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THE USE OF SOFTWARE IN MATHEMATICS ACTIVITIES AT SCHOOL

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Summary
The purpose of this work is to verify whether the teaching of mathematics can become more interesting for the student through the use of technological tools. In this context, softwareExcel, Power-Point and Geogebra ARappears as a means of assisting in the educational process, with the aim of promoting playful and dynamic teaching, stimulating graphic memory and visual intelligence. Therefore, use of the computer and*software*enables the construction for the introduction of this new methodology for teaching-learning content in schools. Through these activities, we aim to awaken greater interest and curiosity in students, due to the ease and speed of this software, in addition to taking advantage of the desire to learn and know that students demonstrate in the area of IT – a space that appears to be little used by teachers.
Key words Education, Teaching Mathematics, Technologies,*Software*Excel, PowerPoint and Geogebra AR.

ABSTRACT
The purpose of this work is to verify whether the teaching of mathematics can become more interesting for the student through the use of technological tools. In this context, Excel, PowerPoint and Geogebra AR software emerge as a means of assisting in the educational process, with the aim of promoting playful and dynamic teaching, stimulating graphic memory and visual intelligence. In this way, the use of computers and software makes it possible to build the introduction of this new methodology for teaching and learning content in schools. Through these activities, we aim to awaken greater interest and curiosity in students, due to the ease and speed of this software, in addition to taking advantage of the desire to learn and know that students demonstrate in the area of IT – a space that appears to be little used by teachers.
Keywords: Education, Mathematics Teaching, Technologies, Excel, PowerPoint and Geogebra AR software.

INTRODUCTION

Currently, society is experiencing constant technological transformations, and we human beings are responsible for these advances. Given the profound transformations taking place in the world, at the speed of information technology, communication, globalization, the diffusion of new technologies and new forms of work organization are some examples of the changes that have been demanding the development of new skills in the professions.

In this context, information technology is a fundamental part of this transformation, as it is present in all sectors of society: in commerce, industry, health and education, etc., making the world more efficient and dynamic, therefore, as in any profession , educators, must be in constant search for knowledge and appropriation of these new technological tools to combine them with the educational programmatic contents, according to their area of activity and scope.

Expanding what you already know in mathematics makes it easier to improve your work or achieve a better position. Teaching and learning mathematics are not easy tasks, neither for the student nor for the teacher, as obstacles and learning difficulties, In this area, they appear from the first years of students' school life, challenging teachers' pedagogical and didactic procedures. In this

In this sense, any efforts to minimize difficulties in learning mathematics are very welcome, to develop autonomy and self-confidence and to deal more easily with the demands of daily life and, thus, guarantee citizenship.

In this “mathematics” discipline, the content of functions is broad and highly complex, presenting Having special difficulties, one of them is their different representations. Therefore, it is up to the teacher to research and provide challenging activities so that the student can “travel” between them, checking their

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similarities and thus facilitate the understanding of their concepts, their properties, as well as the specificities of the relationships with their explanations.

According to (Duval, 2003, p.23), discarding the importance of the plurality of representation registers leads to the belief that all representations of the same mathematical object have the same content or that their respective contents can be perceived in each other as if by transparency .

This article presents approaches to the use of computers as a teaching resource and the experience of using the software Geogebra visual, Geogebras AR, Geogebra as alternatives in teaching affine functions and quadratic functions, in particular, because they are free and do not need to be connected to the internet for its use, in addition to standing out for its interactivity and practicality in teaching and learning mathematical concepts. As educational software is considered a powerful resource that assists teaching practice, its objective is to combine these technological resources with mathematical content.

Based on the school's mission, which is to provide quality education aimed at awakening in students a critical awareness of reality, as well as preparing them for the full exercise of their citizenship and democracy imbued with human principles, we will develop two types of exercise for each software, which will give you six in total.

In this way, we will prepare a plan, with the method used, taking into account the relationships and subjectivity of the student, combining the contents of mathematics with knowledge and technological availability with the aim of understanding post-modern educational expectations, which prioritize the process, the path and skills, to introduce students to a world of constant transformation.

Finally, awakening and interest are the greatest participation of students, leading them to construct knowledge through their own facilitated perceptions, the teaching-learning process should not be considered as ready-made and finished systems, the educator must be the one who is able to research, plan, be flexible, self-evaluate, mediate, innovate and enjoy their profession, as such actions are individual characteristics of each student, with the specific purpose of developing their skills, within technology, with the teacher being the mediator of this process, to develop their social intellects.

1. HOW TO TEACH MATHEMATICS TODAY?

We live in a period of technological and scientific transformations that are changing humanity's way of life. However, the school organization seeks questions that break paradigms to better meet the needs imposed by this modern world of new information technology. Therefore, the school in this social context seeks to develop new ways of teaching, incorporating new technologies into the teaching method, including how to teach mathematics.

Currently, there are several work proposals for the constant teaching of mathematics, such as:

1.1 Using problem solving.

Problem solving is a path to teaching Mathematics that has been discussed over the last few years.

The History of Mathematics shows that it was constructed as a response to questions arising from different origins and contexts, motivated by practical problems (division of land, calculation of credits), as well as by problems related to investigations internal to Mathematics itself.

The fact that the student is encouraged to question his own answer, to question the problem, to transform a given problem into a source of new problems, highlights a conception of teaching and learning not through the mere reproduction of knowledge, but through the path of reflected action that builds knowledge.

2. THE RESORT TO INFORMATION TECHNOLOGIES.

Scholars on the subject show that writing, reading, seeing, hearing, creating and learning are captured ed by increasingly advanced information technology. In this scenario, another challenge arises for the school, that is, how to incorporate new ways of communicating with these new technological methods into its work, supported by oral and written words.

On the other hand, it is also clear that access to calculators, computers and other technological elements is already a reality for a significant part of the population. Therefore, the computer is seen as an instrument that brings versatile possibilities to the process of teaching and learning Mathematics, whether through

its prominent presence in modern society, whether due to the possibilities of its application in this process.

3. THE RESOURCE OF GAMES.

In addition to being a sociocultural object in which Mathematics is present, the game is a natural activity in the development of basic psychological processes, although it demands demands, norms and control.

In the game, through the articulation between the known and the imagined, self-knowledge is developed; in group games it also represents a cognitive, emotional, moral and social achievement for the child and a stimulus for the development of their logical reasoning.

Finally, a relevant aspect of games is the genuine challenge they provoke in the student, which generates interest and pleasure. According to the National Curricular Parameters: "it is important that games are part of the school culture, and it is up to the teacher to analyze and evaluate the educational potential of different games and the curricular aspect that is desired to be developed". (Ministry of Education, 1997).

4. GAMES INVOLVING BASIC MATHEMATICS OPERATIONS

Addition and subtraction were chosen because they are content in the curriculum of the Study Plan for the 1st cycle of Elementary School and because the software Excel, PowerPoint and Geogebra AR offer teaching resources that facilitate the teaching and learning of these mathematical operations.

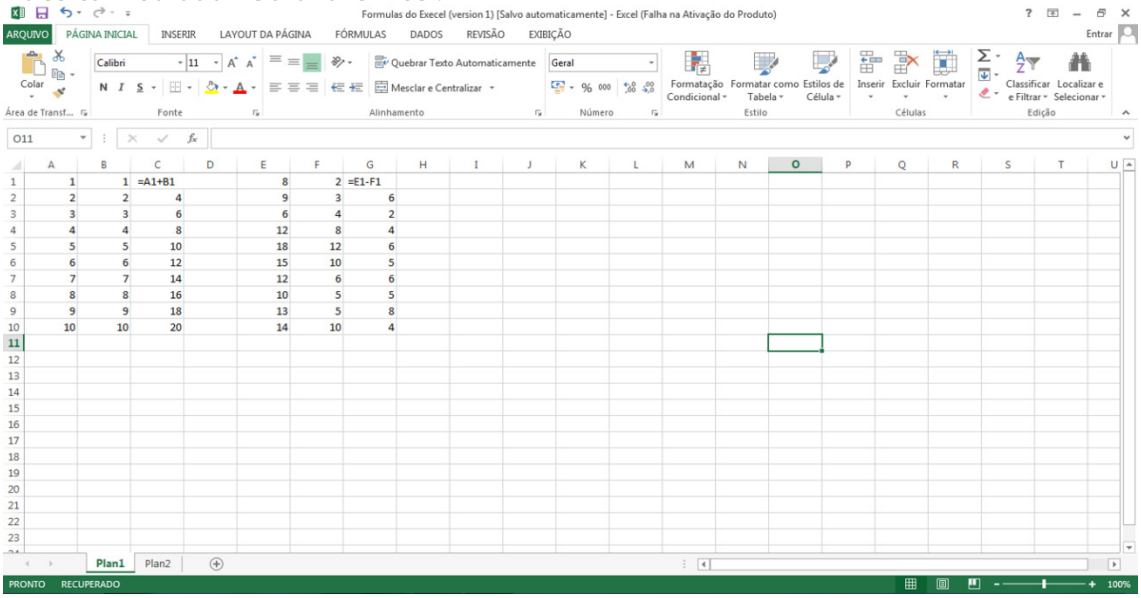
For a better understanding of the concepts of addition and subtraction and their different representations, each of them is briefly presented below.

4.1 Addition: It is the most natural operation in a child's life, because it is present in their internal experiences. fans from an early age. Furthermore, it involves situations such as "adding" and "adding", which are effectively pleasurable for them.

This purpose of students with addition greatly facilitates the pedagogical work, which consists of planning situations appropriate to the stage in which they find themselves.

When working on addition, initially, practical situations must be used that help the student construct the results of additions with all possible combinations of natural numbers from zero to nine. Little by little, he will memorize these results, known as fundamental addition facts, because they are used to add any natural numbers.

Activities carried out in*Software*Excel:



4.2 Subtraction: It is an operation, although present from a very early age in children's daily lives, it has an adverse affective aspect, often related to situations of loss ("Maria had 5 little buckles. She lost 2. How much does she have now?", or "Pedrinho had 12 little buckles and gave 7 to his brother. How much did he have?"). Subtraction involves ideas that are quite different from each other, such as taking away, comparing, completing.

Activities carried out in*Software*Excel:

8 two =E1-F1
9 3 6

6	4	two
12	8	4
18	12	6
15	10	5
12	6	6
10	5	5
13	5	8
14	10	4

As we saw in addition, it is important that the child is presented with situations in which they can act on objects to perform calculations. In the case of subtraction, this recommendation becomes even more necessary, because only when acting on objects can the child verify that it makes no sense, for example, "take 9 candies out of a package in which there are only 6", and that the representation writing 6-9 is impossible in the set of natural numbers.

It becomes complex to understand and analyze, in detail, these children's difficulties. As for ideas related to subtraction, there is consensus even among educated adults.

5. The *SOFTWARE* EXCEL IN MATHEMATICS TEACHING

Maxim and Verhey (1995, apud COXFORD and SHULTE 1999, p. 205) define the electronic spreadsheet as "[...] a two-dimensional arrangement of cells. Each cell, the intersection of a row and a column, can contain a label, a value or an expression".

Mcconnell (1995 apud COXFORD and SHULTE 1999, p. 163) states that spreadsheet programs deal with the conceptualization of the problem in abstract symbols. The user can solve a specific case and leave the generalization task to the program. We have to take into account that the user may not be able to talk about mathematical rules in terms of *x* It is *y*, or even using cell naming conventions. In this way, it is important to pedagogically explore the potential of *software*. Maxim and Verhey (1995, apud COXFORD and SHULTE 1999, p. 205) state that "[...] Electronic spreadsheets can be effective teaching tools, helping students to experience the process of doing mathematics".

In this research, we chose Microsoft Excel, as, according to Abreu et al. (2002, p.92), the program is convenient and easy to use and allows interactive learning. Furthermore, it is a *software* available and linked to computers, but most of the time the student is not even aware of this tool, which is considered rich for learning mathematics. The Excel spreadsheet has an iconography that is easily identifiable with other Microsoft programs such as Text Editors, widely used by computer users. It consists of a menu bar, followed by toolbars that can be viewed on the computer screen. It is presented in the form of a table composed of rows and columns. Each row is identified by a number: 1, 2, 3, successively, and each column, by a letter: A, B, C.... The intersection between a row and a column is called a cell and each cell is identified by address. For example, A1 means column A and row 1 (see Figure 4).

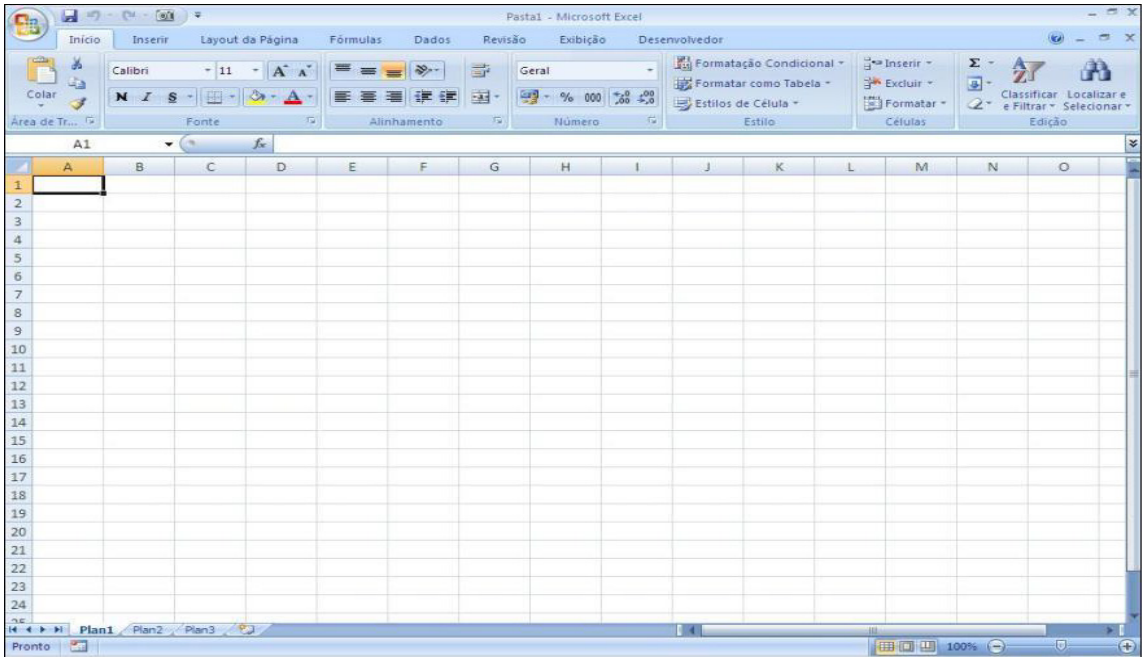


Figure 4: Excel opening screen.

Mathematics learning has been one of the main focuses for mathematics education, especially in recent years, as greater attention has been paid to methodological problems.

In this context, we can say that the teaching processes and methods adopted by teachers prove to be inadequate from the point of view of some researchers, mainly because they do not make use of available technologies to change traditional teaching methods. Aranha (1998) defines knowledge technologies or cognitive technologies as the set of techniques designed to manage, preserve, update and transmit knowledge, cultural heritage and collective memory.

In this context, it is worth highlighting the importance of information technology in teaching Mathematics, especially regarding the use of*software*, specifically in this work Excel will be used, which we believe can help in the development of students' logical reasoning and creativity.

The National Curricular Parameters mention the importance of teaching Mathematics integrated with new information and communication technologies, mainly using computers as an instrument to encourage students to test their hypotheses and build their knowledge through interaction with the machine. Because of this, we can cite the idea of Tarja (2001, p. 19), when referring to the use of*software* simulation and programming, "[...] are excellent computational resources that allow the improvement of logical, mathematical and problem-solving skills".

Information technology is present in our daily lives. The media highlights the importance of becoming familiar with this technology and those who end up not familiarizing themselves are running the risk of being considered "technologically illiterate". Today, society sees school as the gateway responsible for preparing students for life. However, the teacher, as a mediator of knowledge and agent of this process of preparation for life, needs to integrate into his pedagogical practice the elements that are part of the realization of this progress, including the computer and its multifaceted features.

In general, it is known that transforming technological education into reality is an arduous task that requires education professionals, research, knowledge and, above all, openness to change, as Tarja shows us:

> The incorporation of new communication and information technologies into educational environments causes a continuous process of change that no longer allows for a stop, as changes occur increasingly quickly and in a very short space of time. (STRIPE, 2001; p 125)

We can say, then, that the teacher is assigned the mission of monitoring these changes, expanding their educational methods, thus enabling greater interaction between teachers and students. To do this, the teacher needs to be prepared, that is, be constantly updated. According to Borba:

(...) the teacher also has to constantly update his vocabulary about computers and software. New developments in this area are emerging at a very rapid pace. (...) the teacher often cannot

follow this discussion and find yourself faced with the need to know more about the topic. (BORBA, 2001, P. 61).

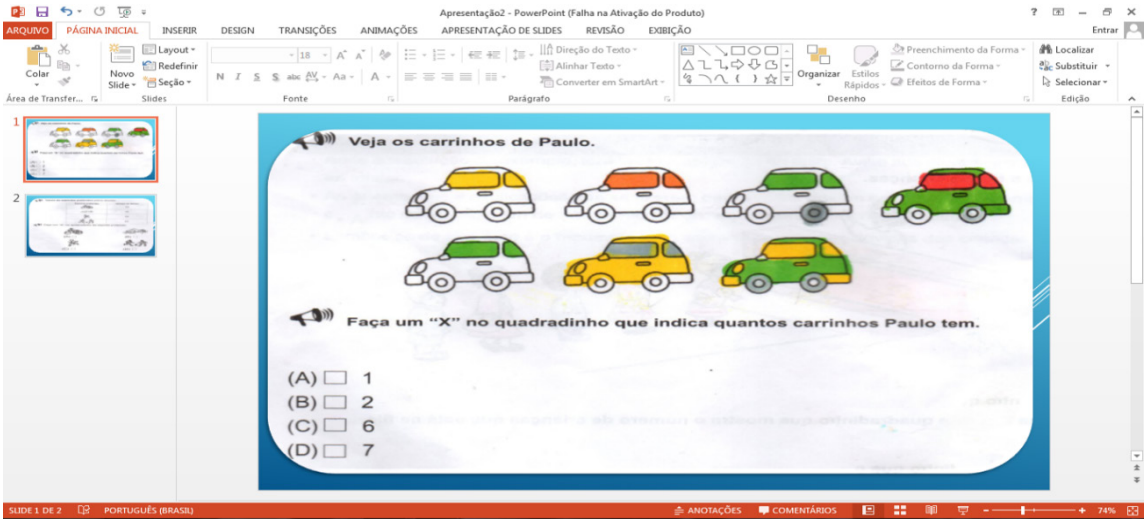
In this way, teaching practice with the use of*software*It involves discussions and study among professionals in the search to increase their knowledge, as well as requiring more time to prepare their classes. After choosing a*software*, having studied its operation and applications, the teacher embarks on one of the most important steps in the use of information technology in education, which is to plan the process of mediating knowledge in order to achieve learning and so that the results obtained with the help of this tool may be satisfactory.

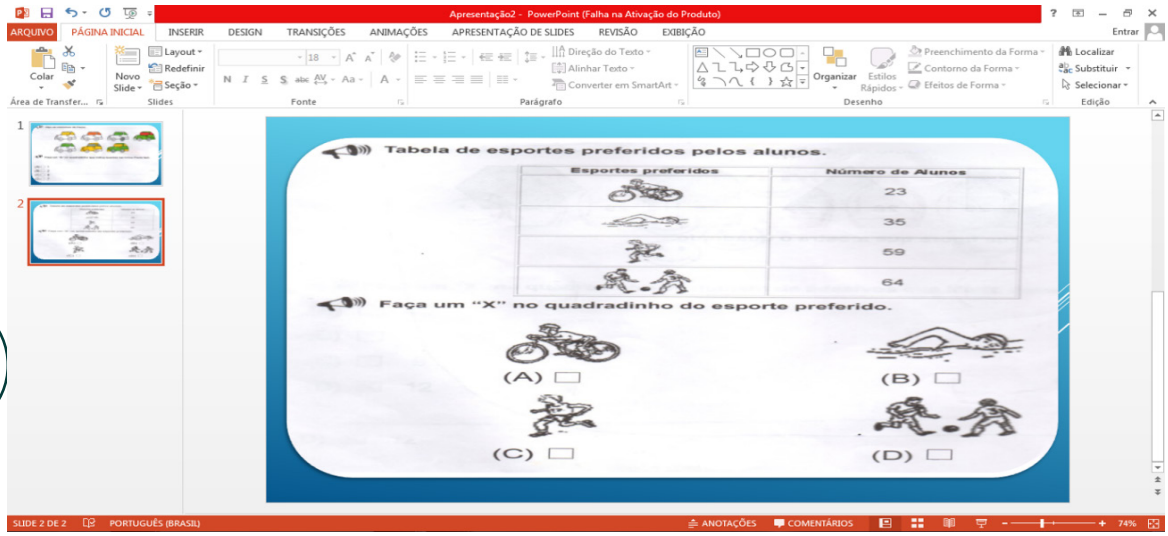
6. INTRODUCTION TO POWERPOINT SOFTWARE

PowerPoint is an application widely used to develop presentations, with various resources such as: graphic objects, symbols, organizational charts, photos, among other graphic resources. Developed by Microsoft, it allows the projection of presentations on computer monitors, Datashow and other platforms. Among its main features, we can highlight slide transition effects, the option of different fonts, pre-defined presentation templates, audio and video resources, in addition to the possibility of including animations.

PowerPoint lets you create and dictate a variety of projects. The program is an all-in-one tool - one-in-one for people who need to create documents for business purposes. Projects like slide shows, print presentations, stationery and calendars are all possible. Information is visual on a computer screen, printed on paper or projected onto a larger screen.

Activities with PowerPoint software





7. INTRODUCTION TO GEOGEBRA AR SOFTWARE

With the GeoGebra Augmented Reality app, you can create 3D mathematical graphs in your living room, garage or anywhere else and literally walk around them. When we weigh in on augmented realities (AR), we hardly remember how this technology can be useful in everyday areas such as mathematics. Or software like GeoGebra.

GeoGebra is a set of useful applications in the world of mathematics at the most varied levels of education, combining geometry and algebra, graphs and calculations, they are freely available for Windows, etc.

8. REFERENCES

ABREU, Maria Auxiliadora Maroneze de.**Mathematics teaching methodology**. Florianópolis: UFSC/ LED, 2002.

ARANHA, Jayme.**Electronic Tribes: Uses & Customs.**1998. Ed. Cortez.

BORBA, M.de C.; PENTEADO, MG**Computer Science and Mathematics Education**.2nd ed. Belo Horizonte: Autêntica, 2001. (Col. Trends in Mathematics Education).

DANTE, L.R.**Mathematics Context & Applications. Secondary Education and Preparation for Higher Education.** 2nd Edition. São Paulo: Ed. Ática, 2002. 21

BRAZIL. Ministry of Education. Secretariat of Fundamental Education. National Curricular Parameters: Mathematics. Brasília: MEC/SEF, 1997, p. 18-22.

Maxim, BR, & Verhey, RF (1988). Using Spreadsheets in Algebra Instruction. In Arthur, Coxford F. & Albert, Shulte P. (Eds.), The Ideas of Algebra, k-12. Yearbook 1988. NCTM

TARJA, SF**Information Technology in Education: New pedagogical tools for teachers today.** 4th ed. São Paulo: ÉRICA, 2001.