

63225 - Innovation and Classroom Research in Mathematics

Syllabus Information

Academic year: 2023/24

Subject: 63225 - Innovation and Classroom Research in Mathematics

Faculty / School: 107 - Facultad de Educación

Degree: 584 - Master's Degree in Teaching Compulsory Secondary Education
593 - Master's Degree in Teaching, specializing in Mathematics

ECTS: 4.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

This subject is related to the subjects of the Mathematics specialty, especially with "Curricular and instructional design in the Mathematics specialty" since educational innovation and research are supported by the theories and models developed in it. It provides students with information on innovation educational movements and on different lines of research in mathematics didactics that are important for their professional future.

General Objective: Acquire the concepts, criteria and instruments necessary to analyse processes of teaching innovation and educational research in mathematics, with the aim of continuous improvement of the teaching activity.

ODS: 4, 5,10 (<https://www.un.org/sustainabledevelopment/es/>).

2. Learning results

The learning results obtained in the subject are important because they familiarize the future teacher of Secondary Education with innovative teaching proposals or with the results of didactic research that offer alternatives to the usual teaching and that can contribute to an improvement of the teaching-learning processes.

1. Recognize, describe and evaluate innovative teaching proposals in Mathematics, identifying the theoretical assumptions to which they respond and the problems related to teaching and learning that they try to solve.
2. Explain the most important approaches and methodologies to evaluate the educational activity in Mathematics and to apply some of the most consolidated evaluation instruments to concrete teaching-learning situations.
3. Differentiate the different paradigms of educational research in Mathematics and use them to evaluate research articles
4. Know and effectively use bibliographic and documentary resources related to innovation and research in Mathematics education.

3. Syllabus

1. Innovation in mathematics education and the role of the teacher.
2. Documentary sources of teaching innovation in mathematics.
3. Overview of educational innovation in Mathematics in Aragon.
4. ICTs and educational innovation in Mathematics.
5. Research in didactics of mathematics: theoretical frameworks and research techniques.
6. Bibliographic sources.
7. Description and critical analysis of some lines of research.
8. Relationships and differences between innovation in mathematics education and research in didactics of mathematics.

4. Academic activities

The future teaching professional must develop a didactic action focused on problem solving and on the interaction of the student with their material and social environment. Therefore, the teaching offered in this subject is based on the same principles. In general, the master class will not have the traditional function of sequential presentation of contents, but will serve to anchor the contents, both mathematical and didactic, that have previously appeared in the practical classes around problem solving and case study tasks.

Activities:

- Practical face-to-face classes (active learning methodologies): resolution of problem situations, cases... both of mathematical and didactic nature by manipulating different didactic materials. To do so, students will need to build new concepts, and review and deepen those already known. The scripts will be handed in at the end of the session and will therefore be weighted in the final grade (evaluation activity A1).
- Theoretical classes (expository sessions and discussion of works): presentation of new contents or deepening of contents that have previously appeared in the practical classes.
- Problem classes and case studies (elaboration of assignments): articles on the subject matter will be handed in and assignments with problems and case studies. Some of them will be solved in class, and others will be handed in and will constitute the A2 assessment activity.
- Elaboration and presentation of a directed individual work (tutorials and elaboration of work): students will be called to participate in tutorials to follow up the work (evaluation activity B).
- Additionally, the organization of conferences or seminars with guest speakers will be considered to facilitate the acquisition of the competences of the subject.

5. Assessment system

A. Participation in practical classes and practical dossier (40%=30%+10%): A1) Group work related to the classroom practices (30%). The degree of participation in the classes, the adequacy between the activities carried out and the reports presented, as well as the grammatical correctness and quality of the design of the dossier will be assessed. A2) Individual work linked to the classes (10%). In A1 and A2, the complete completion of the work, the correctness and adequacy of the answers to the proposed activities with respect to the contents addressed in the program of the subject will be assessed. The degree of depth and reflection in the response to the activities will also be assessed.

B. Individual directed work (60%). Elaboration of a report presenting the state of teaching and learning of a mathematical object of the Secondary Education curriculum, including:

- what aspects have been studied by research in Mathematics Education, - what teaching is usually done in textbooks,
- what difficulties and common mistakes students make, and
- what innovation contributions in Mathematics Education exist for its teaching.

The establishment of theoretical references for the instructional and cognitive analysis will be valued: search and use of references in the research, analysis of the planned curriculum (curricular documents) and the implemented curriculum (text books) associated to the object, as well as characterizing key aspects of the learned curriculum (obstacles, difficulties and errors of the students in the learning of said object) that allow the establishment of conclusions on the teaching and learning of the object and the decision making on the design of a proposal. Clarity, order and quality of exposition; spelling, morphological and syntactic correctness and the format of the work will also be valued.

Requirements to pass the subject, to obtain at least:

- 1) 1 point out of 4 in A,
- 2) 2 points out of 6 in B,
- 3) 5 points out of 10 in A+B

If any requirement is not met, the grade will be the minimum between 4 points and A+B.

Overall test and second call.

A') Presentation of an individual dossier with all the face-to-face and non-face-to-face practices carried out during the term (40% of the overall grade). It will be valued similarly to A.

B') Presentation and defence of a report analogous to the work proposed in the evaluation activity B, described above (60% of the overall grade). The report will be evaluated with the same evaluation criteria mentioned for the evaluation activity B, and on

the other hand, in the defence of the report, the fluency, clarity and organization of the presentation and the precision and clarity of the answers to the questions posed by the teacher will be evaluated.

Requirements to pass the subject, to obtain at least:

1º)1 point out of 4 in A',

2º)2 point out of 6 in B',

3º)5 points out of 10 in A'+B'

If any requirement is not met, the grade will be the minimum between 4 points and A'+B'.

For the second call, the student may retain all or some of the A or B grades.

Fifth and sixth summons: for the evaluation of students in this situation, the same evaluation criteria and requirements are applied as indicated above, depending on whether it is the first or second summons of the school year.

Finally, it must be taken into account that the Regulations of the Norms of Coexistence of the University of Zaragoza will be applicable to the irregularities committed in the evaluation tests by means of academic fraud, as well as the application of article 30 of the Regulations of the Norms of Evaluation of Learning in relation to irregular practices other than academic fraud.