

# Multimedia environment for the learning of applied mathematics in elementary school children

**Entorno multimedia para el aprendizaje de la Matemática aplicadas en niños de Educación Básica Elemental**

**Ambiente multimédia para a aprendizagem da matemática aplicado a crianças do ensino básico**

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## Abstract

Current teaching is fundamentally based on playful activities that contribute to fostering individual and collaborative skills and competencies through the use of specific didactic resources. In the subject of mathematics, teachers have been forced to develop skills in the use of multimedia environments in a very short time. The literature has shown that the use of mathematical virtual environments can positively influence students' learning experiences. The present study established didactic strategies through a package of multimedia activities to enhance the teaching of mathematics in the face-to-face education modality. The methodology was mixed and descriptive, where the Focus Group technique and the survey were applied to 21 Basic Education teachers. Three educational software multimedia environments were proposed to enhance the learning of Mathematics. The findings show that multimedia environments allow activities to be varied, adapting to the needs and learning requirements of students. In addition, the establishment of didactic strategies allows the promotion of didactic games and collaborative work. The constant training and updating of teachers is essential to improve the quality of the educational process and promote more meaningful and interactive learning. It is recommended that teachers continue to explore new didactic strategies for teaching mathematics in the face-to-face modality, trying to incorporate differentiated educational technologies to improve learning.

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**Key words:** : Didactic strategy, multimedia, active methodology, focus group, educational software.

### **Resumen**

La enseñanza actual se basa fundamentalmente en actividades lúdicas que contribuyan a fomentar destrezas y competencias individuales y colaborativas a través de la utilización de recursos didácticos concretos. En la asignatura de Matemática los docentes se han visto obligados a desarrollar habilidades en el manejo de entornos multimedia en muy poco tiempo. La literatura ha demostrado que el uso de entornos virtuales matemáticos puede influir positivamente las experiencias de aprendizaje de los estudiantes. El presente estudio estableció estrategias didácticas a través de un paquete de actividades multimedia para potenciar la enseñanza de las Matemáticas en la modalidad de educación presencial. La metodología fue mixta y descriptiva, donde se aplicó la técnica de Grupo Focal y la encuesta a 21 docentes de Educación Básica. Se propusieron tres softwares educativos de entornos multimedia para potenciar el aprendizaje de las Matemáticas. Los hallazgos demuestran que los entornos multimedia permite que las actividades sean variadas adaptándose a las necesidades y requerimientos de aprendizaje de los estudiantes. Además, el establecer estrategias didácticas permite fomentar los juegos didácticos y el trabajo colaborativo. La capacitación y actualización constante de los docentes es fundamental para mejorar la calidad del proceso educativo y fomentar un aprendizaje más significativo e interactivo. Se recomienda que los docentes continúen explorando nuevas estrategias didácticas para la enseñanza de las matemáticas en la modalidad presencial, tratando de incorporar tecnologías educativas diferenciadas para mejorar el aprendizaje.

**Palabras clave:** Estrategia didácticas, multimedia, metodología activa, grupo focal, softwares educativos.

### **Resumo**

O ensino atual baseia-se fundamentalmente em atividades lúdicas que contribuem para fomentar capacidades e competências individuais e colaborativas através da utilização de recursos didáticos específicos. Na disciplina de Matemática, os professores têm sido obrigados a desenvolver competências na utilização de ambientes multimídia num espaço de tempo muito curto. A literatura tem mostrado que a utilização de ambientes virtuais matemáticos

pode influenciar positivamente as experiências de aprendizagem dos alunos. O presente estudo estabeleceu estratégias didáticas através de um pacote de actividades multimédia para melhorar o ensino da Matemática na modalidade de ensino presencial. A metodologia foi mista e descritiva, onde a técnica de Focus Group e o inquérito foram aplicados a 21 professores do Ensino Básico. Foram propostos três ambientes multimédia de software educativo para potenciar a aprendizagem da Matemática. Os resultados mostram que os ambientes multimédia permitem variar as actividades, adaptando-se às necessidades e exigências de aprendizagem dos alunos. Além disso, o estabelecimento de estratégias didáticas permite a promoção de jogos didáticos e de trabalho colaborativo. A constante formação e actualização dos professores é essencial para melhorar a qualidade do processo educativo e promover uma aprendizagem mais significativa e interactiva. Recomenda-se que os professores continuem a explorar novas estratégias didáticas para o ensino da matemática na modalidade presencial, tentando incorporar tecnologias educativas diferenciadas para melhorar a aprendizagem.

**Palavras-chave:** Estratégia didática, multimédia, metodologia ativa, grupo de discussão, software educativo.

## INTRODUCTION

The skills and abilities developed in Elementary Basic Education (EBE) are the educational support that allows students to advance efficiently in the learning process. At the EBE level, teaching is fundamentally related to playful activities that contribute to fostering individual and collaborative skills and competencies, through the use of concrete didactic resources and based on research and technological advances. At the EBE level, children learn to read, write and apply the four fundamental operations of Basic Mathematics. This represents for teachers a period in which they must place special emphasis on the design of learning activities in order to achieve the best results in their teaching (Torres et al., 2021). For most basic education teachers, the COVID 19 pandemic was a determining factor in the change of attitude towards teaching methods, since it made possible a transformation in the learning processes, where the teaching staff had to adapt quickly and efficiently. Despite the fact that the experience was mandatory, the approach to digital teaching of teachers has marked a before and after in current teaching (Cruz, 2021).

The implementation of virtual learning environments at present is clearly justified due to the situation generated by the COVID-19 pandemic (Corrales, 2021). (Corrales, 2021)The implementation of virtual learning environments today is clearly justified due to the situation generated by the COVID-19 pandemic (Corrales, 2021), in which teachers have been forced to develop new skills in the management of multimedia environments in a very short time. This has generated a change in face-to-face teaching since multimedia learning tools are not totally under their control and require specific techniques and knowledge for their management in order to achieve meaningful learning through them (Miranda et al., 2020). It has been found that the competencies related to information access, information management, internet management and virtual environments have been the most developed by teachers and that they have to put into practice with students (Novay and Chacin, 2022).. International and national literature has shown that the use of mathematical virtual environments in education can positively influence students' learning experiences. Virtual environments are a valuable tool that provides a variety of opportunities to students for their learning process in accordance with current educational demands (González and Granera, 2021). This is achieved through virtual reality educational games, which influences academic performance by increasing engagement with the subject (Akman and Çakır, 2020). Other studies have studied the effects of a game-based learning environment in supporting adaptive numeracy and related arithmetic skills in elementary school students. The findings demonstrate varied effects of training at different grade levels, with a more pronounced improvement in adaptive numerical knowledge of upper grade students (Brezovszky et al., 2019).

In Ecuador, important research has been conducted on the use of digital environments for the teaching of mathematics in EBE. In the research of Quilca (2020) on Web 2.0 tool for learning multiplication in third grade is based on the environment and the difficulties of learning multiplication found in students and to solve it, a virtual environment was developed with Web 2.0 tools. García (2021) sought to structure a virtual environment suitable for teaching mathematics. Through the use of the Google Sites platform, a high interest of teachers in the application of the designed instruments is reflected, concluding that the application of digital resources in properly designed environments significantly supports the improvement of teaching-learning of students.

In this context, one of the most complex problems faced by EBE teachers was the teaching of mathematics, which, due to its subjective characteristics, is a complex teaching task in face-to-face classes, becoming a difficult problem to overcome in today's virtual education. The study was designed to answer the following research question How does a multimedia environment affect the learning of mathematics in elementary basic education students?

As a main objective, it has been proposed to determine a multimedia environment for students' learning of mathematics, specifically, (a) to establish didactic strategies used for teaching mathematics in the face-to-face education modality; (b) to highlight multimedia didactic strategies suitable for teaching; and (c) to structure a package of multimedia didactic activities suitable for learning mathematics.

### **MATERIALS AND METHODS**

The research approach was quantitative and qualitative since the perception of teachers regarding the methodological processes of Mathematics and the use of multimedia resources was analyzed with respect to the need to develop an interactive proposal for learning the subject. The design was non-experimental with descriptive scope, since activities for learning Mathematics were developed and applied.

In this research, no sampling was carried out, but the instrument was applied to all teachers working in Basic Education. The work was carried out in the facilities of the Simón Rodríguez Educational Unit in the Licán parish of the Riobamba canton, with EBE teachers in the second, third and fourth years.

The method used for this research work was the inductive-deductive method. The research is based on the analysis of the particularities of teachers in relation to the use of digital environments for the teaching of mathematics in order to establish generalizations by way of conclusions and recommendations.

The technique used to determine the didactic strategies used by classroom teachers was a Focus Group. The data collection technique was a structured survey to measure the teachers' perception of digital learning environments, elementary mathematics teaching and the need for a proposal to promote mathematics teaching using educational software. The instrument for the Focus Group was a questionnaire-guide of eight open-ended questions about mathematics learning techniques in EBE. The second instrument used was a survey questionnaire with 12 question items rated according to the Likert scale where: "1" represents never and "5"

represents always. The questions were divided into three categories, the first category, covers questions related to multimedia environments and refers to questions 1 to 5, the second category is related to learning elementary mathematics covering items 6 to 10. The third category refers to the teachers' perception of the need to propose a proposal for teaching mathematics in digital environments, but, for the purpose of analysis, it was placed together with the first category.

The validity analysis of the survey was carried out through an evaluation by experts in the field of virtual environments. The quality of the instrument was evaluated as follows: Poor (0 to 20%), Fair (21 to 40%), Good (41 to 60%), Very Good (61 to 80%) and Excellent (81 to 100%). Based on this assessment, the experts issued an opinion on applicability, suggesting whether the instrument is applicable. For the reliability of the instrument, a pilot test was conducted with five volunteer teachers where, with a total number of valid cases, a Cronbach's Alpha value of 0.933 was reported. This means that the instrument is highly reliable and can be applied.

## RESULTS

Table 1 shows the answers given by the 21 teachers on the use of didactic strategies for teaching mathematics through the Focus Group technique.

**Table 1.** Interview of 21 teachers through the Focus Group.

Ask	Reply
What are the didactic strategies used by teachers to teach mathematics face-to-face in elementary basic education?	Teachers mentioned several strategies to teach mathematics in a face-to-face manner, such as: using concrete materials, playing games, solving problems, teaching in a collaborative manner, using everyday examples, among others.
How would you describe the activities that teachers use to teach mathematics face-to-face in elementary basic education? Are they interactive or rather expository activities?	Teachers mentioned that the activities they use are predominantly interactive, as they seek to encourage student participation in problem solving and in the construction of their own knowledge.

<p>What do you think of the activities used by teachers to teach mathematics in elementary school? Do you think they are effective or not? Why?</p>	<p>The teachers felt that the activities they use are effective, as they allow students to better understand mathematical concepts and apply them in a practical way. They also noted that these activities allow them to follow up more closely on the learning process of each student.</p>
<p>What are the strengths and weaknesses of the didactic strategies used by teachers to teach mathematics face-to-face in elementary basic education?</p>	<p>The teachers mentioned as strengths of their didactic strategies the encouragement of student participation, the practical application of concepts and the adaptation to the individual needs of each student. As weaknesses, they mentioned the lack of time available to carry out some activities and the lack of technological resources and didactic materials.</p>
<p>How does the use of technology influence face-to-face mathematics teaching in elementary basic education? What technological tools do teachers use to teach mathematics face-to-face?</p>	<p>Teachers pointed out that the use of technology can be beneficial for teaching mathematics, as it allows for greater interactivity and visualization of concepts. Some of the technological tools they mentioned are: interactive whiteboards, projectors, tablets and educational software.</p>
<p>How do teachers engage students in the process of learning mathematics face-to-face? What techniques do they use to motivate students to learn mathematics?</p>	<p>Teachers mentioned that they involve students in the learning process by conducting interactive activities and using everyday examples. They also use techniques such as constant feedback, adapting to the individual needs of each student, and recognizing students' achievements.</p>
<p>How do teachers adapt to the individual needs of students in face-to-face mathematics instruction in elementary basic education?</p>	<p>Teachers mentioned that they adapt to the individual needs of students by providing differentiated activities, constant feedback and personalized attention. They also noted that they work collaboratively with other teachers to identify the needs of each student and adapt instruction accordingly.</p>

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<p>What recommendations or suggestions would you offer to teachers to improve face-to-face mathematics instruction in elementary basic education?</p>	<p>Teachers suggested that the use of concrete materials and technology in mathematics teaching should be encouraged, as well as the use of interactive and differentiated activities. They also suggested the need for more training and updating in terms of didactic strategies for teaching mathematics in elementary basic education.</p>
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According to the responses obtained from the Focus Group, it can be observed that teachers use a variety of didactic strategies to teach mathematics face-to-face in the EBE. These strategies focus mainly on student interaction and participation in the learning process, suggesting that teachers seek to foster knowledge construction through practice and problem solving. Brezovszky et al. (2019) state that the development of adaptive skills with arithmetic problem solving is a highly desired goal of elementary school mathematics education. However, there are very few practical tools for teachers to help achieve this complex mathematical learning goal.

Regarding the use of technology, it can be observed that teachers recognize its potential benefit for the teaching of mathematics, although they also recognize the need to have adequate resources for its implementation. The multimedia environment has a great potential, in constant development, which allows finding the most diverse and effective ways and methods of self-realization, which contributes to the implementation of the principle of educational education (Fernandez et al, 2018). Regarding the strengths and weaknesses of didactic strategies, it can be observed that teachers recognize adaptation to the individual needs of students as an important strength, although they point out the lack of time and resources as a weakness.

Considering the results obtained from the teachers on mathematics learning, which were obtained in the Focus Group workshop conducted for the induction of the survey, it was asked: what were the main didactic strategies they traditionally used for teaching mathematics? the analysis of the criteria allowed reaching an agreement. In this context, the teaching of mathematics in the face-to-face education modality aimed at elementary school students of the Simón Rodríguez Educational Unit is a challenge for teachers. Arauco (2022) considers the methodology of mathematics teaching as a pedagogical science about the tasks, content and way of making



students learn mathematics. Etchepare et al. (2017) proposes mathematics teaching methods as a section of pedagogy that explores the patterns of teaching mathematics at a certain level of its development in accordance with curricular objectives.

Several didactic strategies have been developed linked to the curricular planning proposed by the Ministry of Education and applied by all teachers in order to make the teaching of mathematics more effective. According to the curricular planning of the Ministry of Education (MEC, 2022). (MEC, 2022) learning should develop a wide variety of cognitive processes and encourage the development of as many skills as possible, preventing learning from focusing on only a few specific ones.

One of the most effective strategies is problem-based learning, which involves posing real-life mathematical problems for students to apply mathematical concepts and skills learned in class. This strategy fosters collaboration and communication among students as they work as a team to find solutions. Vera et al. (2021) emphasizes that the core of problem-based learning is the identification, description, analysis and resolution of such problems, which is achieved with the help of the teacher, who thus assumes a new role in the teaching-learning process and for the students. Tapia et al. (2020) emphasize that by incorporating prior knowledge and practical issues and fostering the growth of skills and logical reasoning, this helps students to understand ideas and practical activities relationally.

One strategy that teachers claim is example-based teaching, which involves teaching mathematical concepts through concrete examples. For the examples, everyday situations or real problems that students face in daily life are chosen; for example, working in the fields, taking care of animals, going to the market, going for walks, among other activities. These examples linked to the environment according to the opinion of the teachers in the virtual workshop allow students to better understand mathematical concepts and how to apply them in practical situations. A tool that can be applied in this area is gamification, in which the student can learn to solve problems based on mathematical games and apply it in their daily lives (Holguin et al., et al., 2005). (Holguin et al., 2021)..

Another very useful strategy is project-based teaching, in which mathematical skills acquired in class are taught. These projects can be of different types, such as building models, solving practical problems or conducting experiments. These didactic strategies are related to the interdisciplinary projects proposed in the prioritized curriculum of the Ministry of Education of Ecuador. del Valle et al.

(2020) mention that project-based teaching is a methodology that can improve educational practice because it provides students with methods to learn through active and dynamic research in environments that more closely resemble real life, resulting in the creation of authentic and real products.

The use of mathematical games is also an effective strategy, as it allows students to learn in a playful and fun way. Games are used to reinforce mathematical concepts and skills, as well as to foster healthy competition among students. Pallares and Murillo (2019) explain that geometry and arithmetic are the subjects with the greatest learning challenges for teachers, although they are generally positive about the inclusion of didactic games in mathematics classes. Through mathematical games, students play a more active role where resources are used to capture their attention, keep their interest and arouse their curiosity about the various topics of the subject (Carrillo, 2018).

Based on the surveys, teachers expressed the importance of using didactic and technological materials, which they hardly have, for teaching mathematics. Audiovisual resources, such as videos and multimedia presentations, are applied very sporadically to help students better understand more complicated mathematical concepts. Amaro and Villaseñor (2018), point out that the use of short videos created by students allows the reinforcement of concepts covered in class or as support for exam preparation. The design and production of videos is oriented around their fundamental role as a tool for knowledge acquisition, which is to clarify key concepts and ideas of the subject.

The use of software and computer applications most teachers have not used them, taking into account that they also have difficulties in the realization of computer packages applied to the teaching of mathematics. Nivela et al. (2018) demonstrated that the use of mathematical software managed to inspire and motivate students to create their own exercises; this demonstrates the important value of incorporating this didactic material to the process of teaching and learning mathematics. Castro et al. (2019) emphasize that mathematics is taught in a dynamic and engaging way through the use of educational software such as Geogebra, which allows the student to gain a deeper mathematical understanding when used correctly. In addition, Castro et al. (2022) point out that the use of educational software improves cognitive skills for learning mathematics-based technologies and contributes to problem solving in practical situations and the development of critical thinking.

These are just some of the traditional didactic strategies used by teachers at the school and which they claim are effective for learning mathematics in EBE. It is important to mention the teachers' criteria in assuring that each student is different and that what works for one may not work for another, so it is important to try to be creative and vary the strategies to adapt to the individual needs and abilities of each student. Supported by Vygotsky's theory, Olivo-Franco et al. (2019) mentions that didactic strategies provide the opportunity to approach teaching and learning, particularly in Mathematics, in a meaningful way and through a variety of interactive, fun and genuinely dialogical strategies that allow students to take an active role in their own learning.

In percentage terms, it could be said that approximately 33% of the teachers mentioned the use of concrete materials as an important strategy, 38% mentioned the implementation of interactive activities, 19% mentioned the adaptation to the individual needs of the students, and 10% mentioned the use of technology. In addition, 60% of the teachers recognized that the didactic strategies they use are effective in face-to-face mathematics teaching, while 40% mentioned some weaknesses in their implementation.

From these results it can be said that teachers assume the importance of using multimedia resources and are willing to work with them; however, there is still a percentage of teachers who are reluctant and maintain doubts and concerns, which can be overcome by discovering the importance of multimedia resources as a support for learning mathematics (Figure 1a). Ruiz-Ledesma et al. (2019) highlight that today's world is changing as a consequence of the new generations that arrive already accustomed to new technologies. Since today's students are expected to carry electronic devices with them, it is necessary to introduce methodologies that take into account these demands in both teaching and learning.

In the analysis of the multimedia environment, they reflect that the training they have received in the use of ICT resources is at the necessary level to promote their use (Figure 1b). However, the knowledge acquired does not reach the required level (Figure 1c), due to the lack of technological means. In this sense, educational institutions in rural areas scarcely integrate multimedia content in their learning processes (Figure 1d).

Teachers' experience points to a sequence for ICT integration for schools in rural areas, which have to include planning, teacher training, provision and management of resources, maintenance and monitoring, and incentives (Molina and Mesa, 2018). The above is a

cumbersome process so teachers prefer traditional methodologies. The influence of virtuality has allowed sporadic activities with multimedia devices, learning spaces that students enjoy and are motivated (Figure 1e). Ochavano et al. (2022) emphasizes that students can improve their mathematical skills, acquire learning autonomy and expand their knowledge through interaction with their peers and the teacher by making appropriate use of technology.

On the analysis of the teaching-learning of mathematics, teachers agree with the curriculum that is handled (Figure 1f), but defend the traditional teaching processes, which, despite allowing acceptable learning, limits the use of other teaching tools, such as the use of multimedia, of proven efficiency (Figure 1g). (Marín et al., 2019; Manrique et al., 2021). According to the teachers, the attitude of the students is active and spontaneous; unfortunately, most teachers continue working with a behaviorist scheme, which reduces the motivation of the students and makes the mathematics classes unpleasant for the students (Figure 1h).

The teachers assure that the learning of mathematics is at the level of the requirements of curricular planning, but it is important to mention that they privilege content over skills, with the purpose of complying with the obligatory subjects (Figure 1i). As pointed out by Samaniego et al. (2018) a fundamental part of the teaching-learning process is planning, since it allows teachers to guide their students' learning, identifying the objectives, skills and evaluation criteria set out in the curriculum. The relationship, experimentation, application, cooperation and transfer of knowledge, as part of the methodological strategies of curricular planning, have improved the teaching-learning process in mathematics.

The teachers' perception of the importance of using multimedia is evident, since they claim to perceive the differences between the methodologies (Figure 1j). About a multimedia proposal for teaching mathematics is accepted with pleasure assuring that it would contribute to improve the quality of learning, so most teachers, but with different perception are willing to use these teaching tools (Figure 1k and 1l). Marín et al., (2019) mentions that multimedia proposals meet the needs of students through the creation of multimedia appropriate for the end user. Novay et al. (2023) emphasize that new ways of learning through different techniques and alternative methodologies open new spaces to investigate different methods of how to assimilate the knowledge of students regardless of obstacles of time, space and resources.

The objective of the proposal is to develop methodological strategies

for teaching Mathematics in ebe, using the applications eXelearning, Ardora and Hot Potatoes. eXelearning is an open source tool that facilitates the creation of educational contents (Angraini et al., 2023).. Ardora is a software application for teachers that allows the creation of Web content (Delgado et al., 2020). (Delgado, 2020). Hot Potatoes is a software for creating educational exercises that can be performed on the Web at a later date. (Ansari et al., 2019).. Figure 2 mentions different multimedia didactic activities to be applied with students using eXelearning.

**Figure 2.** Multimedia didactic activities with eXelearning.

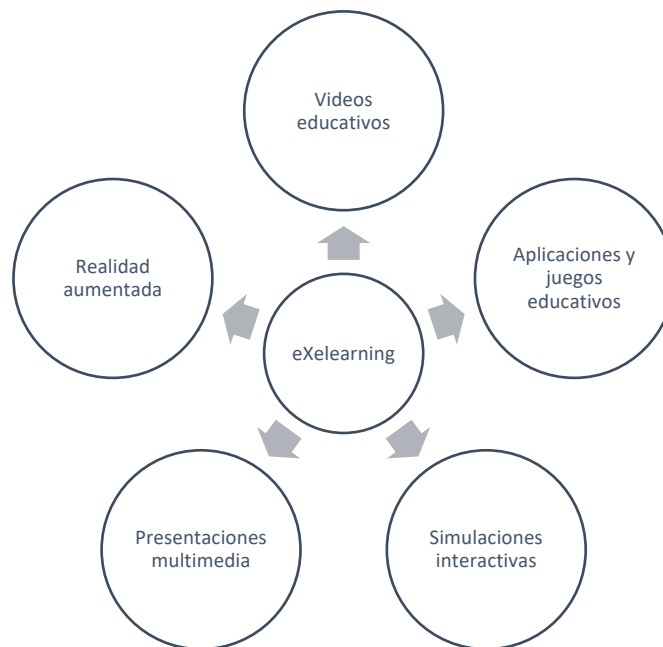


Table 2 shows the details of each of these activities.

**Table 2.** Description of eXelearning activities.

Activity	Description
Use of educational videos	Educational videos are an excellent tool for explaining complex mathematical concepts in a clear and visual way. Short, animated videos can be used to introduce or reinforce a particular concept, or longer videos can be used to explain an

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Educational applications and games	entire topic. Educational apps and games are a fun and effective way to teach mathematics to elementary students. These tools can be used to teach math skills such as counting, basic operations and geometry in an interactive and playful way.
Interactive simulations	Interactive simulations allow students to explore mathematical concepts in a visual and hands-on way. For example, simulations can be used to explain the relationship between the diameter and circumference of a circle, or to demonstrate how the area of a square changes when its side is changed.
Multimedia presentations	Multimedia presentations, such as PowerPoint, Prezi or Google Slides, can be used to explain complex mathematical concepts in a clear and visual way. Images, graphics, videos and other resources can be used to make the presentation more attractive and interesting for students.
Augmented reality	Augmented reality allows students to explore and visualize mathematical concepts in an interactive and hands-on way. Augmented reality applications can be used to visualize geometric figures in 3D, solve mathematical problems using virtual objects, and make learning more interactive and engaging.

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Figure 3 mentions different multimedia didactic activities to be applied with students using Andora.

**Figure 3.** Multimedia didactic activities with Andora.

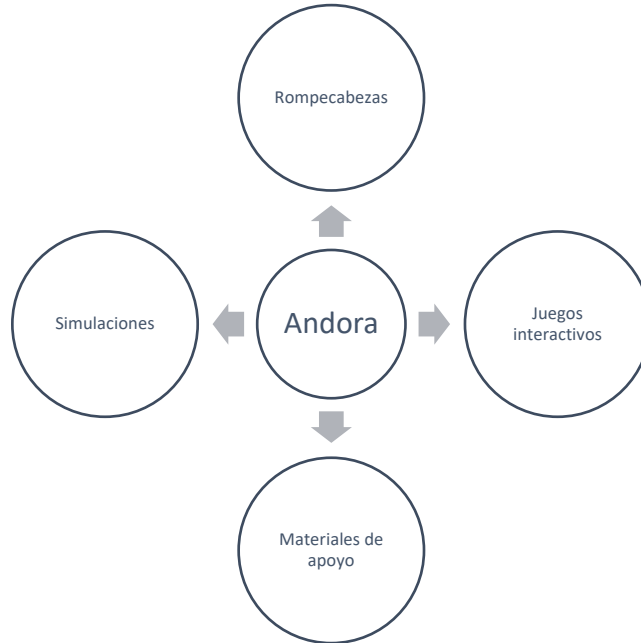


Table 3 shows the details of each of these activities.

**Table 3.** *Description of activities with Andora*

Activity	Description
Puzzle	It consists of creating activities that present a mathematical problem or an operation that the student must solve. Ardora allows you to create activities of this type in a simple way and you can incorporate multimedia elements such as images, sounds or videos to make them more attractive.
Create interactive games	The student must apply the mathematical concepts he/she has learned. Ardora allows the creation of different types of games, such as memory games, question and answer games, association games, among others.
Develop support materials	Tools such as Ardora can be

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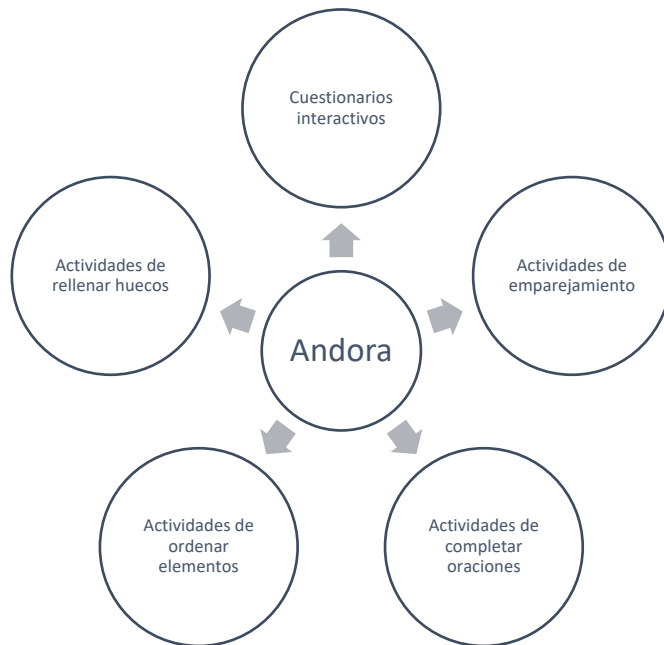
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Perform simulations	used to create support materials, such as review worksheets, practical exercises, multimedia presentations, among others. These materials can be useful for students to review the mathematical concepts that have been worked on in class in a more dynamic and interactive way.
	Ardora also allows you to create simulations that allow students to experiment with mathematical concepts in a practical way. For example, simulations can be created to show how different types of angles work, how basic mathematical operations are performed, among others.

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Figure 4 shows different multimedia didactic activities to be applied with students using Hot Potatoes.

**Figure 4.** Multimedia didactic activities with Hot Potatoes





**Table 4.** *Description of activities with Hot Potatoes*

Activity	Description
Interactive questionnaires	Interactive quizzes can be created to assess students' mathematical knowledge. These quizzes can include multiple choice, true or false, short answer, among others. In addition, feedback can be used to help students understand mathematical concepts more effectively.
Matching activities	Activities can be created in which an incomplete sentence related to a mathematical concept is presented and the student must complete it. These activities can be useful for assessing students' understanding of mathematical concepts.
Activities to order elements	Activities can be created in which students must sort items related to a mathematical concept in ascending or descending order. These activities can be useful for assessing students' ability to sort and classify information.
Gap-filling activities	Activities can be created in which students must complete a mathematical exercise or problem by filling in gaps. These activities can be useful for assessing students' understanding and ability to solve mathematical problems.

## CONCLUSIONS

A multimedia environment for learning mathematics in EBE students allows the activities to be varied and adapted to the needs and

characteristics of each group of students. Establishing didactic strategies used for teaching mathematics in the face-to-face education modality for elementary school students allows the use of manipulative materials, didactic games, problem solving and collaborative work. In addition, it has been found that the constant training and updating of teachers is essential to improve the quality of the educational process and to promote more meaningful and interactive learning. By highlighting multimedia didactic strategies suitable for teaching mathematics to elementary school students with tools such as eXelearning, Ardora and Hot Potatoes, it is possible to integrate didactic strategies effectively in the teaching of mathematics to elementary school students. These tools allow the creation of interactive and dynamic activities that facilitate the understanding and learning of mathematical concepts. In addition, it has been found that these multimedia tools can be used to adapt learning to the individual needs and rhythms of each student, which is beneficial to achieve meaningful learning.

It is safe to say that the construction of multimedia didactic activity packages for teaching mathematics in elementary basic education is a task that requires planning, creativity and technical knowledge. It is important to take into account the learning objectives, the characteristics of the group of students and the multimedia tools available in order to design effective and attractive activities. It is recommended that teachers continue to explore new didactic strategies for teaching mathematics in the face-to-face modality, trying to incorporate differentiated educational technologies to improve learning. It is also suggested that greater collaboration among teachers be promoted to share experiences and good practices in mathematics teaching. In this sense, it is important to continue promoting the training and constant updating of teachers in topics related to mathematics teaching and the appropriate use of educational technologies. In this way, it will be possible to ensure a comprehensive and effective training for students in this important area of knowledge.

The teachers' recommendations suggest the need to continue developing innovative teaching strategies adapted to the needs of the students, as well as the need for training and constant updating regarding mathematics teaching in EBE.

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