
REPORT ON REALIZATION OF THE TRAINING *BOOSTING TECHNOLOGIES IN HIGHER EDUCATION II*

The realization of this course was related activity 3.3 (**TRAINING OF TEACHING STAFF FOR USING NEW EDUCATIONAL TECHNOLOGIES**).

General data: In order to increase capacities of teaching staff in natural and mathematical sciences for knowing, using, and integrating educational technologies into their teaching activity, the team from the University of Oviedo designed this course taught by experts in different fields related to this topic.

The course material was provided to the participants in terms of different presentations, documents and applications.

The objectives of the course: University and college teachers of natural and mathematical sciences are presented different tools for boosting formative tasks, video-educational resources and data visualization in Higher Education.

The realization of the course:

Mode of delivery: The course delivered face-to-face in Niš.

Dates: The duration of the course was of 5,5 hours. It was on March 28th and 30th 2022.

Agenda:

Module 1. Audiovisual and graphic content for teaching

Module 1A. Searching, designing, and editing educational images, audios, and videos

Date: March 28th, 9:30-11:30

Audiovisual content is becoming a powerful tool in the teaching and learning process.

Audiovisual content can be used not only as an external support in face-to-face teaching but also for organizing an online or blended learning setting. This is because audiovisual content helps to keep students' attention and to understand some disciplinary contents. In this sense, teachers must be able to search and design audiovisual content that support their teaching and assist students' learning. The quality of the audiovisual content also influences the learning process. Thus, some guidelines about where to search and select (in case they already exist) or how to design and edit audiovisual content are necessary. Different software can be used for this purpose.

Objectives. This module aims at identifying which audiovisual element (image, audio, video...) is the most appropriate on each occasion, and searching, designing and editing each type of audiovisual content with the most convenient software.

Contents. · Image search. · Image and GIF design using Canva and Giphy. · Image editing with Photopea. · Audio search, recording and editing. · Video search and design with Canva. · Specific guidelines about audiovisual content.

Methodology. This module will be developed through an online session on Teams. After the session, participants will be required to design a short educational video integrating other contents (image and audio) learnt during this first module.

Module 1B. Designing graphs for data visualization

Date: March 30th, 11-12:30

Graphs are an efficient way of communicating results in many contexts, especially when the amount of information summarized on the visualization is too big to be communicated in other formats e.g., tables or text. To create plots of different shapes such as bar plots, scatter plots, word clouds etc. is a convenient solution for transferring clear information faster than in other formats.

Objectives. The aim of this module is to use the ggplot2 package of the R programming language (free and open-source software). Previous knowledge about R is not required. Some examples of these graphs can be found in the ggplot2 gallery using the following link: <https://www.r-graph-gallery.com>

Contents. · Introduction to R · Introduction to ggplot2 package · Choosing the best data visualization depending on the available data · Implementation of different types of plots

Methodology. This module will be developed through an online session on Teams. After the session, participants will be required to implement and submit a plot as final assessment of the module.

Module 2. Formative tasks. Designing and assessing different type of formative tasks: self-assessment, peer assessment, group discussion and problem-based tasks

Date: March 30th 9:30-10:30

Assessment is a crucial element in educational processes, since it influences the way the students learn. In higher education, using different types of assessment becomes a need in order to promote complex skills. Particularly, in the case of scientific education, being peer review one of the fundamental features of scientific development, peer assessment and group discussion are very relevant.

Objectives. This module aims at providing an overview of assessment techniques and strategies in scientific and technological higher education.

Contents. · Self-assessment, peer-assessment, group tasks, problem-based learning and project-based learning · Online and face-to-face tools

Methodology. This module will be developed through an online session on Teams. After the session, participants will be required to design a brief task adapted to their subjects.



Course participants: The total number of course participants who attended the course was 38, 22 women and 16 men.

Teachers: The course was taught by 3 experts in that field: Noelia Rico, Laura Muñiz-Rodríguez and Luis J. Rodríguez-Muñiz, all from the University of Oviedo.

Assessment: After each one of the sessions, participants discussed with the speakers about different aspects of the presentations and they were asked to prepare proposals for using technology in their own specific courses that were discussed individually with the speakers in the following months.



Laura Muñiz Rodríguez

Laura Muñiz-Rodríguez has a degree in Mathematics and a PhD in Mathematics and Statistics (University of Oviedo) and in Educational Sciences (Ghent University). She is an assistant professor at the Department of Statistics and Operational Research and Mathematics Education of the University of Oviedo. Her research focuses on the field of initial and continuous training of future mathematics teachers, the use of games and manipulatives for the teaching and learning of mathematics, and the role of feedback in the teaching and learning process.



Noelia Rico

Noelia Rico has a Bachelor degree in Software Engineering (University of Oviedo) and a Master degree in Research in Artificial Intelligence (International University Menéndez Pelayo). Her research interests are computational social choice optimization, the incorporation of the aggregation methods define in this field into machine learning algorithms and also its application for data analysis in real problems.

Luis J. Rodríguez Muñiz

Luis J. Rodríguez-Muñiz is Associate Professor (with accreditation for Full Professor) in the University of Oviedo from 2003, within the Department of Statistics and Operations Research and Mathematics Education. Bachelor's and Ph.D. Degree in Mathematics (awarded with the Extraordinary Doctoral Prize). His late research interests are focused on mathematics education, within two research lines. The first one is statistics and probability education: analysis of textbooks, resources, and curriculum analysis, and students' difficulties. The second line is the initial and continuous teacher training, particularly, the initial training of secondary mathematics teachers. He is the coordinator of the Mathematics Education Research Group (MERG), which is certified by the Spanish National Agency. From 2018 he is the president of the Education Commission of the Royal Spanish Mathematical Society (RSME). He is also a member of the Spanish Society for Research in Mathematics Education (SEIEM).