they employed materials built by them, such as mini springboards, little hurdles and the balance beam that were part of different circuits during classes. The mini goal was used in the game, in which children should hit the target, rolling tennis balls on the floor. P1 used PET bottles for the manufacture of a back-and-forth and to replace the pins in bowling

and shooting. Sock balls worked as "ammunition" in this last activity. The little sand bags helped in the strength work and coordination in activities like playing human tic tac toe and hopscotch. Sack racing with the burlap sack, group volleyball with a sheet and EVA ball and "Base 4" with EVA plates were also part of the activities of this teacher. For "tail seeking" and sensory activities ("I'm in your hands" = blindfolded), they used handkerchiefs or fabric strips and, in free lessons, some materials, which were already described, there were also stilt, can stilt and rackets made with (metal) clothes hanger and thin sock.

2 - Adaptation of other official and/or available materials at school: P1 used the chair as a "basket" in the basketball game, in which a student stood on a chair (located below the official basket - broken) and when they received the basketball ball, without dropping it, the team scored. Another adaptation was made by P3, which used the in (beach) volleyball ball in a handball match.

Of the 89 lessons observed, 35 were used alternative material; 40 used official material; and only 14 used no manipulation of any type of material. These 14 lessons were given by P1, in which they proposed singing plays and other activities using the student's own body to achieve the goal of the class, as proposed by Soler (2003).

We see more frequent use of alternative materials in the first grades of elementary school, perhaps because, in this period, there is greater attention to diversity of materials to aid the development of the child, as stated by Batista (2003), Freire (1997), Soler (2003) and Santos (2004). The authors stress the need to offer children in this age group the opportunity to handle different objects and transform the experience into symbols, and provide a more attractive lesson to students. It is also important to remember that the presence of alternative material presented above does not preclude the use of other official material, such as that of P2 used balls, rackets, frisbees, among others.

For more details on the use of alternative materials, interviews with three teachers were conducted. When the interview started, they were asked whether they believed that material resources at the school were sufficient and were in good condition. All of them responded negatively, confirming the statement by Soler (2003), for whom public schools rarely have space and equipment required for Physical Education classes. In addition to P2 emphasizing that "there is a lack of supplies, and materials we have, some are so... uhm ... damaged", P1 and P3 said that the purchase of materials for Physical

Education classes is not a priority for the school.

In the second question, interviewees should say if they use alternative materials in their classes. Again there was a unanimous response. All said they have used and continue to use alternative materials. P1 states that they purchase some materials and that, as they work at other schools, they exchange equipment. P3 also says: "There are many toys that we make to replace those that we do not have". However, these manufactured materials were not used during the observation of the lessons of that teacher.

All resources presented were made from cheap or recyclable (scrap) materials, confirming statements by Freire (1997), Soler (2003), Santos (2004), Batista (2003) and Venancio and Carreiro (2005). While P1 and P3 cite only the materials, P2 explained how the construction and the purpose of its use happened. Moreover, they showed all the materials they cite, as access to them was easier because the interview was conducted in the material room.

Teachers identified the research tools used to create the materials listed above. We can see that the exchange of ideas with other professionals and the use of their own creativity to create materials that meet their content needs were mentioned by all teachers. Soler (2003) emphasizes that creativity is important for the construction of materials to each lesson, because the variety makes the child's learning more enjoyable. Unanimity also gives update on courses and seminars, as P1 take technical guidance courses, P2 attended seminars on public university and P3 is part of a study group on the board of education, as noted earlier. This shows the importance of continuing education in the teacher intervention (FILGUEIRAS, 2007).

It is interesting to note that television has some influence on teachers to create classroom strategies and alternative materials. P1 says he was inspired by TV shows to create games such as the so-called "intellectual football", an alternative for rainy days, and a set of questions and answers. P3, however, is inspired by TV shows on the educational channel.

The three teachers claim that they were not given assistance to manufacture the materials used. But gradually appear in their speech, information that contradicts part of this response. For example, P1 states they get aid from some school teachers, since they allowed the use of materials no longer needed, especially the arts teacher, as it is

evident in the sentence: "[...] then you make a prospecting somewhere and you think that they are not using it, then you get it".

The involvement of students in the manufacture of materials is reported by P2, as the participation came down to making an adapted tape. The other materials, they explain that they themselves made them, because as they use a "hammer, saw, nail [...]", they are afraid that the students will get hurt. In turn, P3 states that in 2006, students helped in the preparation of can stilts, rackets and Bilbo catchers with materials that they brought themselves. And the perception that the teacher had with this practice was that: "[...] When they make it, they care more about it, when you bring it, most of them don't, because it is not theirs".

Thus, this teacher confirms what Freire (1997), Venancio and Carreiro (2005) had already stated on the importance of student participation in both planning and manufacturing activity materials. But besides encouraging the manufacture of this outstanding value for P3, the involvement of students in the production of materials to be used in class can also be a strategy for discussing other issues such as environmental changes and the need for recycling of waste produced.

Considering further that Physical Education should aim to prepare students for the use of unattended motor potential (Freire, Mariz de Oliveira, 2004), manufacturing material in class is a feature so that they understand the need to adapt environment to achieve the motor task appropriate to their characteristics and that, in their education path, are able to create replacement equipment, respecting their abilities and potentials.

Teachers were asked if the culture of manufacturing materials was initiated by them or whether they already existed before entering school. Based on years of acceptance of teachers, one realizes that there is some discrepancy in the responses, since the teachers who started in 2006 (three years after P3), gave a mixed response. While P3 states that they built a culture in school, P2 said: "We didn't even have tires here."

The uncertainty regarding the use of alternative materials by other teachers may refer to the hypothesis that the most reliable is that of P1, emphasizing the idea that P3, when joining together with teachers at the time, created a culture of manufacturing materials which exists today. In any case, the uncertainty is evidence that they do not know

well the work done by colleagues.

They also claim that they started the manufacture of materials before entering the researched school. As a result, the hypothesis that the culture of manufacturing materials has been transmitted from one teacher to another within the school because they have brought the practice with them was cancelled. However, it is possible that the interaction between them has some influence, because they all say they are also based on experiences of other teachers to prepare their materials, as shown above.

Teachers were asked what motivated the construction of the first alternative material. The lack of available material was cited by all respondents. P3 adds other reasons, such as the poor condition of the materials and the large number of students. P1 explains that the problem is not always the lack of material. They exemplify when stating they have worked in private school that had good amount of equipment, but that many were not suited to the characteristics of students in early grades of elementary school. P2 also highlights the need to give students diverse stimuli.

It is apparent then that for these teachers, the origin of the practice of manufacturing alternative materials was the need to find tools to do their job. However, this need arises to many Physical Education teachers, also facing a lack of material resources appropriate to their classes, but they did not adopt the postures in the subjects of this research.

Thus, this may not be the only reason to explain the results observed in the study. It is believed that the main motivation of interviewed teachers is the commitment to their work and continued education. The commitment to the achievement of quality work can be perceived in the speech of P2, shown below:

The positive point was to see children develop an ability to balance, in a way that they were not used to do. One thing is to draw a line on the floor and ask them to walk on it, and another thing is doing it on a crossbar, from a distance of the ground. So at this point, you could to see the evolution, the children were able to develop a little more this ability.

The commitment to continuing education, however, is perceived when we see that, as shown above, the three participate in study

groups and appreciate the search for new knowledge. Some skills that characterize successful teacher are then identified, presented by Galvão (2002).

When asked about the inclusion of material resources in the teaching planning, teachers emphasize that there is a general plan, which are defined themes and common events. However, the prediction of materials to be manufactured or used in planning does not appear, not even in lesson plans of each teacher. It is perceived that the preparation of lessons and the use of material resources are barely influenced by the group, starting with individual initiatives. It seems that the plan drawn up earlier this year only serves to fulfill a bureaucratic step, confirming statements by Vasconcellos (1995).

For P1, the lack of material may impede the treatment of certain ideas during classes. They say they stopped addressing certain issues and had to improvise in different phases that cannot use a more suitable space. P2 and P3, on the other hand, believe it is possible to address all issues. However, P2 points out that in some situations, it is necessary to reorganize the planning and cites an example: "Last year, I had to work with rhythm, dance and the school has little sound system available, and as I don't have one home, I had to wait for the teacher to finish".

Concluding the interview, it appears that teachers need to recognize the variability of materials for the age group who they are working with and, although they do not believe they can count on financial resources nor on the proper appreciation of their work by the managers of the school, manufacturing materials do not bother them. We understand that this manufacture facilitates their work and also assists in developing the potential of the child. They also realize that this practice, in order to make up for the shortage of materials, should not be prolonged because the government should provide funds for the purchase of materials and the school must also distribute the existing resources.

Conclusion

This case study was conducted with the objective to understand how to organize the use of material resources in the teaching practice of Physical Education and identify the material resources used by teachers in their classrooms. We noticed that teachers create and use

alternative materials as a strategy to solve, even momentarily, the problem of scarcity of material resources. Alternative materials have emerged from ideas presented in courses, seminars and study groups on the subject, TV programs and exchange of experiences with other teachers. The teachers rarely engage students in the manufacture of this material.

The use of alternative materials was justified by the absence, lack of diversity or reduced amount of materials for Physical Education classes, highlighting the concern of teachers to ensure a class with several stimuli. However, the materials they will use during the year do not appear in the overall planning, which is made jointly by the teachers, nor in the development of individual classes, giving evidence that this planning is done in a bureaucratic way.

As this practice is not supported by a collective project, but by individual initiatives, the possibility that manufacturing materials is a current trend among teachers is raised. Another hypothesis is that, in the surveyed grades, the need for more varied stimuli encourages teachers to use alternative materials. Thus, it is expected that further studies are conducted so that these hypotheses are accepted or denied.

The investigated case presents some interesting results, as they differ from the reality usually expected for Physical Education, in which many teachers, when facing the lack of material resources, are no longer limited by location and delete certain topics from their speech. This reality is portrayed in the work of Soler (2003) and Freire (1997). Examples such as those presented here are relevant, showing that changes have occurred in the area. Much remains to be processed, and the analysis of individual situations and reports of successful experiences can contribute to the dissemination of new teaching practices.

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