

100 - THE PRACTICE OF FUTSAL AS A TOOL FOR TEACHING AND LEARNING MATHEMATICS CONTENT

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INTRODUCTION

According to Goldberg (1998, p.40), "educate is to transform; is to awake aptitudes and guide them to the best use in the society in which the learner lives", the teacher has a crucial role in student's life which in turn has this great responsibility of educating that goes beyond just passing content. The teacher must always focus on the development of the student and realize if it needs extra assistance, acting as a facilitator of learning. On the face of this, the research comes with the intention of putting a new method to teach, fleeing of traditional classes that often discourage students.

Education fights for the teachers of each course can make your student a being who can express their ideas and thoughts with their own mathematical reasoning and be able to understand what is proposed in an easy way, and not get stuck in formulas and calculations. However it is hard to understand this desire without using coherent methods that can contribute with this. According to Biaggi:

It is not possible to prepare students capable of solving problems teaching mathematical concepts disconnected from reality, or that may be meaningless to them, expecting them to know how to use them in the future (BIAGGI, 2000, p.4).

Thus, to relate theory to practice in the area which students enjoy can somehow facilitate to them see mathematics as a way to better comprehend. So, I investigated the importance of sport practice of futsal in a specific content and I noticed the importance of integrating other curricular component for improving teaching.

The experience gained as a student at the elementary school, high school and now as a graduate student, lead me to reflect on how education should has a successful use, leading students to have the interest for the mathematics contents which hitherto has been seen as a course isolated of the world. Mathematics, being a "difficult" course to be understood, has caused a large negative impact on students. They have been passive human beings in which do not feel the urge to expose and discuss their ideas in the classroom.

Thus, the application of mathematics in futsal, that is, combining the mathematical theory in the practice of futsal provides extracurricular activities in which the teacher and students work together, and thereby conducting the teaching learning. The activities developed by the integration of the two curriculum components are the basis for introducing or even deepening the contents worked in classroom. It stands out as the main content that can be worked in this application is the theorem of Pythagoras, besides geometry and even the introduction to trigonometry. According to Pombo (1994),

Interdisciplinarity is any form of combination of two or more courses in order to understand an object, starting from the confluence of different viewpoints and with the ultimate goal, the developing of a synthesis relatively to the common object. (Pombo, 1994, p. 13)

Therefore, interdisciplinarity is an intersection of knowledge between two courses, thereby creating new school knowledge by interaction of the two curricular components.

Accordingly, I realize that this work follows an interdisciplinary line, an inter-relation between mathematics and physical education. It is a new method to relate mathematics to the practice of futsal that is inserted into another curriculum component; we understand that this fact can lead to a more enjoyable learning because the vast majority of students say that physical education as the best course. When students perceive the presence of mathematics in things they culturally enjoy, such as soccer, futsal and other sports, lead us to new experiences of mathematics, considering that the course will be inserted in the leisure of students, hence the curiosity to learn increases as well as the willingness to participate of the Math classes.

Recently, I have been observing that students have driving themselves away from Math and there are several reasons that we can highlight, such as: the world has changed and unfortunately the teacher of Mathematics itself remains the same, the old executioner authoritarian, traditional to the extreme and without innovation.

Therefore, it's a huge challenge for the future Math teachers be confronted with this scenario that is seen today in the classrooms. It will be necessary for these future teachers "pull a rabbit out of your hat" to teach their classes. They can try to combine theory and practice of futsal as well.

MATERIALS AND METHODS

The research has a descriptive character, and the scenario to survey the empirical data was the city of Mossoró / RN, at the Escola Municipal Senador Duarte Filho, with the students of elementary school. We worked with two classes of the morning shift from 9th grade, and the classes A and B, totaling 38 students.

To accomplish this work, we used a qualitative approach that characterized itself descriptively and refers basically about people's lives, experiences, and behaviors. Seeking to analyze this new way for teaching Mathematics content, I sought to gather the data of the intensive direct observation of the procedure. From then on, we have made available through a chart the effectiveness of the method.

DISCUSSION AND ANALYSIS OF RESULTS

The field research was initiated on August 14th, 2014 at the Escola Municipal Senador Duarte Filho, located in Mossoró/ Rn. On this day, the lessons of the Pythagorean Theorem were exposed in two classes of the 9th grade of this school. The content was taught in a traditional way using only the frame, marker and textbooks as resources. The pre-arranged plan was followed correctly, and the classes were given in the 9th grade "A" and "B".

It was noticed during class that the students did not have a critical stance on knowledge acquired at that time, it was like an audience watching a concert which were far away from being a real classroom, but there was no astonishment because it is what we see since our time as a student in elementary school, the Math does not stimulates nor encourages the student to be an active person. The lesson of the Pythagorean theorem despite being traditional, it was not mechanized, that is, we did not taught only the formula, on the contrary, it was exposed the history of the theorem, demonstrations and questions to a deeper study, but even then, the students seemed to spectators.

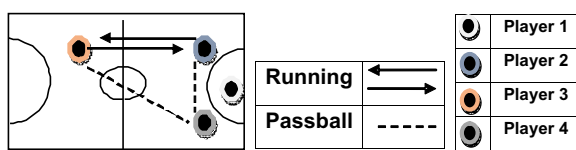
According to Libâneo (1991, p. 54):

"Learning is an act of knowledge of reality, that is., the real situation experienced by the student only makes sense if it results from a critical approach of this reality. So, the knowledge that the learners transfer represents a response to the oppressive situation that is reached by the process of understanding, reflection and critical"

The most important is that the student can be an active person in the classroom who understands what the teacher conveyed and be capable to create questioning that subsequently may criticize for or against what was exposed. The intention of the practical class is become the learner like this, moreover, to show them that Math is outside of the four walls of the classroom.

The second moment was applied the diagnostic evaluation with issues that involved everything that was studied in the classroom and everyday problems. In the next step, the students were taken to the gym for a practical class and at the same time the Pythagorean Theorem was taught in a practical way.

We used as teaching resources in the class, a futsal ball, a whistle, measuring tapes, notebook, pen and calculator. The first activity was to demonstrate from a move-out ball, that we could see clearly that the movement of the athletes, which took form in a rectangular triangle, and moved themselves in the cathets and in the hypotenuse.



The second activity occurred into the sports court. It was a corner move which is very used in futsal. This activity has the same objective as the previous one, which is to deepen the notions of the cathets, hypotenuse and the right angle through the movement of the players, and show that Mathematics can also be seen in a sport as well. Finally in the last activity we used measuring tape to measure the approximate diagonal of the sports court.

In the third moment, it was applied one more time the diagnostic activity in two classes and then, to confirm if there was an increase in the students learning after practice. We made a comparison with the previous notes, and to finish the fieldwork we exposed a questionnaire to know the level of acceptance of students on the classroom practice.

Analyzing the data, we got some results that will be discussed below. In advance we can see the enthusiasm of the students when they were taken off the four walls that often limit their knowledge. After the questionnaires that were applied, which aimed to measure the level of acceptance of the two classes before the practical class, we provided the following questions:

- Question 1: Does the new instrument used to display the content have relevance in their learning?
- Question 2: And if the class did not have the sport practice of futsal together with the content, would it change something in their learning?
- Question 3: Do you consider that this new feature should be extended to other content?

After tabulating the data through the questions, we did the graph which corresponds to the response of the two classes with the help of the Excel, and we obtained the following data. Clearly, in the question one, 89.2% answered yes, supporting the relevance of the practical class. We also observe that for question two, 44.7% said yes, 34.2% responded reasonably and 21.1% answered no; and for the third question 84.2% answered yes, 7.9% responded reasonably and 5.26% answered no. All the data are exposing the approximated results.

In addition, we applied an admeasurement test with the students of the two grades, "9º A" and "9º B", with 29 and 27 students enrolled, respectively. We adopted common sample sizes to 19 elements. Tests of admeasurement were corrected and their marks were recorded in the table below:

9º "A"		9º "B"	
10.0	5.0	5.0	6.5
10.0	10.0	9.5	5.0
5.0	3.0	8.5	8.0
5.0	10.0	10.0	10.0
0.0	10.0	7.5	7.0
0.0	7.5	8.0	8.5
7.5	7.5	6.5	7.5
10.0	10.0	7.0	8.0
1.0	3.5	7.5	7.5
9.5	-----	5.0	-----

Next, after the application of the practice, we applied the test again in order to check whether or not there would be positive influence of the play in learning content. The results that we obtained after practice can be seen below:

9º "A"		9º "B"	
8.0	9.0	9.0	10.0
10.0	10.0	9.5	8.5
7.0	10.0	7.5	0.0
10.0	6.0	8.5	8.5
8.0	8.5	7.5	8.5
7.5	9.5	10.0	6.5
8.5	10.0	8.5	6.5
10.0	8.0	10.0	10.0
9.0	8.0	10.0	10.0
9.5	-----	9.0	-----

The statistic offered us tools so we could endorse our perception between the results of the two tables that were

exposed. We adopted as null hypothesis (H_0) the fact that there was no difference between the results of the averages ($md = 0$) with a significance level of 95%, even after application of the practice. To the alternative hypothesis (H_1), we estimated that there were differences, and that the performance would be greater than in the first table ($md > 0$). Therefore, the hypotheses were figured as you can see below:

$$\begin{cases} H_0: md = 0 \\ H_1: md > 0 \end{cases}$$

The methodology used was the non-parametric Wilcoxon test for paired variables, once the distribution of the data collected did not demonstrated the normality and that the same variable was investigated under two different circumstances. We did this test using computational resource: Action (version 2.7), a supplement to the Excel component of the package Microsoft Office applications oriented to the statistical studies. Here are some images for illustration of the testing:

After selection the appropriate test tool, it was enough to fill the fields in the window that emerged by clicking the Datasets field and selecting each group of cells related to the notes before and after practice.

After repeating the procedures outlined for the two classrooms, we obtained the following results

Test of paired variables of the 9th grade "A"

Information	Value
P-value	0.989413831
Null hypotheses	0
Method	Wilcoxon signed rank test with continuity correction

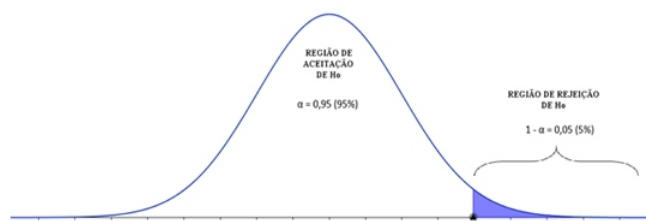
Test of paired variables of the 9th grade "B"

Information	Value
P-value	0.973970962
Null hypotheses	0
Method	Wilcoxon signed rank test with continuity correction

INTERPRETATION

The P-value displayed in each test brings us the following result: In both rooms the students' performance improved after applying the playful practice. The chart below illustrates the issue:

The P-values of the two classes, A and B, exceeded 95% concerning the region of acceptance of the null hypothesis, that adopted the notes would not be affected positively even after applying the playful practice. The class A presented the P-value of 0.9894, or approximately 99%, while the class B presented 0.9739, which is close to 97%. As both invaded the rejection region, we concluded that the performances of the groups were better after applying the playful practice.



CONCLUSION

According to the results that were obtained in this research, it leaded us to believe in the efficacy of a specific mathematical content combined with futsal practice, uniting two curricular components to aid in learning. We realized that it influenced directly the performance of students. however, this research does not solve the problem of teaching and learning Mathematics, but it provides another method that will improve teaching. For this reason, we suggest the realization of future studies involving a larger sample and expanded them to other content as well.

REFERENCES

- GOLDBERG, Marco César. Educação e qualidade: repensando conceitos. Revista brasileira de estudos pedagógicos. São Paulo, v. 79, p. 35-45, set./dez. 1998.
- LIBÂNEO, José Carlos. Didática. São Paulo: Cortez, 1991.
- POMBO, O., GUIMARÃES, H. M., LEVY, T. A interdisciplinaridade reflexão e experiência. 2. ed. Lisboa: Texto, 1994.
- APOLO, A. Futsal: metodologia e didática na aprendizagem. São Paulo: Phorte, 2004.
- FAZENDA, I. C. A. Práticas interdisciplinares na escola. São Paulo: Cortez, 1991.
- BARBOSA, R. M. Descobrimo padrões pitagóricos: geométricos e numéricos. São Paulo: Atual, 1993. 93p.
- BIAGGI, G. V. Uma nova forma de ensinar matemática para futuros professores administradores: uma experiência que vem dando certo. Revista de ciência da educação. Ano 02, N. 20. 2000
- PCN's: Parâmetros Curriculares Nacionais/ Ministério da Educação. Secretaria da Educação Fundamental. – 3ª Ed. Brasília: Asecretaria, 2001.

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THE PRACTICE OF FUTSAL AS A TOOL FOR TEACHING AND LEARNING MATHEMATICS CONTENT

ABSTRACT

This research aims to seek an improvement in the quality of teaching and learning of Mathematics content. The present study related the Pythagorean Theorem and the sport practice of the futsal to demonstrate its effectiveness on student's development. This research has a qualitative approach that characterized itself descriptively. At that, it was conducted with a sample with 38 students of two classes of 9th grade at a school in Mossoró city. We collected the data through intensive direct observation procedure, and we used a questionnaire and diagnostic activities. After collecting the data we can observe how important is the interaction of the courses for teaching and learning process, once that students had a greater interest in the classroom.

KEYWORDS: Pythagorean Theorem, futsal and teaching-learning process.

**LA PRATIQUE DU FUTSAL COMME OUTIL D'ENSEIGNEMENT ET D'APPRENTISSAGE EN MATHÉMATIQUES
RÉSUMÉ**

Ces recherches avaient l'intention d'obtenir une amélioration de la qualité de l'enseignement et l'apprentissage des mathématiques de contenu, la présente étude concernant le théorème de Pythagore avec la pratique du sport futsal et une analyse des résultats a eu lieu pour mettre en évidence son efficacité dans le développement des étudiants. La recherche a une approche qualitative qui caractérise de manière descriptive. Avant cela, elle a été réalisée auprès d'un échantillon de 38 élèves de deux classes de 9 ans d'une école dans la ville. Nous récoltons les données par le biais de la procédure d'observation directe, utilisation intensive questionnaire et activités de diagnostic. Après la collecte des données, nous constatons combien il importe à l'interaction entre les disciplines d'enseignement et d'apprentissage, une fois que les étudiants ont eu un plus grand intérêt pour la leçon.

MOTS-CLÉS : théorème de Pythagore, futsal et enseignement-apprentissage.

**LA PRÁCTICA DE FÚTBOL SALA COMO UNA HERRAMIENTA PARA LA ENSEÑANZA Y EL APRENDIZAJE DE
LAS MATEMÁTICAS
RESÚMEN**

Tal investigación tuvo la intención de buscar una mejora en la calidad de la enseñanza y aprendizaje del contenido de Matemáticas. El presente estudio relaciona el teorema de Pitágoras con la práctica deportiva de fútbol sala. Para eso fue realizado un análisis de los resultados para resaltar su eficacia en el desarrollo de los estudiantes. La investigación tiene un enfoque cualitativo que caracteriza de manera descriptiva y se realizó con una muestra de 38 alumnos de dos clases de 9º grado de una escuela en la ciudad. Recogemos los datos a través del procedimiento de observación directa e intensiva, con la utilización de cuestionario y actividades de diagnósticos. Después de la recolección de datos tomamos nota de lo importante que es la interacción entre las disciplinas para el proceso de enseñanza y aprendizaje, una vez que los estudiantes demostraron un interés mayor por la lección.

PALABRAS CLAVE: Teorema de Pitágoras, fútbol sala y enseñanza-aprendizaje.

**APRÁTICA DO FUTSAL COMO INSTRUMENTO DE ENSINO-APRENDIZAGEM NA MATEMÁTICA
RESUMO**

A referida pesquisa teve a intenção de buscar uma melhoria na qualidade do ensino-aprendizagem do conteúdo de Matemática, o presente estudo relacionou o teorema de Pitágoras com prática esportiva do futsal e foi realizada uma análise dos resultados para evidenciar sua eficácia no desenvolvimento dos alunos. A pesquisa tem uma abordagem qualitativa que caracteriza descriptivamente. Diante disso, foi realizado com uma amostra de 38 alunos de duas turmas dos 9º anos de uma escola da cidade. Colhemos os dados através do procedimento de observação direta intensiva, utilizamos questionário e atividades diagnósticas. Após a coleta de dados podemos constatar o quanto é importante à interação das disciplinas para o ensino-aprendizagem, uma vez que os alunos tiveram um interesse maior pela aula.

PALAVRAS – CHAVE: teorema de Pitágoras, futsal e ensino–aprendizagem.