OT03

Mathematics in the Classroom: from Research to Practice

Matemáticas en el Aula: de la Investigación a la Práctica

Organizers **Organizadores** **Antolatzaileak**

Andrea de la Fuente Silva
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Description **Descripción** **Deskribapena**

The session will bridge research in mathematics education with its teaching and learning processes. It will address questions such as: Why is mathematics education necessary? What is it for? and How can research be applied in the mathematical field? Contexts where innovative practices foster a deeper understanding of mathematics will be presented, promoting critical thinking, problem-solving, the use of playful resources, and creativity. Through practical examples and case studies, attendees will learn how to implement research in mathematics education in specific educational contexts.

La sesión conectará las investigaciones en didáctica de la matemática con sus procesos de enseñanza-aprendizaje. Se abordarán preguntas como: ¿por qué es necesaria la educación matemática?, ¿para qué sirve? y ¿cómo aplicar la investigación en el ámbito matemático? Se presentarán contextos donde prácticas innovadoras fomentan una comprensión más profunda de las matemáticas, promoviendo el pensamiento crítico, la resolución de problemas, el uso de recursos lúdicos y la creatividad. A través de ejemplos prácticos y estudios de caso, los asistentes aprenderán a implementar la investigación en didáctica en contextos educativos específicos.

MSC Codes **Códigos MSC** **MSC Kodeak**

97-02

(primary)

97-02; 97D40; 97D50; 97U10

(secondary)

Slots **Bloques** **Blokeak**

1.B (Aula 1.4); 1.C (Aula 1.4)

QR Code **Código QR** **QR Kodea**

Session Schedule **Horario de la Sesión** **Saioaren Ordutegia**

M14 | 15:30-15:50 | 1.4
Assisting Students in Mastering Linear Equation-Solving Skills
María Sanz Ruiz (Universidad de Cantabria)

M14 | 16:00-16:20 | 1.4
Enhancing Mathematical Visualization Through 3D Printing
Lucía Rotger García (Universitat de les Illes Balears)

M14 | 16:30-16:50 | 1.4
On the modality of study of the real numbers in the Degree of Mathematics
José Ginés Espín Buendía (Universidad de Murcia)

M14 | 17:30-17:50 | 1.4
A first approach to the development of a pre-university teaching proposal on the notion of limits
Mónica Arnal Palacián (IUMA - Universidad de Zaragoza)

M14 | 18:00-18:20 | 1.4
From the quadrivium to STEAM education: the figure of the mathematics teacher.
Jon Anasagasti Aguirre (UPV/EHU)

M14 | 18:30-18:50 | 1.4
Qualitative analysis of a mathematics education classroom experience with a digital tool
Carlos Carbonell Urtubia (Universidad de La Rioja)

M14 | 19:00-19:20 | 1.4
Fostering Creativity and Proof Skills in Gifted Mathematicians through RSME Olympiad Challenges
Juan Miguel Ribera Puchades (Universitat de les Illes Balears)

Tuesday 14	**Martes 14**	**Asteartea 14**
15:30-15:50	**15:30-15:50**	**15:30-15:50**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

Assisting Students in Mastering Linear Equation-Solving Skills

María Sanz Ruiz
(Universidad de Cantabria)

Mathematical learning involves revisiting known concepts to gain deeper insights and apply them in new contexts. Solving linear equations, a skill acquired in Secondary Education, remains challenging for some students in higher levels. To enhance these skills, we propose using STACK, a customizable tool providing adaptive formative assessment. Our study with 196 students analyzes how they interact with the assessment and overcome difficulties, offering insights into their cognitive processes.

Joint work with José Manuel Diego-Mantecón, and Zaira Ortiz-Laso.

Tuesday 14	**Martes 14**	**Asteartea 14**
16:00-16:20	**16:00-16:20**	**16:00-16:20**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

Enhancing Mathematical Visualization Through 3D Printing

Lucía Rotger García
(Universitat de les Illes Balears)

3D printing as an educational tool transforms math teaching in higher education by helping students visualize abstract concepts. This project enhances visualization skills through designing, modelling, and printing 3D objects with tools like Tinkercad. These models serve as manipulatives for problem-solving. Applied in math courses, the approach improves spatial reasoning, creativity, and technical skills, while increasing student motivation.

Tuesday 14	**Martes 14**	**Asteartea 14**
16:30-16:50	**16:30-16:50**	**16:30-16:50**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

On the modality of study of the real numbers in the Degree of Mathematics

José Ginés Espín Buendía
(Universidad de Murcia)

Standard mathematics textbooks often present real numbers through artificial methods like axioms or Dedekind cuts. A theorem links real numbers to decimal expansions, raising the question of whether they could be introduced as decimals. This work investigates why real numbers are taught this way and explores alternative approaches that avoid these constructions. The aim is to enhance training in mathematics degrees, fostering deeper understanding and reflective learning among students.

Joint work with Josep Gascón and Pedro Nicolás.

Tuesday 14	**Martes 14**	**Asteartea 14**
17:30-17:50	**17:30-17:50**	**17:30-17:50**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

A first approach to the development of a pre-university teaching proposal on the notion of limits

Mónica Arnal Palacián
(IUMA - Universidad de Zaragoza)

The mathematical and phenomenological differences between types of limits, as defined by Freudenthal, should guide their teaching. This forum discusses creating a didactic proposal that incorporates both elementary and advanced thinking with various representation formats. Analysis of Spanish textbooks and student feedback reveals a preference for verbal representations, enriching the proposal and avoiding rigid distinctions.

Joint work with Javier Claros-Mellado, and María Teresa Sánchez-Compaña.

Tuesday 14	**Martes 14**	**Asteartea 14**
18:00-18:20	**18:00-18:20**	**18:00-18:20**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

From the quadrivium to STEAM education: the figure of the mathematics teacher.

Jon Anasagasti Aguirre
(UPV/EHU)

The transmission of mathematical knowledge has recently transformed, with methodologies like STEM/STEAM education emerging. Curricular frameworks emphasize 'Mathematical competence and competence in science, technology, and engineering' as key. A study of 185 teachers in the Basque Autonomous Community shows that engineering studies are most represented (31.89%), raising questions about their influence on teaching.

Joint work with Ainhoa Berciano and Ane Izagirre.

Tuesday 14	**Martes 14**	**Asteartea 14**
18:30-18:50	**18:30-18:50**	**18:30-18:50**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

Qualitative analysis of a mathematics education classroom experience with a digital tool

Carlos Carbonell Urtubia
(Universidad de La Rioja)

This work presents an innovative classroom problem-solving and problem-creation experience designed for secondary school students that makes use of three-dimensional modeling software, along with a subsequent case study.

Tuesday 14	**Martes 14**	**Asteartea 14**
19:00-19:20	**19:00-19:20**	**19:00-19:20**
[Room 1.4]	**[Aula 1.4]**	**[Gela 1.4]**

Fostering Creativity and Proof Skills in Gifted Mathematicians through RSME Olympiad Challenges

Juan Miguel Ribera Puchades
(Universitat de les Illes Balears)

This study examines how talented students in RSME olympiads, through problems involving mathematical proofs, develop advanced skills and creativity. Analyzing their responses reveals how these challenges enhance problem-solving abilities and deductive proof skills.

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