# 126 - THE SYSTEMATIZATION OF CLASSES ABOUT BIOMECHANICAL CONTENTS IN THE CONTEXT OF THE SCHOLASTIC PHYSICAL EDUCATION

LORRAINE PATRÍCIA J. SAVANO; JOSÉ ERNANDES FEITOZA;
AMAURI APARECIDO BÁSSOLI DE OLIVEIRA; PEDRO PAULO DEPRÁ[4]
ppdepra@uem.br / aaboliveira@uem.br
State University of Maringá - UEM / Department of Physical Education
Study Group in Scholastic Physical Education CNPq/UEM

## INTRODUCTION

This work presents the report of an example of organization of the content 'speed' (concept, classification, variations, intensity) of the curricular component Physical Education for the third year of the Fundamental Education of the School of Pedagogic Application (*Colégio de Aplicação Pedagógica* - CAP) - Maringá-PR.

The theme 'speed' is part of the programmatic contents proposal presented in the project of Structuralization and Implementation of Scholastic Physical Education Systematization (OLIVEIRA, 2003). These contents are organized starting from thematic nuclei and applied in the several years of the Fundamental and Medium Education.

In the nucleus, the Movement in Construction and Structuralization, the aim is to organize situations of corporal experiences and studies that make possible the understanding in being a body in movement and in constant interactions with objects and people.

The organization of the content 'speed' in three classes' plans is based on the historical-critic methodology (GASPARIN, 2003) starting from a biomechanical dimension and programmed for a length of 6 hours (2 hours each class). The plans structuralization, based on the mentioned pedagogic proposal, consists of the content Initial Social Practice, the Problematization, the Instrumentalization, the Catharsis and the Final Social Practice.

With the three classes it was aimed to study the content 'speed' in the form of corporal experiences, in order to allow an autonomy (understanding, control, modification) of movements in daily situations. For that, it was selected the items referring to: a) the displacement forms, b) the notions of time and c) the relations space-time during the human body movement.

In the content Initial Social Practice it was emphasized the announcement and the recall of the content daily experience, starting from the students' experiences and doubts and, from them, a series of questions concerning the content with problematization was organized.

Starting from the execution of the Initial Social Practice and of the Problematizations, the classes were structured with activities that promoted the corporal experience of the contents. The classes were then concluded with a rethink about the content and the practice (catharsis) and, from an association with the daily activities, the reflection on the reflection in the action (ALARCÃO, 2003).

## THE CLASSES SYSTEMATIZATION

### FIRST CLASS

PART 1 - CONTENT INITIAL SOCIAL PRACTICE

1) ANNOUNCING THE CONTENTS AND OBJECTIVES

SPECIFIC OBJECTIVE:

•To work the perception space-time, emphasizing the displacement of the body, through corporal experiences.

2) CONTENTS DAILY EXPERIENCE

•Do you know what speed is?
•How can we know if a person is faster than another?
•Is there a possibility to measure that?
•Is the speed related to the body displacement?
•Can we increase the speed if we can choose the fastest way?
•Is the speed related to time?
•In Physical Education, do you know any activity that depends on the speed?
•Do you use the speed in games?
•When a person walks or runs, how can he/she alter his/her speed?

PART 2 - PROBLEMATIZATION

1) QUESTIONS CONCERNING THE SOCIAL PRACTICE AND THE CONTENT

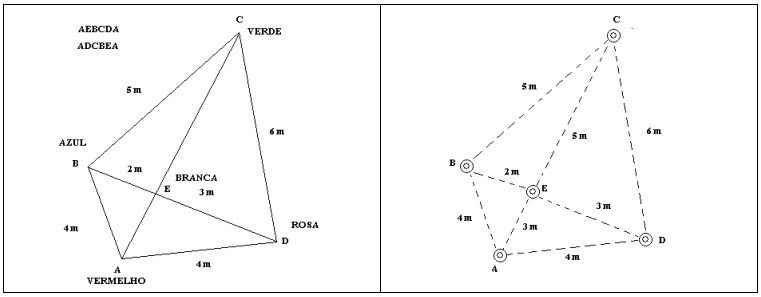
| CONTENT TOPICS | DIMENSIONS | PROBLEMATIZATION QUESTIONS |
|---|---|---|
| Displacement<br><br>a. Direction<br>b. Way | Biomechanics | Can we increase the speed if we can choose the fastest way? (Through a drawing lead the student to notice the different displacement possibilities - direction and way)<br>In how many ways we can move and which is the most efficient? |

PART 3 - INSTRUMENTALIZATION

1) PROCESS OF CONSTRUCTION OF THE DISPLACEMENT CONCEPT

| OBJECTIVE: To work the perception space -time, emphasizing the body displacement, through corporal experiences. | | | |
|---|---|---|---|
| CONTENTS | DIMENSIONS | ACTIONS | RESOURCES |
| Displacement concept<br>Displacement forms, different directions, ways and combinations | Biomechanics | Teacher's oral exhibition and questions<br>Route Strategy<br>Avenue and Street (2 people)<br>Avenue and Street (4 people) | Cardboard<br>Court<br>Cones<br>Colored cards for the stations<br>Cards with Letters for identification |

2) CORPORAL EXPERIENCES
**Name of the activity:** Route Strategy
**Activity objective:** To work the spatial organization. The students will try to choose the shortest route.
**Development place:** Sports court.
**Initial formation:** A circuit is set up in the court, with stations previously numbered. The distance between the stations is previously informed. The activity is accomplished in couples. In each station there will be a cone with a color previously stipulated. The colors will be identified by a card.
**Development:** Each couple receives a card containing the drawing of the circuit (Picture 1). After that, they discuss the route and draw it on a paper. Then they will go to the circuit, where they will identify the colors corresponding to each chosen station. In order to motivate the students, the teacher may associate the activity to a story. For instance, the discovery of the smallest route takes the students to a treasure.
**The end of the activity:** At the end of the class the teacher presents to the group the treasure route in colors sequence and compares it to the course drawn by each couple of students.




**Picture 1 - Route Strategy**
**Name of the activity:** Avenue and Street
**Activity objective:** To work the spatial organization.
**Development place:** Sports court.
**Initial formation:** The teacher positions the students in columns, in a way that all the columns have the same number of people. Each child should maintain a minimal distance of the other (the size of an arm).
**Development:** The activity is put into practice.
**The end of the activity:** The activity is finished when the fugitive is captured, on this way we propose the substitution of these components for two others.
**Variations:** Aiming to increase the difficulty degree and a larger participation, we can apply the activity with 2 catchers and 2 fugitives, in other words, with four students' participation.

PART 4 - CATHARSIS
1) MENTAL AND PRACTICAL ELABORATION OF THE NEW SYNTHESIS
•Discussion about the results of the exercise and game.
•Is there a strategy to reach the opponent?
•If the student has pre-established points of starting and of arrival in the activity, the displacement in straight line is the shortest route and, therefore, it contributes to the increase of the speed.
•At the game the student can reach the opponent if he/she can choose the shortest distance.

PART 5 - FINAL SOCIAL PRACTICE
Ask the students to review their route and to compare it to the teacher's. Request them to discuss with their parents where the content “displacement” appears in the quotidian reality. Which is the influence of the choice of the best route in the daily activities?

**SECOND CLASS**

PART 1 - CONTENT INITIAL SOCIAL PRACTICE
The catharsis of the first class should serve as initial social practice for the second class.

1) ANNOUNCING THE CONTENTS AND OBJECTIVES
SPECIFIC OBJECTIVE:
•To work the perception space-time, emphasizing the time, through corporal experiences.

2) CONTENTS DAILY EXPERIENCE
•In the previous class game there were several possible routes, but to facilitate the fugitive's capture we had to choose the smallest one.
•If, differently of the situation presented in the game (Avenue and Street), we had just one route to go through - for example, a straight line with exit and arrival points. How could we arrive first than our companion? Give the answer in your notebook.
•After the questioning, the teacher presents a video about athletics races.

PART 2 - PROBLEMATIZATION
1) QUESTIONS CONCERNING THE SOCIAL PRACTICE AND THE CONTENT

| CONTENT TOPICS | DIMENSIONS | PROBLEMATIZATION QUESTIONS |
|---|---|---|
| Notions of time | Biomechanics | Do you know how Brazil classifies its racers to go to the Olympic Games?<br>Do you know how to check the hours in a clock? Do you know how many seconds one minute has and how many hundredths one second has?<br>How is the time measured? Do you know what a chronometer is?<br>If, differently of the situation presented in the game (Avenue and Street), we had just one route to go through - for example, a straight line with exit and arrival points. How could we arrive first than our partner? Give the answer in your notebook. |

PART 3 - INSTRUMENTALIZATION
1) PROCESS OF CONSTRUCTION OF THE DISPLACEMENT CONCEPT

| OBJECTIVE: To work the perception space-time, emphasizing the time, through corporal experiences. | | | |
|---|---|---|---|
| CONTENTS | DIMENSIONS | ACTIONS | RESOURCES |
| Notions of time during the movement of the human body | Biomechanics | Teacher's oral exhibition and questions<br>Video<br>Race with a pre-defined space (without initial measure). The race is individual and the times have to be logged for subsequent analysis with the group<br>The analysis is made through a table | Video cassette player<br>Television<br>Cones<br>Chronometers<br>Paper<br>Marker pen<br>Measuring tape |

2) CORPORAL EXPERIENCES
**Name of the activity:** Race with a pre-defined space
**Activity objective:** To work the perception space-time, emphasizing the time.
**Development place:** Sports court.
**Initial formation:** The teacher defines, by positioning two cones, a space for the race.
Observation: The pre-defined space is not measured by the teacher in the beginning of the class, but in the end of the activity.
**Development:** In couples, the students will receive a command to start and they will run through the pre-defined space as fast as possible. The teacher times them and informs the students their respective times. At the end of the activity, the teacher measures the space delimited by the cones.
**The end of the activity:** Each student writes down his/her time and the course distance. The teacher, together with the students, will make a table with the values of velocity calculated by the students.

PART 4 - CATHARSIS
1) MENTAL AND PRACTICAL ELABORATION OF THE NEW SYNTHESIS
•If our game were a competition, who of our group would win?
•The time that the contestants had in the game is related with the course that we defined in the beginning. If the course was altered, the time would probably be different?
•So there is a value that makes possible to say how fast a person is. This value is the velocity. We just have to divide the space by the time. Could you bring this division for the next class so that we can complete our table?

PART 5 - FINAL SOCIAL PRACTICE
In which forms and where can we find, in our daily life, these contents that we are working?

**THIRD CLASS**
PART 1 CONTENT INITIAL SOCIAL PRACTICE
1) ANNOUNCING THE CONTENTS AND OBJECTIVES
The teacher recalls the table bringing it up to date with the speed value calculated by the students.

SPECIFIC OBJECTIVE:
•To work the perception space-time, emphasizing the speed concept, through corporal experiences, in order to proportionate the space and action recognition and the motor function length, being able to point the suitable rhythm to the movement execution.

2) CONTENTS DAILY EXPERIENCE
•From the results the teacher can analyze, with the students, who the fastest one was and establish a classification.
•Who has achieved the highest value? Have you realized that the student who had the highest speed value was the one who spend the least time in the route?
•If you were to perform a new race, should you worry more about being faster than your partner?

PART 2 - PROBLEMATIZATION
1) QUESTIONS CONCERNING THE SOCIAL PRACTICE AND THE CONTENT

| CONTENT TOPICS | DIMENSIONS | PROBLEMATICAL QUESTIONS |
|---|---|---|
| Speed:<br>of your body with regard to a previously determined space<br>of your body with regard to another body in displacement | Biomechanics | How can the contents 'displacement' and 'time' help someone during a game?<br>How do the athletes manage to come first?<br>What do athletes need to change in their movement in order to the body get more speed? |

PART 3 - INSTRUMENTALIZATION
1) PROCESS OF CONSTRUCTION OF THE DISPLACEMENT CONCEPT

OBJECTIVE: To work the perception space-time, emphasizing the speed concept, through corporal experiences, in order to proportionate the space and action recognition and the motor function length, being able to point the suitable rhythm to the movement execution.

| OBJECTIVE: To work the perception space -time, emphasizing the speed concept, through corporal experiences, in order to proportionate the space and action recognition and the motor function length, being able to point the suitable rhythm to the movement execution. | | | |
|---|---|---|---|
| CONTENTS | DIMENSIONS | ACTIONS | RESOURCES |
| Speed:<br>with regard to space<br>with regard to another body | Biomechanics | To finish previous class table with the individual speed values<br>To analyze the table<br>Game: "The shadow"<br>Game: "Diagonal messenger" | Cones<br>Ball |

2) CORPORAL EXPERIENCES

**Name of the activity:** The shadow

**Activity objective:** To work the body speed variations and route changes.

**Development place:** Sports court.

**Initial formation:** The teacher divides the students in pairs for all the court, that is, with no fixed form. One of the students of the pair will be "the shadow".

**Development:** The shadow's mission is to follow the other child wherever he/she goes and imitate all his/her actions. The teacher may orientate the activity by suggesting that children change direction and movements. The followed child will try to get free from the shadow by increasing and diminishing the speed, when changing directions. The time will be previously established and then the children change their positions.

**The end of the activity:** The end of the established time.

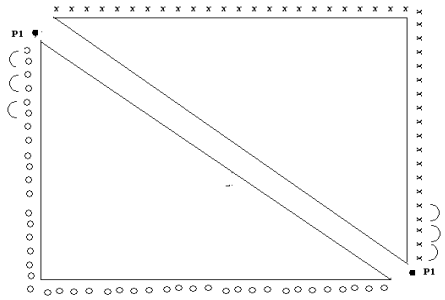
**Variations:** The activity may be developed with groups of three or four shadows following one child.

**Name of the activity:** Diagonal messenger

**Activity objective:** To work displacement with regard to time. During the activity, the speed is emphasized in three different motor functions: running, passing and throwing.

**Development place:** Sports court.

**Initial formation:** A big rectangle with one of its diagonals will be drawn. The students will be divided into two groups with the same number of participants who will be side by side on the lines of the rectangle. Each group will take half of the rectangle. Two positions will be marked with an 'X' and will be called 'p.1' and these will be the positions to receive the ball and the initial point of the race. The positions 'p.1' will be located on the extremes of the diagonal line.




**Picture 02 Graphic representation of the 'Diagonal messenger' activity**

**Development:** The ball starts with the number 1 players of each group (the ones in 'p.1' positions) who passes the ball to his/her respective partners on their right. On this way, the ball trajectory in anti clockwise. After number 1 player passes the ball to his/her partner on the right, he/she runs on the diagonal line reaching the opposite side and waits for the ball. So, the position 'p.1' will be empty and has to be occupied by the nearest student.

The ball will be passed from hand to hand until it reaches player number one who has to roll it to the student who had previously occupied position 'p.1', when the cycle will be finished.

This cycle should be performed by all the students of the group as soon as possible.

Observation: the ball will be passes in anti clockwise trajectory and the students will run on the opposite direction.

**The end of the activity:** The activity ends when the first player of the group goes back the position 'p.1'.

**Variations:** In order to diminish the difficulty level, the child on position 'p.1' may move on the diagonal line holding the ball and give it to his/her partner on the left. On this way, the participants and the ball will move on the same direction, clockwise.

PART 4 - CATHARSIS

1) MENTAL AND PRACTICAL ELABORATION OF THE NEW SYNTHESIS

•What is the conclusion we can come to with regard to the contents we have worked on the last three classes?

a. During the displacement you can increase the speed and reduce the time.

b. To run in the same speed as other person, you have to adapt your step length and your rhythm.

c. Among all possibilities in a game, to find the shortest way may be a good strategy to achieve success.

PART 5 - FINAL SOCIAL PRACTICE

To recall the themes related to daily life.

**METHOD APPLICATION ANALYSIS**

After developing the three planned classes, we can outline some important features of the historical-critical method when orientated on biomechanical dimension basis, that is, the ones concerning the classroom environment, the difficulties in performing the tasks, the acceptance and motivation before the new method, and the achievement of the proposed goals.

The classes were developed in three different atmospheres: the classroom (to the Initial Social Practice, Problematization and Final Social Practice phases), the sports court (to the Instrumentalization phase), and an optional ambience to the Catharsis phase.

During the Initial Social Practice (of the first class) the children proved rather unable to expose orally about their daily expectations. However, this difficulty was gradually overcome on the following classes, as the teacher, through a guided dialog, could make them remember facts which were linked to the content. Reflecting is an exercise that needs to be done.

In the Problematization phase many questions concerning the content which had not been immediately answered were recorded to be recalled in the Catharsis phase. This is not a common procedure and causes difficulties when adopted.

We may say that the children were more excited and curious in the Instrumentalization phase, when the practical activities were developed.

During the Catharsis we tried to diagnose (also through dialog) how the students got close to the problems solutions (questions) which were proposed in the Problematization and during the performance of the practical activities. At this moment, the oral exposition flowed easily, as they wanted to reach the answers in the practice recently experienced. This fact shows us that this is a valid way to make the student use the experimental knowledge to build a theoretical-scientific one, a strategic methodology defended by Hildebrandt-Stramann and Oliveira (2003).

To finish the classes, the children were asked to debate with their families about the relationship between the content and their daily life. In this phase, represented by the Final Social Practice, we tried to understand how they would act and what would be their point of view facing this new knowledge.

In the Final Social Practice, the answers presented to the several problematical questions appeared in a disconnected way if we compare to the oral answers. This fact is understandable as the students are at an early age (8 and 9 years old) and in writing and reading learning process.

Concerning the proposed specific objectives, we can say they were achieved successfully. With the games, the students underwent numerous ways of corporal experiences which made them have the perception of the relation between their bodies and time and space with rhythm variation (corporal perception), besides the perception that there is a theory that supports the experienced empiric observations.

**CONCLUSION**

The systematization of the Scholastic Physical Education contents based on a biomechanical dimension guided by historical-critical method may be a way to conduct the teaching and learning process.

In this process, the contents are not taught through concepts to be memorized. On this way, they are seen with critical thinking requiring active participation between the new content and the student's background.

We have as a goal that the students have conditions to assume a different posture (autonomous) concerning the physical activities practice, as they have changed their perspective before them. Then, they learn to analyze their movements, to perform them in a rational way and appropriated to their daily needs.

**REFERENCES**

ALARCÃO, Isabel. **Professores reflexivos em uma escola reflexiva.** São Paulo: Cortez, 2003.

GASPARIN, João Luiz. **Uma didática para a Pedagogia Histórico-Crítica.** Campinas SP: Editora Autores Associados, 2002.

HILDEBRANDT-STRAMANN, Reiner e OLIVEIRA, A. B. de. A necessidade de mudança metodológica no ensino da Educação Física. In: HILDEBRANT-STRAMANN, Reiner. **Textos pedagógicos sobre o ensino da Educação Física.** Ijuí RS: Unijuí, 2003.

OLIVEIRA, Amauri Ap. Bássoli de. Planejando a Educação Física Escolar. In: VIEIRA, José L. L. **Educação Física e Esportes:** estudos e proposições. Maringá: Eduem, 2004.

**THE SYSTEMATIZATION OF CLASSES ABOUT BIOMECHANICAL CONTENTS IN THE CONTEXT OF THE SCHOLASTIC PHYSICAL EDUCATION**

**Abstract:** This study presents a pedagogic sequence to the work with the theme 'speed' to the third grade of Fundamental Education , on biomechanical perspective. It is about an experience based on historical-critical pedagogic proposal and also on the systematization of the contents of the Physical Education curricular component. This experience has as main objective to verify the possibility of working this theme with this age group and observe which relations come from practical-reflexive experiences. The results have shown the students' difficulty in facing theoretical themes in Physical Education classes, fruit of a practical experience in this area. They have also shown that planned and structured actions may break paradigms and broadens the Physical Education pedagogical horizons on the educational section.

**Key words:** Scholastic Physical Education, Teaching Methodology, Physical Education.

**LA SYSTÉMATISATION DE CLASSES SUR LES CONTENUS BIOMÉCANIQUES DANS LE CONTEXTE DE L' ÉDUCATION PHISIQUE DANS L' ÉCOLE**

Resumé

Ce dossier présente une séquence pédagogique pour le travail avec le thème Vitesse pour la troisième de l' Enseignement Fondamentaire( neuvième de l' École Elementaire), dans la perspective de la biomécanique. Il s'agit d'une expérience basée sur la proposition pédagogique-historique-critique et aussi sur la proposition de la systématisation des contenus du composant du curruculum: Éducation Physique. Cette expérience a eu comme objectif central vérifier la possibilité de travailler ce thème avec cette âge scolaire en question et observer quelles réactions sont provenantes d' une façon de vivre pratique-réflexive. Les théoriciens ont démontré la difficulté que les élèves possèdent de faire la confrontation avec les thèmes téoriques dans les classes de l' Éducation Physique, fruit d'une façon de vivre historique éminantement pratique dans ce domaine ainsi comme a été évident que les actions projetées et estructurées peuvent rompre des modèles et indiquer pour l`Éducation Physique des nouveaux horizons pédagogiques dans le secteur de l' Éducation.

**Mots-clés**: Éducation Physique dans l' École, Méthodologie de l' Enseignement, Éducation Physique.

**LA SISTEMATIZACIÓN DE LAS CLASES ACERCA DE LOS CONTENIDOS BIOMECÁNICOS EN EL CONTEXTO DE LA EDUCACIÓN FISICA ESCOLAR**

**Resumen:**

Este relato presenta una secuencia pedagógica para el trabajo con el tema Velocidad para la tercera serie de la Enseñanza básica, en la perspectiva de la biomecánica. Se trata de una experiencia basada en propuesta pedagogica histórico crictica y también en la propuesta de sistematización de los contenidos de componente curricular de Educación Fisica. Esta experiencia tuvo como objetivo central evaluar la posibilidad de trabajarse este tema de acuerdo con la edad en la cuestión y observar cuales reacciones son provenientes de una vivencia práctico reflexivo. Los resultados demuestraron la dificultad que los alumnos poseen en confrontarse con los temas teóricos en las clases de Educación Fisica, fruto de una vivencia histórica eminentemente práctica en el área como también, dejó claro que la acciones planeadas y estructuradas pueden romper paradigmas y apuntar para la Educación Física nuevos horizontes pedagógicos en el sector educacional.

**Palabras clave**: Educación Física Escolar; Metodologia de la Enseñanza; Educación Física.

**A SISTEMATIZAÇÃO DE AULAS SOBRE CONTEÚDOS BIOMECÂNICOS NO CONTEXTO DA EDUCAÇÃO FÍSICA ESCOLAR**

**Resumo:**

Este relato apresenta uma seqüência pedagógica para o trabalho com o tema Velocidade para a terceira série do Ensino Fundamental, na perspectiva da biomecânica. Trata-se de uma experiência baseada na proposta pedagógica histórico-crítica e também na proposta de sistematização dos conteúdos do componente curricular Educação Física. Esta experiência teve como objetivo central verificar a possibilidade de se trabalhar este tema com a faixa etária em questão e observar quais reações são provenientes de uma vivência prático-reflexiva. Os resultados demonstraram a dificuldade que os alunos possuem em se confrontar com temas teóricos nas aulas de Educação Física, fruto de uma vivência histórica eminentemente prática na área, assim como também deixou evidente que ações planejadas e estruturadas podem romper paradigmas e apontar para a Educação Física novos horizontes pedagógicos no setor educacional.

**Palavras-chave**: Educação Física Escolar; Metodologia do Ensino; Educação Física.