CONTEXTUALIZATION OF MATHEMATICAL CONCEPTS: POSSIBILITIES AND CHALLENGES

CONTEXTUALIZAÇÃO DE CONCEITOS MATEMÁTICOS: POSSIBILIDADES E DESAFIOS

CONTEXTUALIZACIÓN DE CONCEPTOS MATEMÁTICOS: POSIBILIDADES Y DESAFÍOS

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ABSTRACT

Brazil has not achieved good results in the learning indices of its students, a fact confirmed in 2009 when the Programme for International Student Assessment (PISA) was conducted, in which Brazil ranked 53rd among sixty-one countries evaluated in Mathematics. In 2012 a new result was released and Brazil's position improved slightly: among the 65 countries evaluated, Brazil ranked 58th with 391 points in Mathematics, and the most recent result placed Brazil in the 66th position among the 70 countries evaluated. With the current result it is clear that the expected standards regarding the quality of Mathematics education in the country have not yet been achieved. In other major learning assessment examinations such as SAEB, SPAECE, among others, the averages obtained are very low when compared with results from other countries with levels of development similar to Brazil. It has been clearly observed that Brazilian students' learning in Mathematics has been unsatisfactory, especially regarding their ability to interpret mathematical texts. One of the major challenges in the National High School Examination (ENEM) has been precisely the amount of information contained in a single item that must be interpreted in order for the question to be correctly solved, a situation that also occurs in other national-scale examinations and that has raised concern throughout Brazil, especially among Mathematics teachers, since it has become evident that the current work is not on the right path and that something needs to be done to change this reality. This study aims to identify the difficulties found in the pedagogical practices of a group of teachers from lower secondary education and high school regarding the use of contextualized mathematical practice as a teaching tool, as well as the teachers' knowledge about the issue addressed: contextualization. The methodology used in this study is descriptive research, in which data were collected about current practices or opinions of the Mathematics teachers involved through questionnaires, interviews and observations, taking into account the contextualization of mathematical content and the difficulties faced.

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The results show that teachers who teach in the early grades face fewer difficulties in contextualizing Mathematics and in stimulating students' interest in the classes when compared with teachers who teach in later grades, especially in high school. Throughout this work the problem of Mathematics teaching will be widely discussed and suggestions will be presented for a more interactive teaching approach that provides students with better learning and greater satisfaction with their studies. It is expected that this work may inspire or at least encourage a new moment for Mathematics in which students feel part of it and use it as a tool in their daily lives.

Keywords: Mathematics. Contextualization. Teaching. Basic Education.

RESUMO

O Brasil não tem alcançado bons resultados nos índices de aprendizagem dos nossos alunos, fato esse comprovado em 2009, quando da realização do Programa Internacional de Avaliação de Alunos (Pisa), o Brasil figurou no cenário mundial em 53º lugar num grupo de sessenta e um países avaliados, no que se refere à Matemática. Em 2012, um novo resultado foi divulgado e a posição do Brasil melhorou um pouco, dos 65 países avaliados, o Brasil ficou na 58ª posição com 391 pontos alcançados em Matemática e o mais recente resultado colocou o Brasil na 66ª posição dentre os 70 países avaliados. Com o resultado atual fica claro que ainda não estamos alcançando o esperado no que se refere à qualidade do ensino de Matemática em nosso país. Nos outros principais exames de avaliação de aprendizagem tais como Saebe, Spaece, dentre outros, as médias obtidas são muito baixas se comparadas à resultados de outros países com desenvolvimento semelhante ao Brasil. Tem-se percebido nitidamente que a aprendizagem dos alunos brasileiros em Matemática tem sido insatisfatório principalmente quanto à capacidade de interpretação de textos matemáticos. Um dos grandes vilões para realização do Exame Nacional do Ensino Médio - ENEM, tem sido exatamente a quantidade de informações em um único item que precisa ser interpretado a fim de que questão seja corretamente resolvida, fato esse que ocorre também em outros exames de escala nacional e que tem preocupado o Brasil como um todo e principalmente nós professores de Matemática, pois estamos percebendo que o trabalho não está no caminho certo e que algo precisa ser feito para mudar essa realidade. Esse trabalho tem por objetivo geral identificar as dificuldades encontradas nas práticas pedagógicas de um grupo de professores do Ensino Fundamental II e Ensino Médio sob a utilização como ferramenta de ensino de um fazer matemático contextualizado, bem como o conhecimento desses professores sobre a problemática abordada: contextualização. A metodologia utilizada nesse estudo trata-se de uma pesquisa descritiva, na qual foi realizado um levantamento de dados sobre práticas ou opiniões atuais dos professores de Matemática envolvidos na pesquisa, através de questionários, entrevistas e observações, levando-se em consideração a questão da contextualização dos conteúdos matemáticos e as dificuldades enfrentadas. Os resultados mostram que os professores que ensinam em séries iniciais enfrentam menos dificuldades em contextualizar a Matemática, em despertar o interesse dos seus alunos pela aula, se comparamos com as opiniões dos professores que lecionam em séries finais, principalmente no Ensino Médio. Ao longo desse trabalho a problemática do ensino de Matemática será amplamente discutida e sugestões serão dadas para um ensino mais interativo, que proporcione ao aluno um melhor aprendizado e uma maior satisfação quanto aos seus estudos. Espero poder despertar, ou pelo menos incentivar, um novo momento para a Matemática em que o aluno se sinta parte dela e a use como ferramenta do seu dia a dia.

Palavras-chave: Matemática. Contextualização. Ensino. Educação Básica.

RESUMEN
Brasil no ha alcanzado buenos resultados en los índices de aprendizaje de sus estudiantes, hecho comprobado en 2009 con la realización del Programa Internacional para la Evaluación de Estudiantes (PISA), en el cual Brasil ocupó el puesto 53 entre sesenta y un países evaluados en Matemáticas. En 2012 se divulgó un nuevo resultado y la posición de Brasil mejoró ligeramente: de los 65 países evaluados Brasil ocupó el puesto 58 con 391 puntos en Matemáticas y el resultado más reciente colocó a Brasil en la posición 66 entre los 70 países evaluados. Con el resultado actual queda claro que aún no se están alcanzando los niveles esperados en lo que respecta a la calidad de la enseñanza de las Matemáticas en el país. En otros exámenes importantes de evaluación del aprendizaje como SAEB, SPAECE, entre otros, los promedios obtenidos son muy bajos en comparación con los resultados de otros países con niveles de desarrollo similares a Brasil. Se ha observado claramente que el aprendizaje de los estudiantes brasileños en Matemáticas ha sido insatisfactorio, especialmente en lo que se refiere a la capacidad de interpretación de textos matemáticos. Uno de los principales problemas en la realización del Examen Nacional de la Enseñanza Media (ENEM) ha sido precisamente la cantidad de información contenida en un único ítem que debe ser interpretado para que la pregunta sea correctamente resuelta, situación que también ocurre en otros exámenes a escala nacional y que ha generado preocupación en todo Brasil, especialmente entre los profesores de Matemáticas, ya que se percibe que el trabajo no está siguiendo el camino correcto y que algo necesita hacerse para cambiar esta realidad. Este trabajo tiene como objetivo identificar las dificultades encontradas en las prácticas pedagógicas de un grupo de profesores de la educación básica, específicamente de los años finales de la enseñanza fundamental y de la enseñanza media, en relación con el uso del quehacer matemático contextualizado como herramienta de enseñanza, así como el conocimiento de estos profesores sobre la problemática abordada: la contextualización. La metodología utilizada en este estudio corresponde a una investigación descriptiva, en la cual se realizó un levantamiento de datos sobre prácticas u opiniones actuales de los profesores de Matemáticas involucrados en la investigación mediante cuestionarios, entrevistas y observaciones, considerando la contextualización de los contenidos matemáticos y las dificultades enfrentadas. Los resultados muestran que los profesores que enseñan en los primeros años enfrentan menos dificultades para contextualizar las Matemáticas y despertar el interés de sus estudiantes por las clases si se comparan con los profesores que enseñan en los años finales, especialmente en la enseñanza media. A lo largo de este trabajo se discutirá ampliamente la problemática de la enseñanza de las Matemáticas y se presentarán sugerencias para una enseñanza más interactiva que proporcione al estudiante un mejor aprendizaje y una mayor satisfacción con sus estudios. Se espera poder despertar o al menos incentivar un nuevo momento para las Matemáticas en el que el estudiante se sienta parte de ellas y las utilice como una herramienta en su vida cotidiana.

Palabras clave: Matemáticas. Contextualización. Enseñanza. Educación Básica.

1 INTRODUCTION

Brazil has not achieved good results in the learning rates of our students, a fact that was proven in 2009, when the Program for International Student Assessment (PISA) was carried out, Brazil was ranked 53rd in the world scenario in a group of sixty-one countries evaluated, with regard to Mathematics. In 2012, a new result was released and Brazil's position improved slightly, of the 65 countries evaluated, Brazil was in the 58th position with 391 points achieved in Mathematics and the most recent result placed Brazil in the 66th position among the 70 countries evaluated. With the current result, it is clear that we are still not achieving what is expected in terms of the quality of Mathematics teaching in our country.

From these conceptions, it is perceived that there are no desired satisfactions in the different spheres of Mathematics Education in Brazilian education, due to the paradox between such low results, showing that something is wrong, that palpable and urgent attitudes need to be taken so that the teaching of Mathematics can get out of this valley that has been perpetuated for decades.

It cannot be denied that much has already been proposed in this area, however, the context of the classroom remains the same, and it is up to us teachers, together with the entire school community, to take the initial step towards an urgent awakening in order to give mathematical content a real meaning for its learning.

When we return to the competencies that are required of the student who proposes to take the New ENEM, it is clear that they revolve around the reading and interpretation of mathematical texts combined with the mother tongue.

In view of this urgent need, and taken by a feeling of change that has been awakened both by daily practice in the classroom, and by studies by authors who defend new strategies for the teaching of mathematical contents, highlighting the studies of D'Ambrósio (1996), the work proposed here will be based on a case study carried out with a group of eight Mathematics teachers, taken by sampling, in schools 1 Professor: PhD, UFERSA -Mossoró-RN, nunesag@ufersa.edu.br; 2 Mathematics Course – UFERSA - Mossoró-RN euclidesnn@gmail.com; ISSN: 2358-8829 private schools in the city of Fortaleza/CE, in order to identify the real causes of the difficulty in contextualizing the teaching of Mathematics from the educator's point of view, having as a guiding question: What are the difficulties of implementing a contextualized teaching in the conception of mathematics teachers?

In addition, the objective is not limited to understanding causes or pointing out errors, on the contrary, it is the main objective to bring a perception and reflection on this problem, in order to contribute to the enrichment of the teaching of Mathematics and to seek, together with this group of teachers, new methodological alternatives for the teaching of Mathematics,

although I am aware that this process will not occur by magic, but with a lot of struggle and persistence.

In view of the above, this article has the general objective of analyzing the difficulties found in the pedagogical practices of Mathematics teachers in the application of contextualized teaching. The specific objectives are:

- Outline the profile of the group of Mathematics teachers of Elementary School II and High School in relation to their pedagogical practices.
- Identify the difficulties faced by a group of teachers in the process of contextualization in the teaching of mathematics.
- Verify the perception of the observed teachers about the contextualization of mathematical content

2 METHODOLOGY (OR MATERIALS AND METHODS)

The methodology used in this study is a descriptive research, in which a survey of data on current practices or opinions of the Mathematics teachers involved in the research was carried out, through questionnaires, interviews and observations, taking into account the issue of contextualization of mathematical content and the difficulties faced.

The research was developed in the city of Fortaleza/CE, directed to a group of eight mathematics teachers from Elementary School II and High School, from two private schools and one public school in the Municipality of Fortaleza/CE. Data collection was carried out through 01 questionnaire with 10 questions to know the profile of the group under study and direct interviews to know the difficulties in relation to the contextualization of Mathematics teaching

3 THEORETICAL FRAMEWORK

In the ideas of Mathematics Education and its main defenders such as D'Ambrosio (1996), it is possible to teach Mathematics content in a differentiated way in the teaching practice. According to Druck (2006), former president of the Brazilian Mathematical Society, "the quality of mathematics teaching has perhaps reached its lowest level in the country's educational history".

> Our schools have spent a lot of time teaching math, social science, and other content to their students, and little time has been devoted to showing them how to share feelings and thoughts with others. The result is there, from the school itself: a large group of alienated, lonely, anxious, nervous, aggressive, irritated people, who do not know how to communicate effectively and who do not know why they are unhappy (MINICUCCI, 2001, p 54)

These difficulties are not recent, because for Vitti (1999, p.19),

> The failure of mathematics teaching and the difficulties that students present in relation to this discipline is not a new fact, as several educators have already listed elements that contribute to the teaching of mathematics being marked more by failures than by successes.

Vasconcelos and Rego (2010, p.4) argue:

> Although everyday situations are of great importance in the sense of favoring the construction of meanings for many contents to be studied, it is necessary to consider the possibility of constructing meanings from internal issues of Mathematics itself, otherwise, many contents would be discarded because they do not have concrete and immediate applicability. In addition, many reasons explain a basic education for all people and the utilitarian aspect is just one of them.

Contextualization aims to give meaning to what is intended to teach the student (...) it helps in the problematization of the knowledge to be taught, making the student feel the need to acquire knowledge that he does not yet have. (Ricardo, 2003, p. 11).

4 RESULTS AND DISCUSSIONS

The survey was carried out in August and December 2018 and consisted of questions directed to the theme under analysis that consist of understanding what are the main difficulties that teachers feel to teach Mathematics, giving it a more practical focus, that is, contextualized teaching.

At first, all the teachers approached were solicitous in answering the questionnaire, although it was very visible on the part of some that they were not interested in the subject ISSN: 2358-8829 under study, manifesting themselves in the absence of the justifications requested in some questions of the questionnaire. Even so, it was possible to arrive at the expected data, which were collected and organized and analyzed.

One of the questions asked to the group of teachers was: what did they understand and what was the view that each one had about the central theme of our study: Contextualization in Mathematics. The answers were as varied as possible and organized, in full, as follows:

- Universal interrelation.
- It is to produce as much information as possible, where the student can have greater support to reach a conclusive and correct result.
- I understand that it is the application of what is studied in the classroom in the students' daily lives.

- Use mathematics in everyday situations.
- Relate the content to everyday life.
- Insert in certain contents its applicability in everyday life.
- Try to bring mathematical content as close as possible to what is used on a daily basis.
- Relate the contents addressed with reality, giving "meaning" to the discipline.

It can be observed, from the answers of the interviewees, that the theoretical knowledge on the subject is quite broad and, although they are different answers, they all converge to the real meaning of what Contextualization in Mathematics really is. With this, we can conclude that what is lacking in Brazilian classrooms with regard to the teaching of Mathematics in a contextualized way is not the knowledge of the subject by teachers, but the minimum application that is made, in practice, of this knowledge.

With this, I do not defend the idea of omission on the part of Brazilian educators, I believe that the lack of human preparation for the implementation of this teaching model in classes, the scarce resources that most schools offer, among others, are very decisive for the absence of a more meaningful teaching of Mathematics for our students. It is also necessary to highlight that there are teachers who are already taking the first steps in this new teaching, and this fact only drives us to fight for more teachers to put into practice a teaching that combines theory and daily experience, whenever possible.

Following the research that has as its main purpose to discuss the main problems faced by Mathematics teachers when it comes to contextualization of the contents taught, the surveyed teachers were asked about the intensity of ISSN: 2358-8829 times that they brought the contents taught in the most diverse grades of action to a reality closer to the student, giving them a more significant meaning.

What can be concluded is that the opinion of the teachers when asked about the possibilities of contextualizing the contents of Mathematics and they pointed out that only some contents were possible to do this. And it is directly linked to what the authors themselves in Mathematics think.

5 CONCLUSION

It is not new that the need for a profound change of paradigms within education, and teaching itself, has been perceived. In Mathematics it is no different. The teaching of Mathematics in Brazilian schools has been losing its meaning, the results show this fact, due to the lack of teaching that shows the significance that it can have in the lives of students, a fact that has distanced the student from the object of study and has caused a huge aversion to the point that this, I quote: Mathematics has become a discipline rejected by most students.

The lack of preparation of many of the teachers has also been a very strong cause when it comes to teaching Mathematics, and this has been presented by the absence of a class that goes far beyond the mere memorization of formulas and concepts, as well as the presence of large lists of exercises in order to occupy the students' time. For many, teaching that values the reason for what is being taught has not been part of the school reality.

However, a lot of material has been published on how we should proceed methodologically so that the teaching of Mathematics, as well as its learning, achieves better results. We can no longer live and teach in the twenty-first century as if we were still in times before ours. The moment requires us to do something concrete in our classroom so that we can recover the prestige that Mathematics has in itself in the daily life of each one of us.

Based on the hope of seeing better days in terms of learning in Mathematics, I proposed the study in question, not only to point out problems that are part of most Brazilian schools, but mainly to discuss, in the light of experts on the subject, possible solutions for teaching that values the meaning of its study for the student. We can no longer hide from a teaching that tells the student where Mathematics can and will be a tool for solving problems in their daily lives, and that it makes perfect sense to learn it. ISSN: 2358-8829.

I believe that this process will not occur suddenly, but with a lot of effort on the part of the entire school community, but especially of Brazilian teachers, the results and the satisfaction rate in learning Mathematics can improve much more. This is our fight.

In this sense, I hope that this text can serve as a motivator for the current reality to be changed by the effort and work of each one of us, Mathematics teachers. We can never give up on seeing our discipline reaching the level it should have in our society.

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