

# Supporting Open Science Oriented skills building by Virtual Research Environments

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According to the EC's Open Science Skills Working Group Report

"When all researchers are aware of Open Science, and are trained, supported and guided at all career stages to practice Open Science, the potential is there to fundamentally change the way research is performed and disseminated, fostering a scientific ecosystem in which research gains increased visibility, is shared more efficiently, and is performed with enhanced research integrity".

Supporting these practices can be very complex without appropriate technological support for instructors and students. The scattered nature of facilities and data of potential interest for a course or for an instructor, the willingness to cover the entire lifecycle of a research activity since open science is pervasive, the ever growing multidisciplinary nature of courses, the aim to reduce as much as possible the distance between the way scientists work, the latest research results and what the students are provided with are all factors posing requirements and challenges on how skills building courses are taking place and on the environments supporting them.

Today, all the steps in preparing course supporting environments require manual work, which is repeated each time a new course is held. These steps, in fact, need the training environment to be reset and reconfigured for the next course. Available data processing services and models come under heterogeneous programming languages, which usually require installing complex software on users' computers. Furthermore, executing models on users' data usually demands a long phase of data preparation and powerful hardware, not always available in the institutions laboratories. Sharing data, parameters and results of experiments is difficult and collaboration

between teachers and students is limited to the duration of the physical course. Furthermore, no instrument exists that currently bridges the scientific and training environments.

This presentation introduces the solution implemented and experimented in the context of the BlueBRIDGE project to overcome the above issues. This solution largely exploit e-infrastructure capacity and customised Virtual Research Environments (VREs).

The VREs support both (i) the instructors in easily defining and developing web-based supporting environments for their courses that allow students to execute, in parallel, data and processing intensive experiments; and (ii) the students in partaking in a course and being provided with "real life" and "state of the art" data, services and tools. Beyond the discipline specific data and tools, by exploiting the dedicated VREs instructors and students are transparently provided with automatic facilities suggesting Open Science practices in all the phases and activities occurring in a course.

The presentation will provide an overview of the solution implemented and of the lessons collected during a series of training courses (<http://www2.bluebridge-vres.eu/training-courses>) run by a number of international organizations and academic institutions dedicated to data scientists operating in the fisheries, aquaculture, and marine biodiversity related domains.

## Topic Area

Data science and skills

## Type of abstract

Presentation (15 minutes)

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