# Postgraduate Certificate

## Didactics of Mathematics in Primary Education

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# Postgraduate Certificate
## Didactics of Mathematics in Primary Education

- Modality: **online**
- Duration: **6 weeks**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/pk/education/postgraduate-certificate/didactics-mathematics-primary-education**

# Index

01

# Introduction

Mathematics is one of the main subjects of the specialized curriculum in Primary Education. Its practical functionality in daily life, cultural knowledge itself, the foundation of other scientific disciplines and the development of very important cognitive aspects such as reasoning, estimation or the capacity for abstraction are some of the characteristics that make its learning so necessary. Students who wish to specialize as mathematics teachers should expand their training with this comprehensive program.

*Acquire superior knowledge in the area of mathematics and learn how to transmit it to your students in a didactic way"*

In Primary Education, the area of Mathematics is fundamental to form future citizens capable of successfully facing everyday situations that arise on a daily basis: calculating a discount, applying for a mortgage, adapting a cooking recipe to the number of diners, interpreting the statistical information that constantly arrives from the media, knowing how to orient oneself on a map, estimating lengths or weights of nearby objects, etc. But, in order to be able to solve these types of everyday situations, it is necessary to acquire a good mathematical basis from childhood.

In this sense, the work of mathematics teachers is of great responsibility because if they are not able to teach their students the need to get into this field, they are likely to miss the opportunity to deepen their knowledge. This Postgraduate Certificate allows the teacher to reflect on the curriculum, competencies and learning standards, with the objective of having a quality reference when analyzing and elaborating classroom proposals.

In this way, we will study various resources that can be used in the mathematics classroom, such as games, ICT, manipulative materials or textbooks. Problem-solving and mathematical processes are very important issues in the teaching-learning of mathematics and for this reason they will also be dealt with in this Postgraduate Certificate.

This program is distinguished by the fact that it can be taken in a 100% online format, adapting to the needs and obligations of the student, in an asynchronous and completely self-manageable manner. The student will be able to choose which days, at what time and how much time to dedicate to the study of the contents of the program. Always in tune with the capabilities and skills dedicated to it.

This **Postgraduate Certificate in Didactics of Mathematics in Primary Education** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented in simulated scenarios by experts in the area of knowledge, where the student will evoke in an orderly manner the knowledge learned and demonstrate the acquisition of the competences
- The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional development
- The latest developments on the educational task of the primary school teacher
- Practical exercises where the students undergo the self-assessment process to improve learning, as well as activities at different skill levels
- Special emphasis on innovative methodologies and teaching research
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

*TECH provides you with the main educational tools to prepare you to develop your work in the field of teaching"*

*You will have access to the contents from any fixed or portable device with internet connection, even from your cell phone"*

*The program invites us to learn and grow, to develop as teachers, to learn about educational tools and strategies in relation to the most common needs in our classrooms.*

It includes in its teaching staff professionals belonging to the field of Primary Education, who bring to this training the experience of their work, in addition to recognized specialists from reference societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will deliver an immersive learning experience, programmed to train in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the teacher must try to solve the different professional practice situations that are presented to them. For this purpose, the specialist will be assisted by an innovative interactive video system that was created by renowned and experienced experts in Mathematics.

02

# Objectives

The program in Didactics of Mathematics in Primary Education is oriented to develop in students the skills required for the exercise of their profession. For this purpose, TECH offers the most complete education from the hand of the main experts in the field.

*Increase your specialization as a primary school teacher thanks to the opportunity offered by TECH, the world's leading online university"*

## General Objectives

- Design, plan, deliver and assess teaching and learning processes both individually and in collaboration with other teachers and professionals of the center
- Recognize the importance of rules in all educational processes
- Promote participation and respect for the rules of coexistence

*Our goal is to achieve academic excellence and to help you achieve it too"*

## Specific Objectives

- Know and value the social and cultural importance of mathematics, as well as its role in the educational system and in the curriculum
- Characterize the learning of schoolchildren at different ages based on the competencies to be developed from mathematics in Primary Education
- Pose and solve mathematical problems of varying complexity through a variety of pathways and analyze the role they can play in education
- Analyze the role of error in learning mathematics and describe the main errors and difficulties that can arise
- Know and use the usual means, materials and resources in the teaching of mathematics with special attention to information and communication technologies
- Describe and analyze different teaching strategies and techniques that promote the development of mathematical competence of schoolchildren in an environment of equity and respect

03

# Structure and Content

The structure of the contents has been designed by top level professionals within the educational panorama, with a wide trajectory and recognized prestige in the profession, endorsed by their experience, and with a wide command of the new technologies applied to teaching.


*The best content to create the best teachers”*

## **Module 1.** Mathematics Knowledge in Primary Education

1.1. Mathematics and its History
- 1.1.1. The Beginning of Mathematics from Prehistoric Times
- 1.1.2. Mathematics Created by Great Names
- 1.1.3. Problems to Understand the World
- 1.1.4. Social and Cultural Importance

1.2. Mathematical Thinking
- 1.2.1. Definition of Mathematical Thinking
- 1.2.2. Characteristics and Components
- 1.2.3. Mathematical Problem-Solving
- 1.2.4. Mathematics is All Around Us

1.3. Natural Numbers and Integers
- 1.3.1. Appearance of the Number
- 1.3.2. Numbering Systems
- 1.3.3. Operations with Natural Numbers
- 1.3.4. Hierarchy of Operations
- 1.3.5. Greatest Common Divisor and Least Common Multiple
- 1.3.6. Patterns
- 1.3.7. Problem Solving with Natural Numbers
- 1.3.8. Meaning of Integers
- 1.3.9. Operations with Integers
- 1.3.10. Operations with Integers

1.4. Rational Number
- 1.4.1. Meaning of Rational Numbers
- 1.4.2. Fractions
- 1.4.3. Equivalences of Fractions
- 1.4.4. Order and Density of Fractions
- 1.4.5. Operations with Rational Numbers
- 1.4.6. Decimal Expressions

1.5. Irrational and Real Number
- 1.5.1. Power
- 1.5.2. Irrational Number
- 1.5.3. Root
- 1.5.4. Real Number

1.6. Measurements
- 1.6.1. Concept of Magnitude and Types
- 1.6.2. Measurement of Magnitudes
- 1.6.3. Measurement Estimation. Errors
- 1.6.4. Measurement Unit Systems
- 1.6.5. Magnitudes and their Relationships

1.7. Proportionality
- 1.7.1. Direct
- 1.7.2. Inverse
- 1.7.3. Rule of Three
- 1.7.4. Increase and Decrease of Percentages

1.8. Plane and Space Geometry
- 1.8.1. Introduction: Origins of Geometry
- 1.8.2. Basic Elements and Vocabularies for the Development of Plane Geometry
- 1.8.3. Polygons. Triangles: Equality and Similarity of Triangles, Points and Remarkable Lines in a Triangle. Quadrilaterals
- 1.8.4. Circumference
- 1.8.5. A Little Bit of Geometry of Space: The Sphere and the Polyhedra

1.9. Functions
- 1.9.1. Functions in Everyday Life
- 1.9.2. Dependence between Variables
- 1.9.3. Relationships by Tables, Graphs and Algebraic Expressions
- 1.9.4. Conception of Function. Properties
- 1.9.5. Elementary Functions: Direct, Affine and Constant Functions

1.10. Statistics and Probability
- 1.10.1. Meaning of Statistics
- 1.10.2. Basic Concepts: Population, Sample and Variable
- 1.10.3. Variables and their Types: Quantitative and Qualitative
- 1.10.4. Frequencies
- 1.10.5. Graphical Representations
- 1.10.6. Measures of Centralization and Dispersion

1.10.7. Study of Two Variables
1.10.8. Statistical Programs
1.10.9. Concept of Probability
1.10.10. Probability Theorem and Bayes' Theorem

## **Module 2.** Didactics of Mathematics in Primary Education

2.1. Mathematical Knowledge
2.1.1. The Culture of Mathematics
2.1.2. Curricular Justification
2.1.3. Learning Models
2.1.4. Theory of Didactic Situations
2.1.5. Errors in the Teaching-Learning Process in Mathematics
2.2. Mathematical Problem-Solving
2.2.1. Problem Definition
2.2.2. Problem-Solving Justification
2.2.3. Types of Problems: Structured and Unstructured
2.2.4. Problem-Solving: Strategies and Techniques
2.2.5. Understanding the Statement
2.3. Relationship Between Affectivity and Mathematics
2.3.1. Effective Dimension of Mathematics
2.3.2. Mathematics Education and its Beliefs
2.3.3. Anxiety Caused by Problem-Solving
2.3.4. Emotions Transferred to the Classroom by the Teacher
2.4. Didactic Element: The Game
2.4.1. The Game as a Didactic Element
2.4.2. Competition as a Factor to be Taken into Account
2.4.3. Games and the Theory of Didactic Situations
2.4.4. Games with Primary Education Curricular Content
2.5. Assessment
2.5.1. Know Why and for What Purpose We Assess
2.5.2. Assessing from the Perspective of Difficulty
2.5.3. Do Not Assess Content but Skills
2.5.4. National and International Assessments BORRAR
2.5.5. Self-Assessment of Teaching Practice
2.6. Didactics and Arithmetic of the Natural Number
2.6.1. Justification of the Number in the Primary Education Curriculum
2.6.2. Concept and Uses of the Natural Number
2.6.3. First Numerical Experiences and Understanding of the Decimal Numeration System
2.6.4. Teaching Arithmetic in Primary Education
2.6.5. Additive and Multiplicative Problem-Solving
2.6.6. Traditional, Alternative, Invented and Historical Algorithms
2.6.7. Materials and Resources
2.7. Didactics: Rational Number and Alternatives to Calculus
2.7.1. Working with Fractions in Primary Education
2.7.2. The Sequence of Fractions in a Didactic Way
2.7.3. Solving Arithmetic Problems with Fractions
2.7.4. Introduction of Decimal Numbers in Primary Education
2.7.5. Differences and Similarities between Mental Calculus and Thought Calculus
2.7.6. Estimates in the Calculation Process
2.7.7. Do We Use the Calculator in Primary Education?
2.8. Didactics: Measurement of Magnitudes
2.8.1. Measurements and Magnitudes in Primary Education
2.8.2. Start Measuring at School
2.8.3. Main Difficulties in the Learning Process of Measurement
2.8.4. Teaching Materials and Resources
2.9. Didactics: Geometry
2.9.1. Practical Applications of Geometry
2.9.2. Psychopedagogical Deficiencies
2.9.3. Representation, Visualization and Reasoning
2.9.4. Materials and Resources to Work on Geometry in the Plane and in Space
2.9.5. ICT: GeoGebra
2.10. Didactics: Statistics
2.10.1. Statistics and its Didactic Utility
2.10.2. Descriptive Statistics
2.10.3. Probability and its Didactic Utility
2.10.4. Statistical Program

04

# Methodology

This training program offers a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

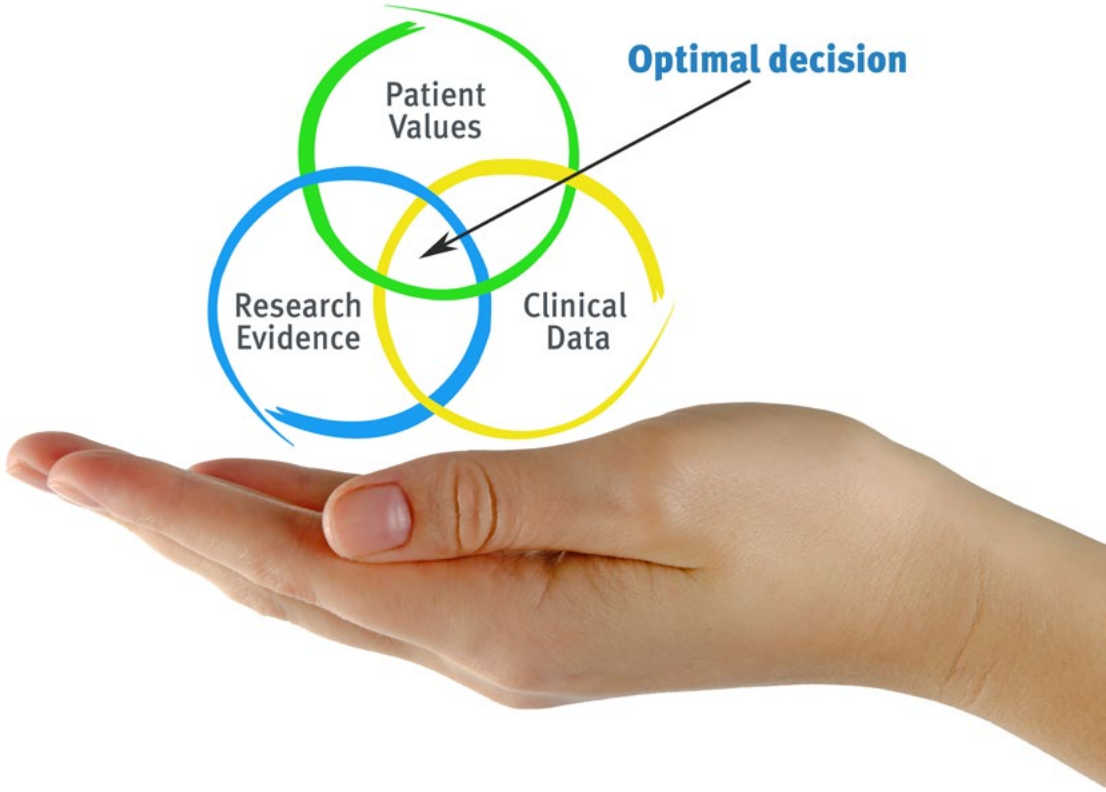
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH Education School we use the Case Method

In a given situation, what should a professional do? Throughout the program students will be presented with multiple simulated cases based on real situations, where they will have to investigate, establish hypotheses and, finally, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method.

*With TECH, educators can experience a learning methodology that is shaking the foundations of traditional universities around the world.*




*It is a technique that develops critical skills and prepares educators to make decisions, defend their arguments, and contrast opinions.*

*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method"*

**The effectiveness of the method is justified by four fundamental achievements:**

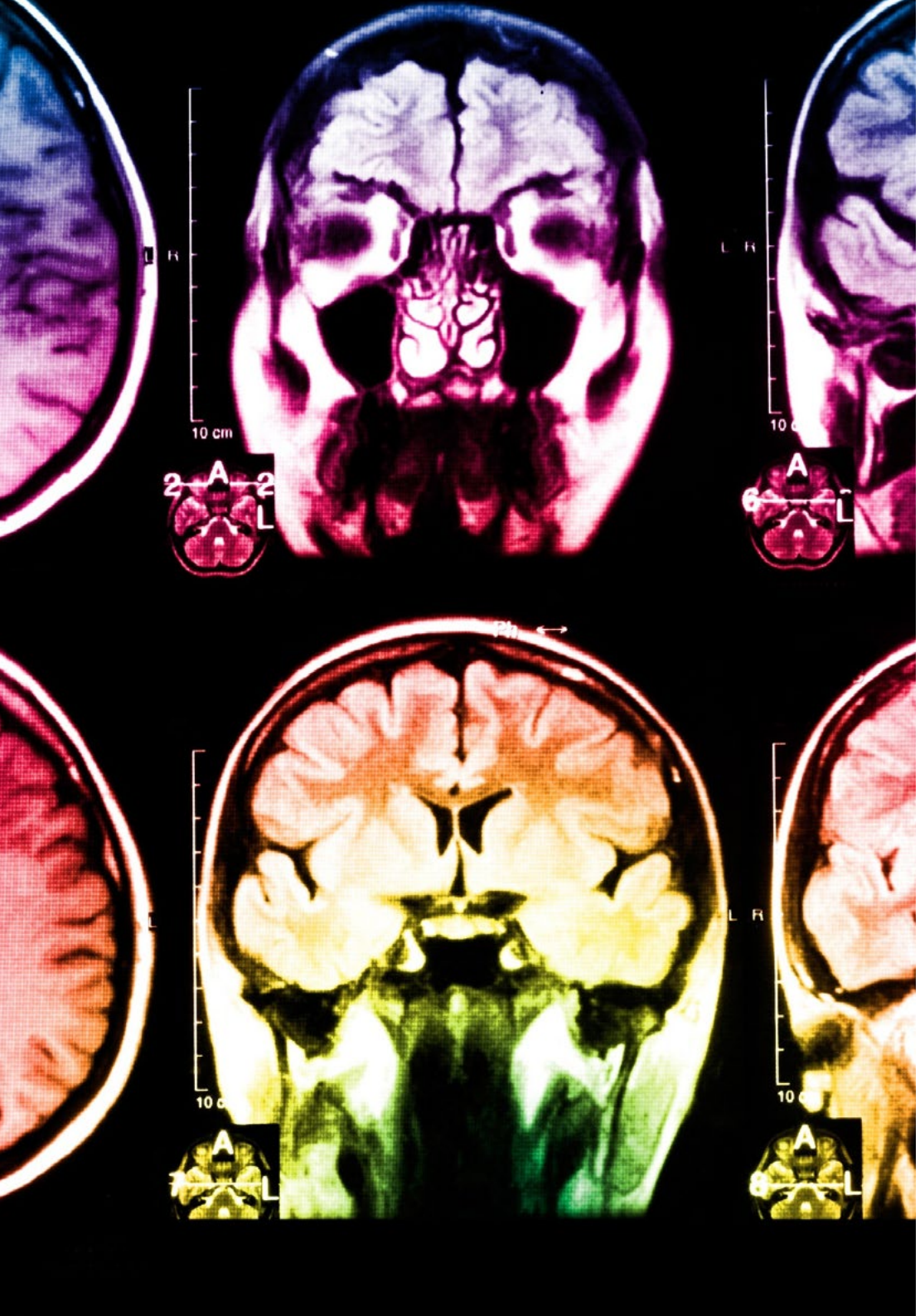
1. Educators who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process is solidly focused on practical skills that allow educators to better integrate the knowledge into daily practice.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life teaching.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

Our University is the first in the world to combine case studies with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases.

*Educators will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology we have trained more than 85,000 educators with unprecedented success in all specialties. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by our learning system is 8.01, according to the highest international standards.

**This program offers the best educational material, prepared with professionals in mind:**

### Study Material

All teaching material is produced by the specialist educators who teach the course, specifically for the course, so that the teaching content is really specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

### Educational Techniques and Procedures on Video

TECH introduces students to the latest techniques, with the latest educational advances, and to the forefront of Education. All this, first-hand, with the maximum rigor, explained and detailed for your assimilation and understanding. And best of all, you can watch them as many times as you want.

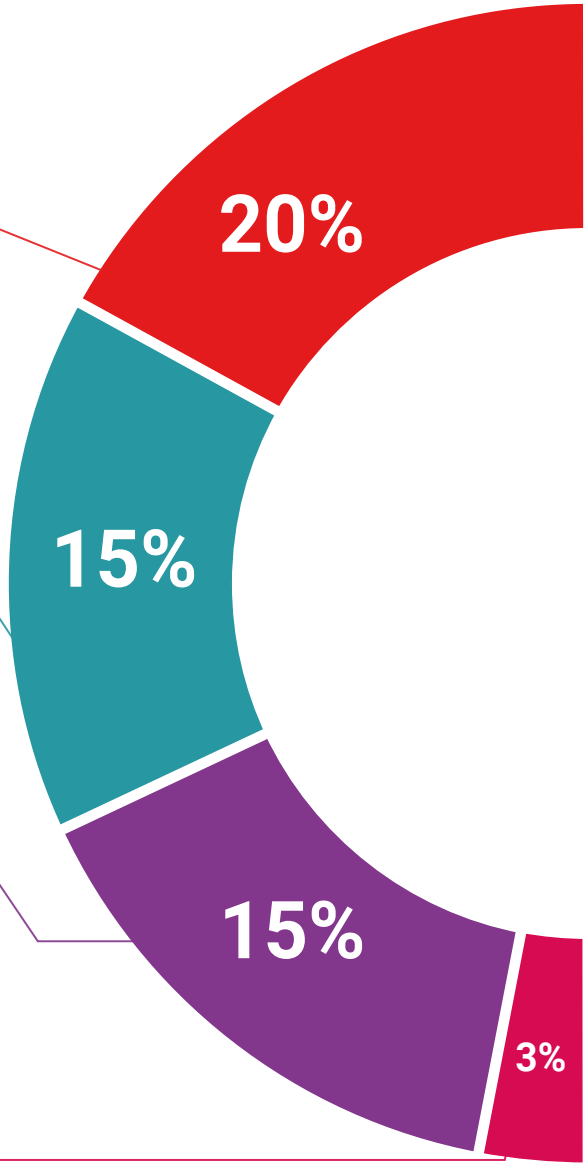
### Interactive Summaries

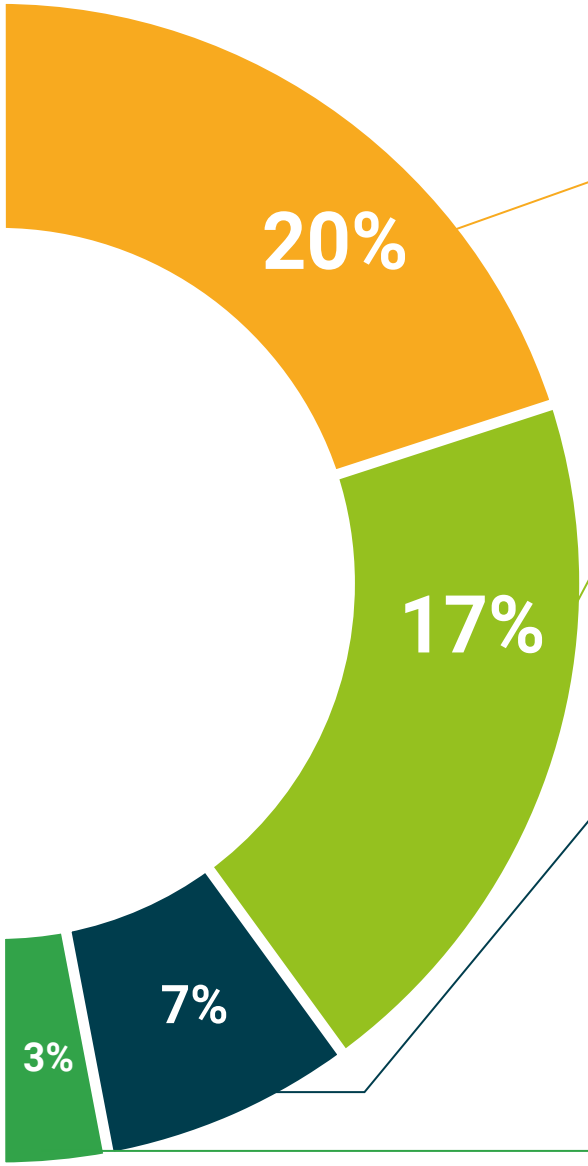
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive multimedia content presentation training Exclusive system was awarded by Microsoft as a "European Success Story".

### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.






### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.

### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises: so that they can see how they are achieving your goals.

### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.

05

# Certificate

The Postgraduate Certificate in Didactics of Mathematics in Primary Education guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"*

This **Postgraduate Certificate in Didactics of Mathematics in Primary Education** contains the most complete and up-to-date program the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

Title: **Postgraduate Certificate in Didactics of Mathematics in Primary Education**

Official N° of Hours: **150 h.**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Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Didactics of Mathematics in Primary Education

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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