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Project Seacleaner: from cooperation among ISMAR-CNR researchers, high school students and the Ligurian Cluster for Marine Technologies to an application for environmental monitoring and scientific research.

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Recently, the Institute for Marine Science of the Italian Research Council ISMAR-CNR has undertaken a series of actions to incorporate oceanography in education: among these, the project "SeaCleaner" that has been developed together with a local Secondary School (Istituto di Istruzione Superiore Capellini-Sauro) and the Ligurian Cluster for Marine Technologies (DLTM) [1]. Seven students, engaged within the national Programme "work-related learning"[2], have worked side-by-side with ISMAR-CNR researchers, investigating on the problem of debris accumulation on beaches, and understanding the damage that this issue causes to marine environments and ecosystems.
This problem has recently become a challenging research subject for an increasing number of oceanographers and, in general, for environmental researchers coming from the Mediterranean areas [3, 4, 5], other European Seas [6] and Oceans [7, 8]. Data collected during repeated surveys (seasonally) in the same beach stretch, over several years, allow calculating debris accumulation rates and flow intensities. Application of current models gives additional information on debris dispersal and origin, but we shouldn't forget that, generally, relevance of acquired data is determined by the accuracy and standardization of the procedure.
In this context, students have previously searched for literature sources and summarized the most important issues, among these: few data that are often collected during small ranges of time and usually a low number of available researchers for carrying out such a time-consuming survey in the field.
In a initial part of the project, several trial surveys have been performed on different beaches in La Spezia province, in order to understand how to elaborate possible strategies to speed up and standardize the procedure. Developing an application for Android system (downloadable on any compatible mobile device such as smartphones, tablets, etc.) has been considered as a good solution since it is easy to spread and distribute among non-technical end-users. This app will help final users to carry out a standard monitoring procedure, in a quick way. All data (photographs, site characteristics, kind of debris, waypoints) will be properly captured and semi-automatically registered on a separate electronic spreadsheet.
SeaCleaner app can be provided to environmental associations, marine parks, volunteers and its easy approach will allow us to obtain standardized and safe data, upcoming from an increasing number of points, which will be acquired in situ and then saved on a dedicated remote database. Citizen participation in scientific programs, already experienced in the field of astronomy [9] has been effective also in other scientific fields, both from the scientific and social point of view, since it brings people closer to science and fills the gap between who produces science and technology and who benefits from it ("citizen science") [10, 11].
SeaCleaner is ready to be used during the school year 2013/2014 to test its validity and usefulness.
Further internships and collaborations between ISMAR and educational institutions, will allow us by the end of April 2014 to show the first dataset processed in this experimental phase. It is worth to highlight the active involvement of young people in this project and its effectiveness as a tool for raising awareness on environmental issues and orientating young people towards scientific careers. The project has been awarded in November 2013 as the best regional work-related learning project.

[1] DLTM: Distretto Ligure per le tecnologie Marine: www.dltm.it.
[2] Italian Law on general rules for work-related learning: D.Lgs 15/04/2005 n. 77 sulla "Definizione delle norme generali relative all'alternanza scuola-lavoro, a norma dell'articolo 4 della legge 28 marzo 2003, n. 53".

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