*International Journal of Humanities and Social Science Invention (IJHSSI)*
*ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714*
*www.ijhssi.org ||Volume 7 Issue 06 Ver. IV ||Jun. 2018 || PP.86-89*

# The Teaching Practice of the Mathematics Teacher in Basic Education: A Vision in the Brazilian School

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***ABSTRACT:*** *In the current school the teacher is seen as the mediator of knowledge in the teaching and learning process and without its participation the educational process becomes imperfect. This paper aims to present several concepts related to the teaching of the mathematics teacher in basic education. It is necessary to minimize the lags between mathematics and its new technologies with the teaching of the mathematics teacher. The teaching act of the teacher privileges the administrator of the process, being a thinker, a true strategist in the construction of mathematical knowledge. This act when it works effectively minimizes traumas, evasions, and student retention at school.*

***KEYWORDS -*** *Teaching mathematics, Maths teacher, Mathematics and its new technologies.*

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Date of Submission: 22-06-2018 Date of acceptance: 07-07-2018

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## I. INTRODUCTION

Several researches in Mathematics Education are carried out annually on alternatives for the teaching of mathematics and its teaching practice in basic education. Based on works by D 'Ambrosio (2002), Vygotsky (1989), Bicudo (1999, 2005), Pais (2002), Ponte (2006), Polya (1986), Biembengut (2009), Bridges possibilities to minimize the lags between mathematics and its new technologies with the teaching of the mathematics teacher. The teaching of mathematics must accompany the evolution of humanity and the best strategies to follow is to associate their concepts, rules and relationships with the new technologies of Mathematics Education. It is necessary to strengthen in the school benches a teaching of mathematics focused on the problematization, for the contextualization and interdisciplinarity. The mathematics teacher must be prepared to face the obstacles arising from this difficult passage from the abstract models of mathematics developed in the classroom to a concrete representation of these models in the real world.

Some educational elements, such as the teaching of mathematics and the teacher of mathematics in basic education, need to be realigned to the new model of the technological, information and communication world. This breakdown of paradigms in basic education becomes necessary, since the school is the most responsible in the formation and qualification of the citizen to supply the needs of the modern world. In this way, this work aims to present suggestions that can effectively improve the teaching of mathematics teacher of basic education.

## II. THE TEACHING OF MATHEMATICS IN BASIC EDUCATION

The teaching of Mathematics in basic education goes through a process of transformation in its methodological conception and drastic change in its identity to present itself in the modern school. This new way of looking at the teaching of mathematics is necessary in order to adapt the technological advances of the modern world to the child of the technological age. This apprentice child from the traditional school needs to develop their skills and competences to understand and transform reality, in which case, mathematics is the gateway to this intellectual development.

D 'Ambrósio (2012) affirms that the great challenge for education is to put into practice today what will serve for tomorrow. Putting it into practice means taking theoretical presuppositions, that is, a knowing / doing over past times, to the present. The actions of the subjects, teacher and student, in the school context exceed the limits of the classroom and for this relationship to be in perfect harmony it is necessary to perform a more effective mathematical learning, in order to provide the student with knowledge that is linked to his reality (Paula et al, 2016).

The use of new technologies focused on Mathematics Education, such as Ethnomathematics, Recreational Mathematics, Mathematical Research, Mathematical Modeling, Problem Solving, Information Technology and Communication are viable alternatives to bring scientific knowledge to the empirical knowledge of students in basic education and , thus making the teaching and learning process of math more effective.

According to D 'Ambrosio (2002) the whole construction of mathematical knowledge must be linked to the tradition, society and culture of each people, such as indigenous societies, urban and rural communities, classes of workers and professionals, among others. At this point it is important to clarify that I understand mathematics as a strategy developed by the human species throughout its history to explain, to understand, to manage and coexist with the sensible, perceptible reality and with its imaginary, naturally within a natural and cultural. This is also true of techniques, the arts, religions, and the sciences in general. It is essentially the construction of bodies of knowledge in total symbiosis, within the same temporal and spatial context, which obviously has varied according to the geography and history of individuals and the various cultural groups to which they belong - families, tribes , societies, civilizations (D 'Ambrósio, 2005).

According to Vygotsky (1989) play activity directly influences the development of the child and through the game she learns to act, to be curious, to acquire initiative, self-confidence, and to provide the development of language, thinking and concentration. Some elements of recreational math may be part of the class; others may be used "just for fun". Recreational math is full of puzzles, games, paradoxes and curiosities. In addition to being selected for their specific motivational power, these devices should be challenging but brief and enjoyable. Although they are sometimes impractical, they are fun, they increase interest, they stimulate intellectual curiosity and allow the development of mathematical techniques and concepts (Posamenteir & Krulik, 2014).

For Biembengut (2009) mathematical modeling is a process, which appeared in the middle of the twentieth century in the literature of Engineering and Economic Sciences, and aims to describe, formulate, model and solve a problem situation of some area of scientific knowledge. The insertion of mathematical modeling into the curriculum of teacher training courses in mathematics indicates that modeling, every day, gains adherents and defenders at official levels of education in almost all Brazilian states due to the possibility of promoting the young, of this millennium in particular (young people of the technological generation), better knowledge and skills in using them. Although there seem to be distinct conceptions of the teachers responsible for discipline in teacher training courses, they converge on the understanding that modeling can contribute not only to enhancing mathematical teaching and learning but also to provoking a reaction and interaction between faculty and students involved in the continuous and necessary production of knowledge (Biembengut, 2009).

For Polya (1995) to solve a problem means to find a path that is not yet known and to bypass an obstacle to reach the goal outlined by appropriate means. There are four steps to solving a math problem efficiently: understanding the problem, designating a plan, executing the plan, and reviewing the problem. To solve problems George Polya stated: A major breakthrough solves a major problem, but there is always a hint of discovery in solving any problem. The problem may be modest, but if it defies curiosity and puts into play the inventive faculties, whoever solves it by its own means will experience tension and will enjoy the triumph of discovery. Such experiences, at a susceptible age, can generate a taste for mental work and leave, for a lifetime, its mark on mind and character (Polya, 1978).

According to Ponte, Brocardo and Oliveira (2006), the use of mathematical research as a teaching and learning activity strengthens the spirit of doing genuine mathematics, since the student will act as a mathematician by formulating questions and conjectures, performing tests and refutations, and making decisions together with the teacher and his classmates. Learning Mathematics is not simply understanding the Mathematics already done, but being able to do research of a mathematical nature (at the appropriate level at each level of education). This is the only way to truly understand what Mathematics is and its usefulness in understanding the world and intervening in the world. Only in this way can one really master the acquired knowledge. Only in this way can one be inundated by the 'detective' passion indispensable to the true enjoyment of Mathematics (Braumann, 2002).

According to Pontes (2013), new technologies in the field of Mathematics Education, particularly for Information and Communication Technology (ICT), have a number of features that can contribute significantly to changes in the teaching and learning process of mathematics. Although these ICTs are not yet fully involved in any educational system, they are indispensable instruments for teaching integrated with the daily life of the learner. In everyday citizens, technological innovations are increasingly incorporated into processes and activities, such as: online shopping, information and public certifications, consultations and banking transactions, elections, income tax returns, etc. The consequence is the emergence of new learning needs in the most diverse segments of society, and especially in education. Teachers are increasingly being pushed to incorporate technology to create pedagogical computing resources, but they have not been part of their history as students, or their training as teachers (Jacon & Kalhil, 2011).

## III. MATHEMATICS TEACHER OF BASIC EDUCATION

The mathematics teacher of basic education of the 21st century has an extremely challenging mission, as it demands, at all times, maximum dedication to its language, general knowledge, understanding of its concepts and relationships and, above all, love of what it does. The math teacher should create classroom

situations that bring his students closer to real models. Pais (2011) states that the mathematics teacher should encourage his students to scientific research, to learn to value logical and argumentative reasoning and to cultivate a taste for problem solving. Playful activities, mathematical games and solving logic problems lead the student to think and create new possibilities for learning mathematics.

It is necessary to relate the work of the mathematics teacher, not excluding the possibility of reconciling these two activities. However, it is important to remember that the type of work developed by the mathematician determines a considerable influence on pedagogical practice. In reality, when talking about competence, the work of the teacher involves the challenge of performing an activity that, in a certain sense, is the inverse of that of the researcher. For, while the mathematician tries to eliminate the contextual conditions of his research, seeking broader levels of generality, the mathematics teacher, on the other hand, must recontextualize the content, trying to relate it to a situation that is more understandable to the student (Pais, 2001).

The mathematics teacher is not only the mathematical researcher, but the mediator of knowledge, the being who thinks and translates to his apprentices new directions for the understanding of this science of patterns. For Cruz (2016) he who is in the classroom, if he does not create the content with which he works, creates meaning for that content and every action of elaborating the meaning of something can reveal a style. It's not a great or right way to present a topic, it's a unique way to do it.

## IV. THE TEACHING ACT OF THE BASIC MATHEMATICS TEACHER

The teaching of mathematics teacher in basic education posits a role of mediator of knowledge, able to break down methodological paradigms in order to transpose a traditional and linear teaching model by a bold and modern model, where the learner can be given permission, soldier of knowledge, to use all his logical reasoning and creativity. The act of teaching does not end in itself (Bicudo, 1999).

Consider what happens at some point in a class from the perspective of a teacher. Note that this takes a significant body of knowledge to the classroom. This includes knowledge of the content, the school environment, the students, and their stories with them. At a more refined level, it also includes various routines, scripts, and schemas to deal with content and classroom processes. Likewise, the teacher brings with it a complex set of beliefs about the school, the students, and the content. It has general goals, plans for instruction and students, specific goals and lesson plans, and the parts that make up it (Schoenfeld & Arcavi, 2010).

Thus, true and transforming learning is a process that begins with the confrontation between the reality of what we know and something new that we discover or even a new way of looking at reality (Selbach et al, 2010). True teaching is one that information passed on by the teacher becomes knowledge for the student.

Being-teacher-of-mathematics is, first of all, being-teacher. To be a teacher is to be concerned with the being of the student, trying to help him to know something that he, teacher, already knows and that he thinks important that the student will know, too. This one already knows has the sense that the teacher is someone who already has at least some domain in the area of knowledge, object of his teaching (Bicudo, 2005).

The teaching act of the teacher may be the expression of greater recognition of having the student as the center of the entire educational process. The present school has a decisive role of minimizing lags between the daily technological of the children and the natural abstractions defined in the school benches. The best guarantee for the process of teaching effective math is the sensitivity of the facilitator teacher in realizing the needs and boundaries of the apprentice child. According to Ponte (1994) in relation to the teacher: All his work with students presupposes a didactic, explicit or implicit perspective. It is from this that each teacher selects objectives, organizes activities, formulates evaluation criteria determines procedures of action for each type of circumstances.

For many teachers, motivating students to learn math is the main concern when preparing to give a lesson. Students who become interested and receptive make the rest of the teaching process easier and much more effective. There are basically two types of motivation: the extrinsic and the intrinsic. Extrinsic motivation usually occurs outside the control of the student, in the learning environment, and, in great majority, under the teacher's control. Intrinsic motivation occurs in the student and can be developed by the teacher, with several principles in mind. Intrinsic motivators tend to correspond to the following basic types: the student wants to develop competencies; the student is curious about new events and activities; and the student needs to feel autonomous (Posamenteir & Krulik, 2014).

The teacher, the motivator of knowledge, must be prepared to understand and follow with skill the new generation of technological students. In the present context, with a changing society, it is necessary to totally and unrestricted schools to the new models of technology, so that the student is motivated and curious in the school he attends.

Faced with these facts, the teacher of mathematics, mediator of knowledge, must find new didactic strategies that may involve his apprentices in the construction of mathematical knowledge. The choice of the strategies to be followed by the teacher must take into account the whole personal dynamics of the student, that

is, the teacher should have knowledge of his student, from his way of acting in his state of mind to acquire new mathematical knowledge. The teacher teaches is to leave your comfort zone and reshape your way of acting facing the barriers that may arise in this walk proactively, with organization and planning of the tasks to perform.

## V. CONCLUSION

In today's globalized world there is an infinity of information from diverse sources of knowledge that are accessed at all times, especially by children and adolescents in search of answers to their inquiries and concerns. The 21st-century school child is a curious, intuitive apprentice individual with a broadly technological vision, differently from the 21st century School, traditional, linear and disconnected teaching with the world of machines. The apprentice student needs to be prepared to deal with dexterity and efficiency the challenges of the contemporary world and the teaching of the mathematics teacher in basic education substantially strengthens this confrontation and minimizes the possible difficulties that the learner will face in his walk.

The explanation of nature phenomena and their technologies, problem solving and challenges, the use of information and communication technology, the construction of concrete mathematical models are well-defined prototypes ready to be installed in basic education, and with the help of the teacher of mathematics, will be the true generators of knowledge. In view of the above, it is expected that this work will alert the representative value of the mathematics teacher in the evolution of the modern world and in the transformation of the traditional models of the basic education school.

## REFERENCES


[1]. Bicudo, Maria AP. V. Ensino de matemática e educação matemática: algumas considerações sobre seus significados. *BOLEMA*, Rio Claro, ano 12, n. 13, p. 1-11, 1999.

[2]. Bicudo, Maria Ap. V. O professor de matemática nas escolas de 1.º e 2.º graus. In: Bicudo, Maria Ap. V. (org.). *Educação matemática*. 2 ed. São Paulo: Centauro, 2005.

[3]. Biembengut, Maria Salett. 30 Anos de Modelagem Matemática na Educação Brasileira: das propostas primeiras às propostas atuais. *Alexandria: Revista de Educação em Ciência e Tecnologia*, v. 2, n. 2, p. 07-32, 2009.

[4]. Biembengut, Maria Salett; Hein, Nelson. Modelling in Engineering: Advantages and Difficulties. In: Haines, Christopher; Galbraith, Peter; Blum, Werner; Khan, Sanowar. *Mathematical Modelling ICTMA 12 - Education, Engineering and Economics*. Inglaterra: Horwood Publishing Limited, 2007.

[5]. Braumann, C. Divagações sobre investigação matemática e o seu papel na aprendizagem da matemática. In: Ponte, J. P.; Costa, C.; Rosendo, A. I.; Maia, E.; Figueiredo, N.; Dionisio, A. F. *As atividades de investigação na aprendizagem da matemática e na formação de professores*. Lisboa: SEM-SPCE, 2002. p. 5 – 24.

[6]. Cruz, Márcia de O. O trabalho do professor: criação de significado e estilo. In: Machado, Nilson J. Cunha, Ortegoza da (orgs.). *Linguagem, Epistemologia e Didática*. São Paulo: Escrituras Editora, 2016.

[7]. D' Ambrosio, B. S. Como ensinar matemática hoje? *Temas e Debates. SBEM*. Ano II. N2. Brasília. 1989. P. 15-19.

[8]. D' Ambrosio, B. S. Formação de Professores de Matemática para o Século XXI: o grande desafio. *Pro-Posições*. Campinas, v.4, n.1/10, p. 35-41, mar. 1993.

[9]. D' Ambrosio, U. *Etnomatemática. Elo entre as tradições e a modernidade*. 2ª Edição. Belo Horizonte: Autêntica, 2002. 110 p. (Coleção Tendências em Educação Matemática).

[10]. D' Ambrosio, U.. *Educação Matemática: da teoria á pratica*. 23º ed. Campinas, São Paulo: Papirus, 2012.

[11]. D' Ambrosio, Ubiratan et al. *Sociedade, cultura, matemática e seu ensino. Educação e Pesquisa*, São Paulo, v. 31, n. 1, p. 99-120, 2005.

[12]. Dante, Luiz Roberto. Didática *da Resolução de problemas de matemática. 1ª a 5ª séries. Para estudantes do curso Magistério e professores do 1º grau.* 12ª ed. São Paulo: Ática, 2003.

[13]. Jacon, Liliane da Silva Coelho; Kalhil, Josefina Barrera. O professor formador e as competências em tecnologia de informação e comunicação: Um estudo sobre quais recursos computacionais estes profissionais utilizam na elaboração do seu material didático. *Amazônia: Revista de Educação em Ciências e Matemáticas*, v. 8, n. 15, p. 27-44, 2011.

[14]. Pais, Luiz Carlos. *Didática da Matemática: uma análise da influência francesa*. 2º ed. Belo Horizonte: Autentica 2002.

[15]. Paula, Samantha C. R. de, Rodrigues, Chang K., Silva, Julio C. da. *Educação Matemática e Tecnologia: Articulando práticas geométricas*. Curitiba: Appris, 2016.

[16]. Polya, G. A. *Arte de Resolver Problemas*: *Um Novo Aspecto de Método Matemático*. Rio de Janeiro: Editora Interciência, 1986.

[17]. Ponte, J. P.; Quaresma, M.; Branco N. Tarefas de exploração e investigação na aula de matemática. *Educação Matemática em Foco*, 2012, Jan/jun, p. 9-29.

[18]. Ponte, J. P. da; et al. O trabalho do professor numa aula de investigação matemática. *Quadrante*, Lisboa, v. 7, n. 2, p. 41-47, 1998

[19]. Ponte, J. P.; Brocardo, J.; Oliveira, H. *Investigações matemáticas na sala de aula*. Belo Horizonte: Autêntica, 2006.

[20]. Pontes, Edel Alexandre Silva. HIPERMAT – Hipertexto Matemático: Uma ferramenta no ensino-aprendizagem da matemática na educação básica. *Psicologia & Saberes*, v. 2, n. 2, 2013.

[21]. Posamenteir, Alfred S., Krulik, Stephen. *A arte de motivar os estudantes do ensino médio para matemática*. Porto Alegre: AMGH, 2014.

[22]. Schoenfeld, Alan. Arcavi, Abraham. Usando o não familiar para problematizar o familiar. In: BORBA, Marcelo de C. (org.). *Tendências Internacionais em Formação de Professores de Matemática***.** 2º ed. Belo Horizonte: Autêntica Editora, 2010.

[23]. Selbach, Simone et al. *Matemática e Didática*. Petrópolis: Vozes, 2010.

[24]. Vygotsky, L. S. O papel do brinquedo no desenvolvimento. In: *A formação social da mente.* São Paulo: Ed. Martins Fontes, 1989. 168p. p.106-118.


Edel Alexandre Silva Pontes"The Teaching Practice of the Mathematics Teacher in Basic Education: A Vision in the Brazilian School."International Journal of Humanities and Social Science Invention (IJHSSI) 7.06 (2018): 86-89.