110 - GAME IN SCHOOL PHYSICAL EDUCATION AS ALLY TO THE PRACTICE OF MENTAL ELEMENTARY MATHEMATICAL CALCULATIONS

ALESSANDRO JESUS CARMO;
JOSÉ PAULO DA COSTA NEVES;
CARLOS MAGNO MONTEIRO SILVA;
GLADIS NEVES BARÃO;
VERNON FURTADO DA SILVA
Universidade Castelo Branco, Rio de Janeiro, RJ, Brasil
professorajc@hotmail.com

INTRODUCTION

The focus of this research was based on the need to clarify some queries about the discussions and studies conducted by professionals who campaign in the school related to effective learning in this context. For this research three questions arise as to guiding this research: Why did the school do not have active participation in the process of teaching and learning in the current school model? Why in education is still not follow the practice prevailing world trend nowadays in the context of various scientific areas, with regard to further work on principles grounded interdisciplinary? You can practice the game and / or components contained in this playful influencing the cognitive response of other subjects teaching?

With regard to the contents developed by Physical Education as a school subject vast literature presents the game sports novelty as an excellent educational tool. Authors such as Taffarel (1985), Kunz (1994), Freire da Silva (2002), Bracht (2005), Beggiato (2007), among others, suggest such an action as the essence in the classroom apply to students.

The school context is based, above all, the development of intellectual aspects. Thus, due to favor activities informed decisions to this end, aiming at solving problems, thus facilitating effective learning. Theoretically, it seems simple, but this idea is presented only as a guiding theory, because in practice, the school routine, there has been little alternative actions that enable school success.

In the context of school physical education, by throwing hand education from bases driving can be seen, for example, that activities peculiar when placed in the context of the game, in all its forms, provides a range of actions cognitive, as a deduction, creativity, flexibility in thinking, memorization, conceptualization and evaluation. The student takes possession of knowledge through their own action.It is his action that will outline their perception of the world around him (Matt and NEIRA, 2006).

Thus, the idea that education should be directed to the active participation of school wins endorsements. On the contrary, exacerbated the submission of school, especially in teaching methods traditionally offers a gap inherent in the acquisition of new knowledge (Calleja 2007).

Among the subjects presented in the common core of elementary school, mathematics is presented as one that has, among students, the greatest difficulties.Some authors such as D'Ambrosio (1997), Rodrigues (2001), Starepravo (2005), Alves (2007), Kishimoto (2007) and Sadovsky (2007), report on the methodologies applied to the teaching of this subject, where state changes are necessary in its applicability with respect, especially the abstraction inherent in this. Also described methods of mixed used by teachers who will not meet the facilitation of understanding of the content.

Kishimoto (2007) suggests, specifically, the possibility of learning through play, taking advantage of the playful character that they present.

Set, therefore, an opportunity to start a job teaching in interdisciplinary basis, between the disciplines of Physical Education and Mathematics, since it appears that the game emerges as an educational tool that can facilitate the achievement of the objectives outlined for each of the disciplines and in the case of this study, in particular, outlined by both.

It is important to highlight that the game used in this research has, in addition to its core sports, a playful character. Thus, uni-disciplinary to the idea, the theory advocated by several authors, classic and contemporary, on the inclusion of playfulness in the process of teaching and learning, as Piaget (1979), Le Boulch (1987), Brougère (1998), Furtado (2007) among others.

In addition to its recreational component, one can still say that the game allows a group learning, where each member has the opportunity to share doubts and certainties, sorrows and satisfactions. One can imagine with this that the school will have more confidence to face the questions that arise during the game, be they of any kind.Without his knowledge, there are still other issues caused by the teacher, which are seen as situations that have the same resolve to continue the practice. In a natural and gradual problem situations arise that substanciarão, cognitively, this process.

From the above provide opportunities to investigate the issue of inclusion of mathematical calculations in games developed in the classes of Physical Education.Supporting this idea, when looking at the various content inherent in Physical Education shows that situations related to mathematical calculations are present on several occasions, especially in the proposed activities through games.It is interesting to note that in this way, the content taught in Physical Education trigger meaning not only for this discipline, but they serve a pedagogical tool in other disciplines, enabling the development of interdisciplinary interventions.

METHODOLOGY

To perform this study we used two aspects of qualitative method, participant observation and content analysis and quantitative analysis, with regard to tables and graphs of representative and comparative results.

The research was developed in a unit school official in the northern city of Rio de Janeiro.

The trial of the research consisted of two steps: The first, called Test1, and the second, named Test2. In the first step, we performed a test of basic mathematical calculations using addition and subtraction, applied in the traditional manner, by complaint, in the second stage, the students took the practice game, which also entered the calculations with the same degree of difficulty the Test1 and is also accused during practice.

The group of students was composed of 38 students, 21 were males and 17 females, mean age of 11.58 years. The choice of this group was based on the fact of averages in mathematics in this class are below the expectation from the school.

The method of argumentation, adopted in Test1 is to examine an individual, asking him verbally. The response should also be verbal.

Were asked to mathematics teachers from the school in question to selected 12 elementary mathematical calculations, and 06 plus and 06 minus. The calculations proposed by Professors were: group adding > 8 + 5, 14 + 9, 27 + 8, 32 +

5, 44 + 7, 57 + 6; group subtraction > 8-3, 19 - 5; 27-3, 31 - 6, 46 - 7; 58-9.

To answer the question applied to the oral arguments, the student could not use any resources that help in the preparation of statements, for example, rely on the assistance of the fingers, shaking his head, tap your foot, etc.

Each student had a maximum time of 05 seconds to answer each question. After this time, the responses were not considered, being marked as wrong. To perform timing researcher used a stopwatch to mark "Oregon," model "Slim" with 500 laps "SL928M" Progressive and Regressive, accurate composition.

Students were called at random and were questioned individually, seated in front of the math teacher, who was also sitting beside him with the researcher, who was responsible for timing the length of each question.

Participated in the second stage of the experiment (Test2), students who have not obtained a minimum of 60% correct responses in Test1.

For Test2 schoolchildren participated in 04 matches Korfebol game with modified rules, two per week. In each game each student answered 03 questions, amounting to the same 12 questions of Test1. The degree of difficulty of the questions was also the same as used in Test1.

The basic rules of Korfebol were maintained, but some of them have been adapted in order to create mathematical questions, originated from points obtained with the pitches. The items below clarify these changes:

a)The target was the same used for basketball matches (basket). However, as a strategy to generate questions related to mathematical calculations, was used to score 04 opportunities to score points. Each day of testing has changed the value assigned to each of the possibilities (Table 1);

TABLE 1: ITEMS OBTAINED

Result of throwing	Day 1 test	Day 2 test	Day 3 test	Day 4 test
Basket	05	07	08	09
Rin	05	06	07	08
Framework	04	05	06	07
Table	03	04	05	06

TABLE 2: ITEMS LOST

Type violation	Day1 test	Day2 test	Day3 test	Day4 test
Missing staff	06	07	08	09
Raid the opposite side	05	06	07	08

Dynamics of questioning and resolution of the calculation took place as follows: after performing a successful pitch (which originated points) researcher uttered aloud the name of any player of either team, the player ran toward the researcher, which organized the calculation so that the sum had to plot the total points before the pitch and the points obtained with the pitch.After being in front of the researcher and suffer the questioning, the student should make the response under the maximum period of 05 seconds. Just as in Test1, the responses made after this time were considered wrong. The same procedure occurred in relation to the abduction, when the existence of a violation to the rule, described above. In this case announced the total number of points the team and subtract the value on the offense.

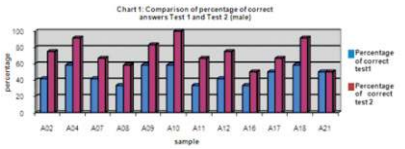
Adopted as standard the first pitch of each team would not generate calculations, since one of the parcels would be equal to zero. The maximum score for each game was 60 points, because then we would not have different calculations from those in Test1, who used a dozen "50" as one of the parcels in the calculation. Thus, remained the same degree of difficulty in both tests.

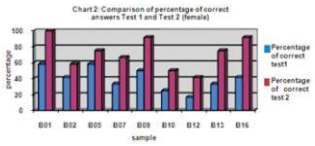
ANALYSIS AND DISCUSSION OF RESULTS

In a study that proposes to discuss the possibility to experiment with an education that can take hold of the game (and all its playfulness contained therein) as an ally in solving mathematical calculations mentally, it is important that the report traces the behavior of students when asked the tests.

On completion of Test1, it was observed that most of the students presented a physiognomic expression of tension. Some showed no tension, but also showed no pleasure, standing in a state of neutrality. Already in Test2, perhaps because they are imbued with an atmosphere of joy, provided by the making of the game, the questions were regarded by most students, with tranquility and relaxation. The emotional references present in the implementation of elementary mental mathematical calculations performed in this study may have influenced the final result, since it is understood that the factors related to pleasure and motivation are relevant to school activities.

When analyzing the results of Test1, it appears that most of the students had difficulties in performing basic mathematical calculations so mental.Of the 38 students accused, only 17 were able to obtain recovery of more than 60% of items, representing 44.7% of the total. Other 21 escolares or 55.2% of the total recovery did not reach less than 60% and hit 02 to 07 questions. Of these, 12 belong to the males and 09 females. Only 07 individuals had utilization above 80%, ie, agreed between 10 and 12 questions, representing 18.4% of the total.Among them only 01 had 100% success. Ten students took advantage of 60% and 75%, hitting 08 or 09 issues, representing 47.6% of the total.





To better elucidate the progress made after the completion of Test2, we show the tables below, where you can make comparisons between the tests. It is evident also on the calculation of the percentage progress of each individual, in this case represents the percentage difference obtained between the tests.

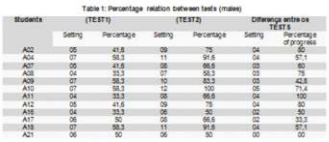


Table 1: Percentage relation between tests (males)

Students	(TEST1)		(TEST2)		Differenga entre os TESTS	
	Setting	Percentage	Setting	Percentage	Setting	Percentage of progresso
A02	05	41,6	09	75	04	80
A04	07	58,3	11	91,6	04	57,1
A07	05	41,6	08	66,6	03	60
A08	04	33,3	07	58,3	03	75
A09	07	58,3	10	83,3	03	42,8
A10	07	58,3	12	100	05	71,4
A11	04	33,3	08	66,6	04	100
A12	05	41,6	09	75	04	80
A15	04	33,3	06	50	02	50
A17	06	50	08	66,6	02	33,3
A18	07	58,3	11	91,6	04	57,1
A21	06	50	06	50	00	00

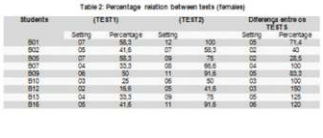


Table 2: Percentage relation between tests (females)

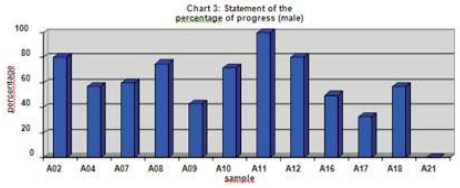
Students	(TEST1)		(TEST2)		Differenga entre os TESTS	
	Setting	Percentage	Setting	Percentage	Setting	Percentage
B01	07	58,3	12	100	05	71,4
B02	05	41,6	07	58,3	02	40
B05	07	58,3	09	75	02	28,6
B07	04	33,3	08	66,6	04	100
B09	06	50	11	91,6	05	83,3
B10	03	25	06	50	03	100
B12	02	16,6	05	41,6	03	150
B13	04	33,3	09	75	05	125
B16	05	41,6	11	91,6	06	120

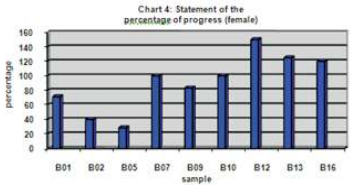
It is clear, after analyzing the data shown in the tables above, there was significant improvement in the number of hits of individuals belonging to the sample, comparing the two tests. For best results remain evident, one should pay special attention

to the percentage on the progress of each individual, because this way you can have a rather individual development of each student and emphasizes the changes that occurred between the experiments.

It is observed that the exception of the student A21, which has remained stagnant, all others had to progress when comparing the difference in yield between the tests.This means that 95.2% of individuals have benefited by way of applicability of mathematical questions, ie included in the context of the game Korfebol.Of the 20 individuals who have made progress, 04 of them reached levels below 50%, which represents 19% of the total. Already 07 students, representing 33.3% of the total sample, percentage of progress achieved between 50 and 75%.With percentage progress further, 06 students were between 80 and 100% growth, representing 28.5% of the total. To conclude the analysis of the percentage of progress of the present study, we found that 03 individuals, representing 14.2% of the total, showed a trend above 100%, reaching as high as 150% of progress.

Then you can analyze the results of the percentage of progress set up under the frame of graphics.





FINAL CONSIDERATIONS

When analyzing the results of this study, some questions become true with respect to pedagogy employed in teaching and learning in the school context. After all, the method used to question a student on an educational question affects the mental process of his answer? The game played in Physical Education from the perspective of playfulness, can really be an ally in the process of cognition?It is fair to say that an individual is not competent and / or skill in a particular subject without the possibility of using multiple methods of questioning?

In an attempt to contribute to the elucidation of such questions and mainly provide more questions, is that you arrive at the end of this study with the conviction that the professional task in the field school is hard work and requires constant research.

For the group of 21 people belonging to the sample of this experiment, the game used as the content of Physical Education was an ally in solving basic mathematical calculations mentally. It is believed that the inclusion of playfulness in time to perform basic mathematical calculations mentally it was very valuable, since 95.2% of students progressed after interventions in Test2.

An interesting fact that deserves attention is the difference between the mean percentage of progress between the genders. The males had a mean equivalent to 58.8%. Since the females received 90.9% of average in its percentage of progress. This study did not bother to investigate differences between genders, but it is believed that these data can be useful to other studies that seek to elucidate this phenomenon.

The feeling of pleasure that was designed in this study, derived from the playfulness of the game, takes an important condition to study its relationship with the achievement of success in the teaching and learning. How often judge the ability or inability of a school without being careful to impose judicious mechanisms trial? Thus, the scenario that presented itself proposes to deepen the studies related to pleasure in the school environment because the same way as an adult, children and adolescents need to dip the principle of hedonism.

It is the search for new knowledge that concludes this study in the hope that it can help to increase the doubts and uncertainties in the minds of dedicated professionals and restless, they live in a permanent state of deprivation, deprivation or emptiness, which the will always be a problem, causing them to have an insatiable desire to seek and glean answers and questions.

BIBLIOGRAPHIC REFERENCES

ALVES, E. M. S**. A ludicidade e o ensino de matemática.** Campinas: 4. ed. Papirus , 2007.

BEGGIATO, Claudson Lincoln. **Educação Física Escolar no ciclo II do ensino fundamental: aspectos valorizados pelos alunos.** Motriz, Rio Claro, v.13, n.2 (Supl.1), p.S29-S35, mai./ago. 2007.

BRACHT, V. et al. **Pesquisa em ação: Educação Física na escola.** São Paulo. Ijuí: Unijuí, 2005.

BROUGÉRE, Gilles. **Jogo e Educação**. Porto Alegre, Artes Médicas, 1998.

CALLEJA, J. M. R. **A participação ativa e efetiva do aluno no processo ensino-aprendizagem como condição fundamental para a construção do conhecimento.**

D´AMBROSIO, U. **Transdiciplinariedade**. São Paulo: Palas Athena, 1997. 174 p.

FREIRE DA SILVA, J.B. **O jogo entre o riso e o choro**. Campinas: Autores Associados, 2002.

FURTADO, V. Q. et al. **Tempo de brincar, hora de aprender.** Londrina: Humanidades, 2007.

KISHIMOTO, TIZUKO M. et al. **Jogo, Brinquedo, Brincadeira e a Educação**. São Paulo: Cortez, 2007.

PIAGET, Jean. **Aprendizagem e Conhecimento**. Rio de Janeiro: Freitas Bastos, 1979.

KUNZ, E**. Transformação didático-pedagógica do esporte.** São Paulo. Ijuí: Unijuí, 1994.

LE BOULCH, J. **Rumo a uma ciência do movimento humano.** Porto alegre: Artes Médicas, 1987.

MATTOS M.G; NEIRA M. G. **Educação Física na Adolescência Construindo o Conhecimento na Escola.** São Paulo: Phorte, 2006.

RODRIGUES, R. N. **Relação com o saber: um estudo sobre o sentido da Matemática em uma escola pública.** São Paulo: PUC, 2001.

SADOVSKY, P. **O Ensino de Matemática Hoje: Enfoques , Sentidos e Desafios.** São Paulo: Ática, 2007.

STAREPRAVO, A. R. **Jogos para ensinar e aprender matemática**. Curitiba: Coração Brasil, 2006. .

TAFFAREL, C. N. Z. **Criatividade nas aulas de educação física.** Rio de Janeiro: Ao livro técnico, 1985.

Alessandro Jesus Carmo
Rua Adelaide,169. Piabetá. Magé. Rio de Janeiro. CEP.: 25915-000.
Tel. Fax: (21) 3655-3891 / Celular: (21) 8899-3032
professorajc@hotmail.com

GAME IN SCHOOL PHYSICAL EDUCATION AS ALLY TO THE PRACTICE OF MENTAL ELEMENTARY MATHEMATICAL CALCULATIONS

ABSTRACT:

This study investigated the cognitive response to questions concerning the basic mental elementary math calculations, when placed in the context of the practice of a game adapted from the rules of Korfebol, developed as part of Physical Education. The individuals are students of both genders, aged between 11 and 15 years enrolled in 6th grade at a official learning institution. Two tests were used; Test1 had the objective of determining the level of competence of the answers given to questions about basic mathematical calculations, performed by the method of questioning. Soon after, the Test2 was applied, where the mathematical calculation were inserted in the practice of the game. We adopted the method of participant observation and content analysis together with quantitative analysis.The results show that 95.2% of individuals have benefited by way of questioning the applicability of mathematical questions from Test2. Thus, the findings suggest that ludic sport game context influenced positively the cognitive response to questions of the math calculations of the children who participated in the experiment.

KEYWORDS: Game. Physical Education. Mathematics.

LE JEU DANS L'ÉDUCATION PHYSIQUE SCOLAIRE COMME ALLIÉ DE LA PRATIQUE DE CALCULS MATHÉMATIQUES MENTAUX ÉLÉMENTAIRES

RÉSUMÉ:

Cette étude a fait une recherche sur la réaction cognitive en ce qui concerne les questionnements a propos de calculs mathématiques élémentaires quando ils sont placés dans le contexte scolaire , c'est-à-dire, lorsqu'ils sont insérés dans la pratique d'un jeu adapté aux régles d'Korfebol et developpé dans les classes de l'Education Physique. Il s'agit d'étudiants du sexe masculin et féminin, agés entre onze et quinze ans. Ils sont en train de suivre le le sixième année dans une école publique. On a employé deux instruments d'observation: le premier a vérifié la capacité de répondre oralement aux questions sur les calculs mathématiques élémentaires; Le duexième a mélangé les calculs et la pratique du jeu. On a adopté la méthode d'observation participant et l'analyse de contenu avec les analyses quantitatives. Les résultats obtenus montrent que 95,2% des individus ont été bénéficié par la deuxième façon d'observation . Les vérifications réalisées sugèrent que la pratique de calculs et le sport apportent une réponse cognitive trop positive parmi les étudiantes qui ont faire parti de cet experience .

MOTS-CLÉS: Le jeu. l'Education Physique scolaire. Mathématique

JUEGO EN LA ESCUELA DE EDUCACIÓN FÍSICA COMO ALIADO PARA LA PRÁCTICA DE CÁLCULO MENTAL MATEMÁTICAS ELEMENTALES

RESUMEN:

Este estudio investigó la respuesta cognitiva a las preguntas sobre el cálculo mental de base, al ubicarse en el contexto de la práctica de un juego adaptado a las normas de Korfebol, desarrollado en el marco de la Educación Física. Los temas son los estudiantes de ambos sexos, con edades entre 11 y 15 años matriculados en 6º de estudiantes de grado en un funcionario de construcción de la escuela. Se utilizó como herramienta Comprobador dos pruebas, y el Test1 el objetivo de determinar el nivel de competencia de las respuestas dadas a las preguntas sobre cálculos matemáticos básicos, realizada por el método de la argumentación. Poco después, se aplicó el Test2, donde las matemáticas se mezclaron a la práctica del juego. Fue adoptado el método de observación participante y análisis de contenido, junto con el análisis cuantitativo. Los resultados muestran que 95,2% de las personas se han beneficiado a través de la aplicabilidad del Test2 (Matemáticas). Así, las encuestas sugieren que el juego de los deportes, de contexto novedad influyó positivamente en la respuesta cognitiva a las preguntas sobre el cálculo mental de los niños de escuelas primarias pertenecientes a la muestra en este experimento.

PALABRAS CLAVE: Juego. La Educación Física. Matemáticas

O JOGO NA EDUCAÇÃO FÍSICA ESCOLAR COMO ALIADO À PRÁTICA DE CÁLCULOS MATEMÁTICOS MENTAIS ELEMENTARES

RESUMO:

O presente estudo investigou a reação cognitiva referente a questionamentos de cálculos matemáticos mentais elementares, quando inseridos no contexto da prática de um jogo adaptado a partir das regras do Korfebol, desenvolvido no âmbito da Educação Física escolar. Os sujeitos são escolares, de ambos os gêneros, com idade entre 11 e 15 anos, matriculados no 6º ano do Ensino Fundamental de uma unidade escolar oficial. Utilizou-se como instrumento verificador dois testes, tendo o Teste1 o objetivo de se verificar o nível de competência das respostas atribuídas aos questionamentos sobre cálculos matemáticos elementares, realizados através do método da arguição. Logo após, aplicou-se o Teste2, onde os cálculos matemáticos foram inseridos à prática do jogo. Foi adotado o método de observação participante e análise de conteúdo em conjunto com análises quantitativas. Os resultados alcançados mostram que 95,2% dos indivíduos foram beneficiados pela forma de aplicabilidade dos questionamentos matemáticos do Teste2. Desse modo, as verificações realizadas sugerem que o contexto do jogo lúdico-esportivo influenciou, positivamente, na resposta cognitiva referente aos questionamentos de cálculos matemáticos mentais elementares dos escolares pertencentes à amostra deste experimento.

PALAVRAS-CHAVE: Jogo. Educação Física. Matemática.

PUBLICAÇÃO NO FIEP BULLETIN ON-LINE: http://www.fiepbulletin.net/80/a1/110