

Aplicación del sitio Web “VirtualMates” en la enseñanza de las Matemáticas

Application of the Web site "VirtualMates" in the teaching of mathematics

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Resumen

La implementación del software matemático así como el uso de las nuevas tecnologías de la información y comunicación en la enseñanza de las matemáticas, es un proyecto que busca innovar dicha metodología, poniendo al alumno como receptor del conocimiento, y con la posibilidad de interactuar en medio de un ambiente de aprendizaje en donde él realice, proponga y concluya tareas, utilizando las herramientas de las TICs, tales como **Web 2.0, Ajax, JQuery**.

Palabras clave Enseñanza, Matemáticas, TICs, Virtual

Abstract

Mathematical software implementation and the use of new technologies of information and communication in the teaching of mathematics, is a project that seeks to innovate this methodology, with the student as receiver of knowledge, and the ability to interact in the middle of a learning environment where he performed, propose and complete tasks using ICT tools such as **Web 2.0, Ajax, JQuery**.

Key words: Teaching, Mathematics, ICT, Virtual

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Introduction

Information and Communication Technologies (ICTs) are a set of resources arranged to manipulate information. Specifically in the area of teaching, the incorporation of these technologies should represent a change in the didactics of the subjects and in particular of Mathematics. Studies carried out in Spain about the advantages of ICTs in the classroom, mentions the implementation of teaching materials of technologies in current education. When teachers use these technologies, young people show motivation, interest, interactivity, cooperation, initiative, creativity, communication, autonomy and feedback for the subjects (Rodríguez, 2009).

On the other hand, poor performance in mathematics is attributed to a lack of liking for mathematics, mathematical self-concept, mathematical attitudes and beliefs, beliefs about the teacher and the family environment. They are results of questionnaires applied to students between 6 and 18 years old in the State of Mexico, to obtain the mathematical emotional profile as a predictor of rejection (Hidalgo et al. 2005). According to the above, a sampling of the failure in the subject of Mathematics was carried out, in the division of Information and Communication Technologies: Networks and Telecommunications Area, included in the period from May-August/2003 to January-April/ 2011, (Dept. of Planning of the Technological University of Tabasco) and reflects that the historical index has fluctuated between 7% and 63%, maintaining an average of 33.47% of failed students per semester.

The implementation of the website with technological resources improves the learning level of the subject of Mathematics Applied to Telecommunications and increases performance in this academic area. The website contains options to consult information on the subject, proposed exercises, videos with exercises solved by the teacher, forums and evaluation instruments. The ICT resources used in the design of the website are:

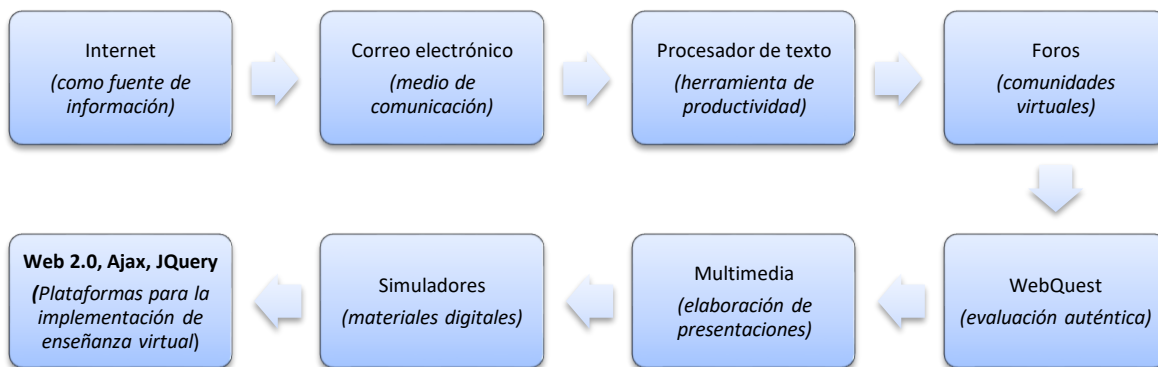
advanced technology tools for handling data and dynamic processes at the service of the end user (Web 2.0), interactive applications (Ajax), applications to create dynamic website designs and aesthetic (jQuery), a site to chronologically compile texts from the participants (Blogs), evaluation instruments generated by the teacher (Webquest), a logical space that can be edited by the students, where they can place solved mathematical exercises (Wikis), videos filmed by the teacher and forums for asynchronous electronic discussion.

The results of the application of this website will benefit the students by increasing their academic performance in the area of mathematics in the division of Information and Communication Technologies: Networks and Telecommunications Area, as well as the Technological University of Tabasco by increasing the approval rating.

BACKGROUND

Today there are more and more people who can access Information and Communication Technologies in all social areas. Specifically in teaching, the incorporation of these technologies must represent a change in the didactics of the subjects, and especially of Mathematics. The modification of calculation methods, graphing equations, among other tasks, are supported by the large amount of software that exists in the market.

The development of tics allows teaching to also evolve the way it is taught:

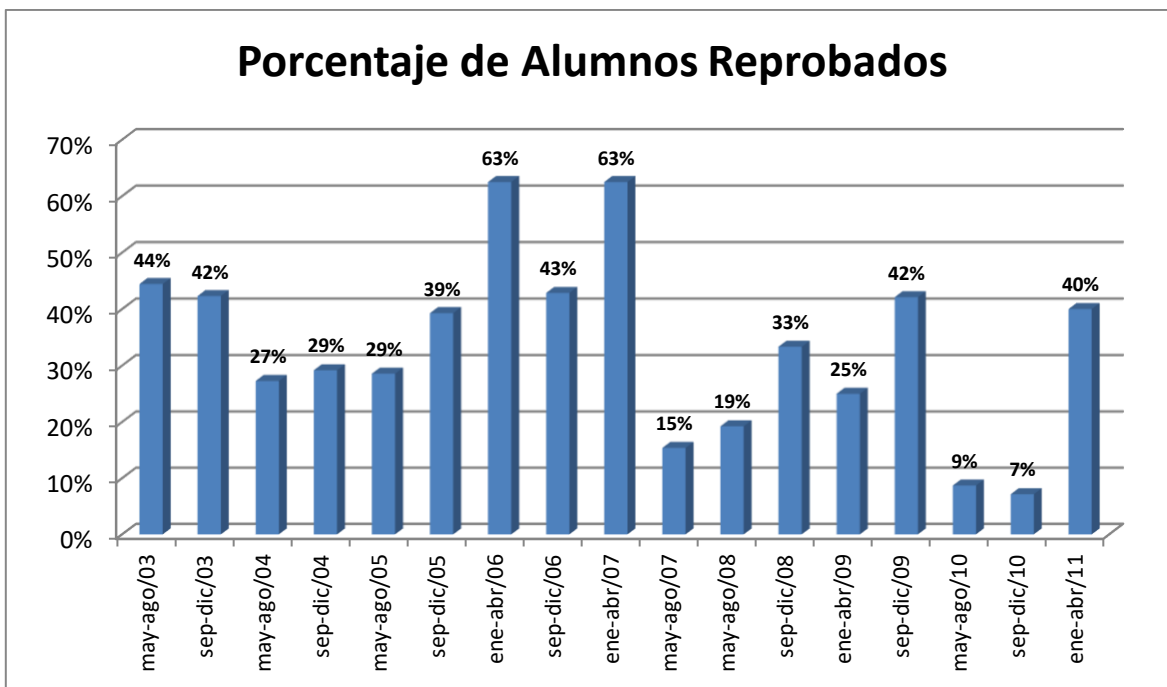


Likewise, teaching in the discipline of mathematics has evolved over time: es.wikipedia.org/wiki/Historia_de_la_matemática

Cultura Matemática	Periodo	Características
Sudáfrica	70.000 años de antigüedad	En Rocas de ocre en una caverna, que están adornados con hendiduras en forma de patrones geométricos.
África y Francia	35.000 y el 20.000 a.C.	Artefactos prehistóricos , que sugieren intentos iniciales de cuantificar el tiempo.
Cazadores y pastores	35.000 y el 20.000 a.C.	Empleaban los conceptos de <i>uno</i> , <i>dos</i> y <i>muchos</i> , así como la idea de <i>ninguno</i> o <i>cero</i> , cuando hablaban de manadas de animales.
En las inmediaciones del río Nilo, al noreste del Congo	20.000 a. C.	El hueso de Ishango , supone la demostración más antigua conocida de una secuencia de números primos.
Antiguo Egipto y en el periodo predinástico de Egipto	5º milenio a.C.	Aplicaron la Multiplicación y representaban pictóricamente diseños espaciales geométricos
Los monumentos megalíticos en Inglaterra y Escocia	3er milenio a.C.	Incorporan ideas geométricas tales como círculos, elipses y ternas pitagóricas en su diseño
Norte de la India y Pakistán (Cultura del Valle del Indo)	3000 - 2600 a. C.	Desarrolló un sistema de medidas y pesas uniforme que usaba el sistema decimal, una avanzada tecnología con ladrillos para representar calles dispuestas en perfectos ángulos rectos y una serie de formas geométricas y diseños, incluyendo cuboides, barriles, conos, cilindros.
China	1600 - 1046 a.C.	Los números fueron representados mediante una notación decimal .
	190 d. C.,	Realizaban cálculos con el ábaco chino .

Antigua India	800–500 a. C.	Usaban números irracionales, números primos, regla de tres y raíces cúbicas; cálculo de la raíz cuadrada de 2 con cinco decimales; un método para cuadrar el círculo; resolución de ecuaciones lineales y cuadráticas; desarrollo algebraico de ternas pitagóricas y enunciado y demostración numérica del teorema de Pitágoras.
Los matemáticos Jaina	400 a. C. y el 200 a. C.	Desarrollaron la teoría de conjuntos, los logaritmos, leyes fundamentales de los índices, ecuaciones cúbicas, sucesiones y progresiones, permutaciones y combinaciones, cuadrados y extracción de la raíz cuadrada y potencias finitas e infinitas.
Los griegos en la Antigüedad	600 a. C. hasta el 300 d. C	Los matemáticos griegos usaban el razonamiento deductivo ; usaron la lógica para deducir conclusiones, o teoremas, a partir de definiciones y axiomas.
India clásica	400–1600	Introdujo las funciones trigonométricas de <i>seno</i> , <i>coseno</i> y <i>arco seno</i> .
Islámica	800-1500	Sobre los números arábigos y sobre los métodos de resolución de ecuaciones.

In the same way, it is important to consider the history that reveals how the students have performed in the use of the mathematics subject. Below is a sample of failure in the subject of Mathematics, in the division of Information and Communication Technologies, from the period May-August/2003 to January-April/2011. (Department of Planning of the Technological University of Tabasco).



PROBLEM STATEMENT

The high failure rates in the subject of mathematics in the Information and Communication Technologies division have resulted in a total demotivation of students who often choose to drop out, or simply stop coming to class. It is worrying to see young people who are predisposed to take an attitude of defeat at the slightest sign of difficulty in the matter, causing a significant drop in student enrollment, deriving high costs to the educational institution and the student.

On the other hand, we observe that young people like technologies, and from this point, we consider making a combination of these resources with the teaching of mathematics, resulting in the application of ICTs, in the virtual teaching of Mathematics. .

There are various resources that can be used in the virtual teaching-learning process of mathematics:

Web 2.0, Includes advanced technology tools for data management and dynamic processes at the service of the client and/or end user.

Ajax, Acronym for Asynchronous JavaScript And XML. This technology for interactive applications has been on the rise lately due to the services it offers by loading all the processes on the client and/or end user side, avoiding overloading the server.

JQuery, The implementation of this service allows the creation of more dynamic and aesthetic website designs for the client and/or end user.

Maple, It is a mathematical simulator software.

In addition to other complementary resources, for specific activities, such as: Blogs, Webquest, the Wiki, in addition to implementing Forums.

JUSTIFICATION

The implementation of mathematical software, as well as the use of new information and communication technologies in the teaching of mathematics, is a project that seeks to innovate said methodology, placing the student as a receiver of knowledge, and with the possibility of interacting in the middle. of a learning environment where he performs, proposes and completes tasks, using ICT tools, such as **Web 2.0, Ajax, JQuery**.

Achieving with this to develop one of the basic skills in the use of the Internet (Blogs, Webquest, the Wiki) among others, without a doubt what is sought is to bring the virtual teaching of mathematics to the environment where the student develops, that is, in its natural habitat.

On the other hand, when using Mathematics Simulation Software, it provides the student with a powerful tool for learning and will also give them a clearer vision of the importance of its application. The teacher will be able to use graphics, as well as simulators to show solutions to problems that are otherwise difficult to observe in the classroom if only the blackboard is available.

The execution time of the tasks is also optimized, since the teacher will be able to implement his evaluation instruments through a Webquest, and leave tasks in the blogs, execute practices in the Maple software, observe the development of a team work online through Wikis.

A collateral benefit is the savings in materials (paper, markers, time) for both the students and the teacher, since most of the information will be worked on online and there is the opportunity to consult it whenever necessary. not limited to the estimated time for math class.

The purpose of this project is to maximize the use of technology in favor of teaching-learning through mathematical simulators.

As a result, it will be a space designed and dedicated to learning this discipline in a pleasant and easy environment. In such a way, that the student assumes a more relaxed posture, without tensions due to the presence of the teacher, which facilitates his attitude of concentration, disposition, commitment and responsibility when consulting the topics and learning from them.

GENERAL OBJECTIVE

Create an application of ICTs, in the virtual teaching-learning process of the subject of Mathematics Applied to Telecommunications.

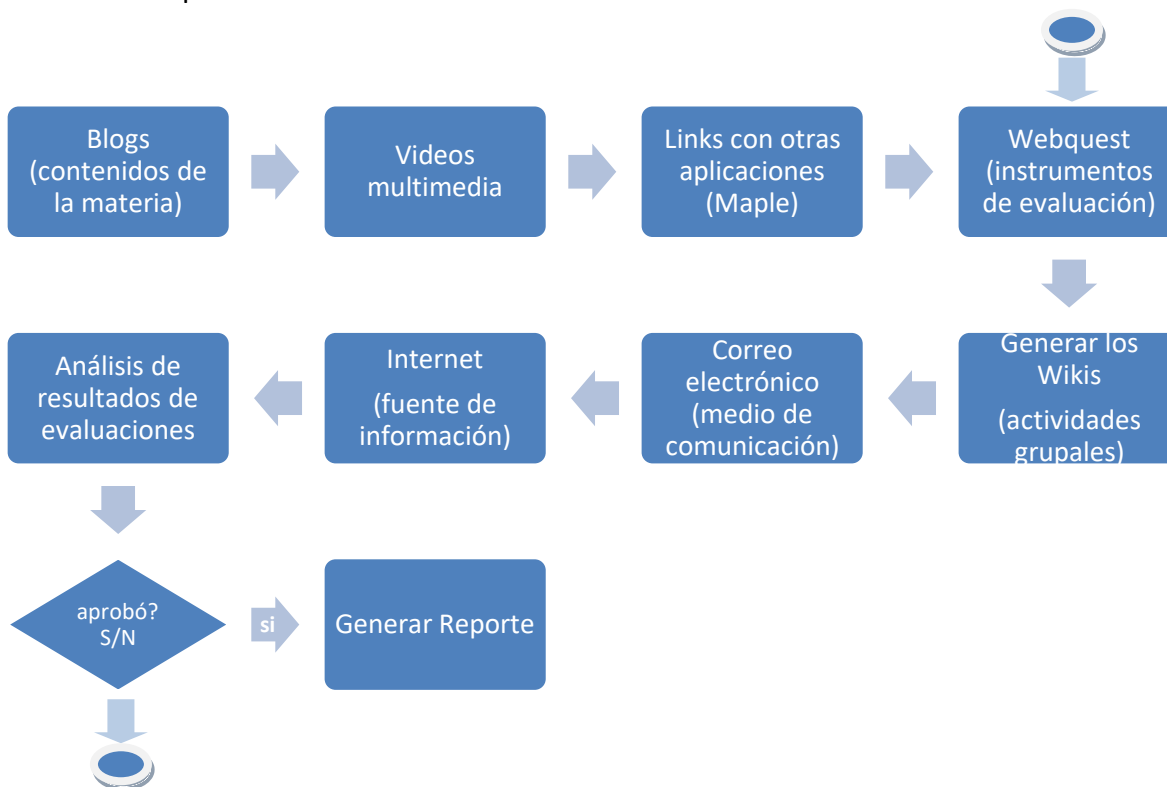
SPECIFIC OBJECTIVES

1. Develop a virtual platform with the contents of the subject
2. Develop practices using Maple software (simulator)
3. Create and use blogs
4. Provide tools for the use of wikis
5. Implement the Webquest in the management of the evaluation instruments
6. Creation of videos by the teacher, in the resolution of mathematical exercises

METHODOLOGY

1. Develop blogs with the contents of the subject
 - a) Generation of multimedia videos
 - b) Originate links with other pages: Maple (mathematical simulator)

- 2.Design in the Webquest the didactic and evaluation material
- 3.Generate group activities that require the use of Wikis
- 4.Use email as a means of communication
- 5.Use the internet as a general source of information
- 6.Analyze evaluation results
- 7.Generate report



VIDEOS FILMED BY PROFESSOR CARLOS MARIO MARTINEZ IZQUIERDO

- ✓ *Anti derivative concept*
- ✓ *Derivative of the exponential function*
- ✓ *Derivative of the logarithmic function*
- ✓ *Derivative of trigonometric functions*
- ✓ *evaluation of a function*
- ✓ *Basic referral rules*
- ✓ *Among others...*

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