

Degree	Type	Year
4313815 Research in Education	OT	0

Contact

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

No prerequisites are necessary.

Objectives and Contextualisation

This module is an introduction to the specialty "research on innovation in science education and mathematics education". The goal of this module is the building of an understanding of didactics of experimental sciences and didactics of mathematics as core disciplines within the research on innovation in science education and mathematics education. The objectives of this module are the following:

- Acquisition of basic knowledge about the specificity of research in Science Education and Mathematics Education relevant for educational innovations.
- Learning how to read, talk and write following the criteria emerging from the above mentioned disciplines.
- Identification of particular rigor criteria of educational research within the areas of mathematics and science contextualized in educational innovations.

Learning Outcomes

1. CA59 (Competence) Assess research on the didactics of mathematics and science while adopting criteria of methodological quality, research consistency and innovative relevance.
2. CA60 (Competence) Assess the contributions of research on the didactics of mathematics and sciences for the improvement of the environment.
3. CA61 (Competence) Assess the contributions of research to the didactics of mathematics and sciences for the improvement of sex/gender based inequalities.
4. KA58 (Knowledge) Describe the paradigms of and approaches to research on the didactics of science and mathematics from a historical perspective.
5. KA59 (Knowledge) Identify the most important changes to lines of research on the didactics of mathematics and science.
6. KA60 (Knowledge) Identify current problems in science education and mathematics education to guide innovation proposals.
7. SA45 (Skill) Review the most relevant sources of scientific literature on the didactics of mathematics and science.
8. SA46 (Skill) Summarise research expressed in a specific type of scientific communication (report, article, contribution to congresses, case study, poster, etc.)

Content

The specific contents approached within this module are the following:

- (a) Characteristics of didactics of experimental sciences and didactics of mathematics as scientific disciplines.
- (b) The importance of philosophical and historical reflection for the understanding of research and innovation in science education and mathematics education.
- (c) Fields developed within research in science education and mathematics education.
- (d) The communication of research and innovation in science education and mathematics education.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Frontal teaching and practical activities in the classroom	36	1.44	
Type: Supervised			
Analysis and collective discussion of documents; oral presentations; tutoring	36	1.44	
Type: Autonomous			
Reading of papers	78	3.12	

The teaching activity will be developed through the following classroom dynamics:

- Lectures
- Reading of papers and other documentary sources
- Analysis and collective discussion of papers and other documentary sources

- Practical activities in the classroom: Problems/Cases/Exercises
- Oral presentations
- Tutoring

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Competences and problem solving in science education and mathematics education	30	0	0	CA59, KA59, KA60, SA45, SA46
Reflexive reading of a research paper on science education or mathematics education	40	0	0	CA59, SA45, SA46
Representation of the state of the art of the research in mathematics education and science education	30	0	0	CA60, CA61, KA58, KA59, KA60

The continuous and single assessment of student learning will be based on 3 activities, as described below. The final grade of the module will consist of the weighted average of the grades obtained in these three activities as long as and when each of them is equal to or higher than 4. The assessment activities are individual and will be evaluated by the teaching staff of the module. The specific guidelines for carrying out these activities are accessible on the Virtual Campus. All deliveries will be made through the Virtual Campus.

Continuous evaluation:

The assessment of student learning will be based on 3 activities:

- Assessment activity 1: Reflective reading of a research article in science education or mathematics education. Submission date: 30-10-2024.
- Assessment activity 2: Representation of the state of research in mathematics education and science education. Submission date: 20-11-2024.
- Assessment activity 3: Skills and problem solving in science education and mathematics education. Submission date: 12-12-2024.

The feedback from the teaching staff will be made 15 days after submission.

To recover the evaluation activities that were not passed in the continuous evaluation option, it is necessary to submit the reviewed activities and a report explaining the changes made in the activities based on the input provided by the teaching staff. The maximum mark for the recovered activities is 5. The delivery deadline for the Virtual Campus will be 09-01-2025.

Single assessment:

A single document will be delivered with the three continuous assessment activities of the module:

- Assessment activity 1: Reflective reading of a research article in science or mathematics education.
- Assessment activity 2: Representation of the state of research in mathematics education and science education.
- Assessment activity 3: Skills and problem solving in science and mathematics education.

The activities will be submitted through the Virtual Campus and will be defended orally on 09-01-2025 from 3pm to 5.30pm.

To recover the evaluation activities that were not passed in the continuous evaluation option, it is necessary to submit the reviewed activities and a report explaining the changes made in the activities based on the input provided by the teaching staff during the oral defense. The recovery deadline will be through the Virtual Campus and will be 23-01-2025.

General aspects of the assessment relating to plagiarism or academic fraud:

Copying or plagiarism in any type of assessment activity constitutes a crime and will be penalized with a 0 as a grade for the module, losing the possibility of recovering the assessment of the activity. An activity or work will be considered "copied" when it reproduces all or a significant part of the work of another colleague. A work or activity will be considered "plagiarized" when a part of an author's text is presented as one's own without citing the sources, regardless of whether the original sources are on paper or in digital format.

The misuse of artificial intelligence for performing assessment activities constitutes academic fraud and will also be penalized with a 0 as a grade for the module, losing the possibility of recovering the assessment of the activity. An evaluation activity will be considered having misused artificial intelligence when it includes a significant number of incorrect or biased statements, fails to include original sources, cites non-existent work, or incorrect way, or inconsistencies of style in the use of language are evident. If plagiarism or academic fraud is suspected, the assessment activity is subject to an oral defense by the student.

Bibliography

LLIBRES I REVISTES DE COMPILACIÓ DE RECERQUES

School Science Review: <http://www.ase.org.uk/journals/school-science-review>

Science Education Review: <http://www.scienceeducationreview.com/editorial.html>

Abell, S.K. & Lederman, N.G. (Eds.) (2010). *Handbook of research on Science Education Volume I*. New York: Routledge.

Abell, S.K. & Lederman, N.G. (Eds.) (2014). *Handbook of research on Science Education Volume II*. New York: Routledge.

Bishop, A. J., Clements, M. K., Keitel, C., Kilpatrick, J., & Laborde, C. (Eds.). (1996). *International handbook of mathematics education*. Springer Science & Business Media.

Bishop, A., Clements, M.A.K., Keitel-Kreidt, C., Kilpatrick, J., Leung, F.K.-S. (Eds.) (2003). *Second International Handbook of Mathematics Education*. Springer International.

Clements, M.A., Bishop, A., Keitel-Kreidt, C., Kilpatrick, J., Leung, F.K.-S. (Eds.) (2013). *Third International Handbook of Mathematics Education*. Springer International.

English, L. D., & Kirshner, D. (Eds.). (2015). *Handbook of international research in mathematics education*. Routledge.

Fraser, B.J. & Tobin, K.G. (Eds.) (1998). *International Handbook of Science Education*. Dordrecht, The Netherlands: Kluwer Academic.

Fraser, B.J., Tobin, K.G. & McRobbie, C.J. (Eds.) (2012). *Second International Handbook of Science Education*. Dordrecht, The Netherlands: Springer.

Gunstone, R. (2015). *Encyclopedia of science education*. Dordrecht, The Netherlands: Springer.

Grouws, D. A. (Ed.). (1992). *Handbook of Research on Mathematics Teaching and Learning*: National Council of Teachers of Mathematics. IAP.

Grouws, D. (Ed.). (2007). *Handbook of Research on Mathematics Teaching and Learning*: National Council of Teachers of Mathematics. IAP.

Gutiérrez, A., & Boero, P. (Eds.). (2006). *Handbook of research on the psychology of mathematics education: Past, present and future*. Sense Publishers.

Gutiérrez, A., Leder, G., & Boero, P. (Eds.). (2016). *Second Handbook of research on the psychology of mathematics education: Past, present and future*. Sense Publishers.

Johnson, C.C., Mohr-Schroeder, M.J., Moore, T.J., & English, L.D. (Eds.). (2020). *Handbook of Research on STEM Education (1st ed.)*. Routledge. <https://doi.org/10.4324/9780429021381>

Kelly, A.E., & Lesh, R.A. (Eds.). (2000). *Handbook of research Design in Mathematics and Science Education*. New York: Routledge.

Lerman, S. (Ed.). (2014). *Encyclopedia of Mathematics Education*. Springer.

Stevenson, R.B., Brody, M., Dillon, J., & Wals, A. (Eds.). (2013). *International Handbook of research on Environmental Education*. New York: Routledge.

REVISTES DE RECERCA EN EDUCACIÓ CIENTÍFICA

Enseñanza de las Ciencias: <http://ensciencias.uab.es>

Didáctica de las ciencias experimentales y sociales: <http://dialnet.unirioja.es/servlet/revista?codigo=418>

Revista Electrónica de Enseñanza de las Ciencias: <http://www.saum.uvigo.es/reec>

Revista EUREKA sobre enseñanza y divulgación de las ciencias: <https://revistas.uca.es/index.php/eureka>

Ciencia & Educação: <http://www2.fc.unesp.br/cienciaeducacao>

Cultural Studies of Science Education:
<http://www.springer.com/education+%26+language/science+education/journal/11422>

International Journal of Science Education: <http://www.tandf.co.uk/journals/titles/09500693.asp>

Journal of Research in Science Teaching: <http://onlinelibrary.wiley.com/journal/10.1002>

Science Education: [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1098-237X](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1098-237X)

REVISTES DE RECERCA EN EDUCACIÓ MATEMÀTICA

Avances de Investigación en Educación Matemática: <http://www.aiem.es/index.php/aiem>

Bolema: Boletim de Educação Matemática: www.scielo.br/bolema

Educational Studies in Mathematics: <https://link.springer.com/journal/10649>

For the Learning of Mathematics: <http://flm-journal.org>

Journal of Mathematical Behavior: <https://www.journals.elsevier.com/the-journal-of-mathematical-behavior>

Journal of Mathematics Teacher Education:
<http://www.springer.com/education+%26+language/mathematics+education/journal/10857>

Journal for Research in Mathematics Education:
<http://www.nctm.org/publications/journal-for-research-in-mathematics-education>

Mathematics Education Research Journal:
<http://www.springer.com/education+%26+language/mathematics+education/journal/13394>

Mathematical Thinking and Learning: <http://www.tandfonline.com/toc/hmtl20/current>

PNA, Pensamiento numérico avanzado: <http://revistaseug.ugr.es/index.php/pna/index>

RELIME, Revista latinoamericana de investigación en matemática educativa:
<http://www.clame.org.mx/relime/relimee.html>

Software

No special computer program is necessary in this module

Language list

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	Catalan/Spanish	first semester	afternoon