



## **PROFILE OF MARINE BIOLOGY STUDENTS AT THE POLYTECHNIC UNIVERSITY OF MARCHE 2015-2016**

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H2020-MSCA-RISE-2014  
GREEN BUBBLES RISE

The Green Bubbles project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 643712. This report reflects only the authors' view. The European Research Agency is not responsible for any use that may be made of the information it contains.

## INTRODUCTION

The following report summarises the results of research done during 2015 and 2016 under the project Green Bubbles RISE. The purpose of the research was to delineate the profile of students in Marine Biology at the Polytechnic University of Marche, Italy. The Polytechnic University of Marche was selected as the case study for this research for three reasons: 1) it forms part of the Green Bubbles consortium; 2) the Marine Biology programme here was one of the first ever made available to undergraduate students in the country; and 3) an option to certify and partake in scuba diving activities is currently incorporated in the programme, with the potential to become more prominent in the future, should it result critical to the students.

The purpose of the research was to assess factors including: 1) the demographic profile of the average student enrolled in the Marine Biology course; 2) the degree of satisfaction of the student with the course; 3) the connection, if any, between the choice of the course and scuba diving activities; and 4) the prospective career plans and expectations of the students after the completion of the course.

## METHOD

### QUESTIONNAIRE SURVEY

A structured questionnaire survey was developed during 2015, targeting students enrolled in the Magister Course in Marine Biology (*“Corso di Laurea Magistrale in Biologia Marina”*). This course is characterised by two years of specialisation (equivalent to an Honours degree and a Master’s degree) following a three year bachelor degree. The questionnaire was characterised by five sections. The first section included five questions covering demographic details. The second section included three questions on the choice to enrol in the Marine Biology course. The third section included six questions on education preceding enrolment in the course. The fourth section included seven questions on the objectives of the students enrolled. The fifth and last section included three questions on the evaluation of the course by the students. The questionnaire was administered online to all second year students enrolled in the Marine Biology course during 2015 (students initially enrolled in the academic year 2013-2014, who were 126) and 2016 (students initially enrolled in the academic year 2014-2015, who were 143). The questionnaire was made available throughout the whole academic year in 2015 and 2016. The survey was closed in November 2016.

### FACE TO FACE INTERVIEWS

Face to face interviews were run parallel to the questionnaire survey administration. In this case, the interviews did not just target students enrolled in the Magister Course in Marine

Biology, but also postgraduate students, although in minor number. The interview contained 11 questions covering demographic details; reasons behind the choice to study Marine Biology; the choice of the university in Ancona and degree of satisfaction with the studies; history of the students as scuba divers, if applicable; the relation, if existing, between the choice to study marine biology and scuba diving activities; and career prospects, also related to scuba diving if applicable. During 2015 and 2016 students in Marine Biology were randomly approached in laboratories and lecture rooms and invited to participate in the interview. Invitations to participate in the interview were made during October 2015 (beginning of academic year 2015-2016), March 2016 (middle of the academic year 2015-2016), and November 2016 (beginning of the academic year 2016-2017). During the interview, answers were either audio recorded with the consent of the student, or captured in Microsoft Word (2010) by the researcher as the students were answering to interview questions.

## **DATA ANALYSIS**

Data from the questionnaire surveys were captured in Microsoft Excel (2010) and analysed using descriptive statistics. The data collected from the interviews were transcribed in Microsoft Word (2010) and translated into English.

## **RESULTS**

### **QUESTIONNAIRE SURVEY**

#### *Section 1: Demographic details*

A total of 82 students participated in the questionnaire survey. This number represents approximately 50-60% of the total number of enrolled second year students (2013-2014 and 2014-2015). The participants were male by 63% and female by 37%. They were born between 1981 (age 34-35) and 1994 (age 22). They were mostly Italian, from outside of Ancona. About 60% claimed to come from families having an income in line with the national average, although 6% were coming from families with incomes much lower than the national average. The majority of the students were supported financially by their families, although 14% claimed to have received a study grant and 18% to have some sort of job.

#### *Section 2: Choice to enrol in Marine Biology*

Almost half of the respondents stated that they had been interested in Marine Biology and had wanted to partake in studies in this field since childhood. A good proportion, however, had decided to study Marine Biology either during the bachelor degree or during the last

years of high school (31% and 24% respectively). The students were motivated to study Marine Biology primarily by two factors: they had always been fascinated by marine organisms; and they wished to live a life of travelling and adventure, as they perceived the typical life of a marine biologist. About 17% of the respondents had decided to study Marine Biology because they were scuba divers and wanted to deepen their knowledge of marine environments. A similar proportion had chosen the course because of a personal connection with the coast and the sea. Most students acknowledged that the choice to partake in Marine Biology studies would likely not guarantee them many job opportunities. They also believed that Marine Biology would be a difficult course to partake in. The Polytechnic University of Marche was chosen mainly as it was perceived to be one of the best in the country (62% of the respondents). About 10% of the students also claimed that this university offered a more interesting course curriculum compared with others.

### *Section 3: Education preceding enrolment*

Most students had come from a secondary education background including scientific studies (*"Liceo Scientifico"*), with a few mentioning also classical studies (*"Liceo Classico"*) and technological studies (*"Istituto Tecnologico"*). Regardless of background, over 60% of the students asserted that even simple biological principles (e.g. differences in respiration between animals and plants) were not imparted. There were mixed views concerning whether photosynthesis was properly learned, with more than half of the respondents claiming that it was not. Almost 30% of the students maintained that their science teachers were generally not well prepared. About 60% of the students agreed that they had not received any exposure and education related to marine environments during school, and that rather there was a tendency by the teachers only to mention terrestrial ecosystems. Generally, the exposure to experiences such as museum visits or field outings was poor. Overall, however, the students felt that they had received an average to good scientific preparation for subsequent undergraduate studies (about 70%).

Knowledge in Marine Biology prior to enrolling at the university had been acquired mainly through documentaries (82%) and books (45%). Other sources of knowledge included the exploration of web pages, forums and social networks (38%); park, aquaria and museum visits, although unguided (37%); regular practice of sports and recreational activities (35%); and nature and science magazines (33%).

While only 9% believed to possess proper statistical skills, most students claimed to be well equipped in the use of the computer and the internet (about 65%), and to have good patronage of English language skills (40%). What contributed the most to a good acquisition of the English language skills was having spent some time abroad (half of the respondents) and the help of foreigner friends (46%). The students generally believed that what would probably help them improve their English language skills would include: attending some courses organised and subsidised by the university (75%); spending time abroad (66%); or if some classes were given in English (58%).

Most respondents were scuba divers (77%), having attained certifications equivalent to PADI Open Water Diver or Advanced Open Water Diver, between 2007 and 2016. The students had logged between one and 250 dives following certification, with the majority not having exceeded 50 dives yet.

#### *Section 4: Objectives*

Before deciding to study Marine Biology, the students had mixed views about their career prospects. More than half knew they wished either to work in research and academia, or become documentarists. Other popular prospects included working for environmentalist associations, and studying marine biodiversity, especially charismatic species like sharks and dolphins. Less popular prospects included to work in schools or in aquaculture. While studying Marine Biology, the respondents tended to grow more interest in jobs related to environmental protection and conservation (86%); research (80%) mostly in marine ecology, marine zoology and ecotoxicology; management of Marine Protected Areas (70%); scientific divulgation (57%); environmental monitoring (60%); and environmental impact assessments (54%). The majority (86%) of the respondents believed that having attained some sort of scuba diving certification would be useful for their selected career path. Over 60% also wished to partake in post-graduate studies following the specialisation, either at the same university or abroad.

Most students (80%) had not participated in internship or exchange programmes during the course. Those who did mentioned fieldtrips to marine tropical areas and Erasmus exchanges in Europe. The greatest difference perceived by the students between the academic system abroad and the local one included the availability of more funding and how funding is used, being reinvested in students and research. The second greatest difference perceived was a more practical approach based on more laboratory and fieldwork sessions, versus a more theoretic approach locally. Both these differences were seen as advantages able to provide more opportunities.

#### *Section 5: Evaluation of the course*

The Marine Biology course received generally good reviews by the students, with 42% giving an overall score of “*very good*” and 17% rating it as “*excellent*”. In the specific, theory and lectures received the best ratings (good to excellent by 72% of the students). Laboratory sessions were rated as average to good by 60%, although field exercises received greater scores (over 70%). The students also believed that the instruments made available for the course were good, although not as good as the interactions teacher-student (75% rated those good to excellent). Peripheral infrastructure and services (e.g. library, common areas, secretary’s office, and IT services) received average to good scores by over half of the respondents. Suggestions made to improve the course in general included: more flexibility on behalf of support offices; reorganising of the class and exam timetable to avoid cluttering; the introduction of intermediate exam sessions; a more practical approach in

teaching (more field and laboratory sessions); more exposure to the English language; more focus on topics of relevance such as fishing and the protection of iconic species; and the improvement of some infrastructure such as parking.

Figure 1 is a conceptual diagram synthesising the main themes emerged from the results of the questionnaire survey, creating a generic profile of the 2<sup>nd</sup> year students enrolled in the Marine Biology course during 2015 and 2016.

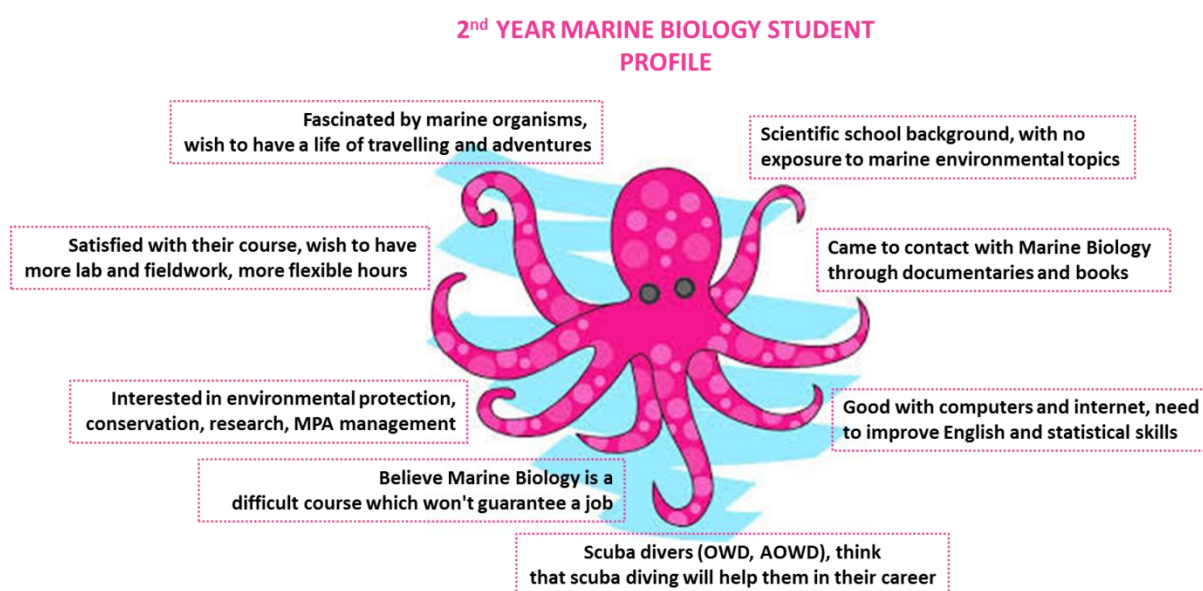


Figure 1. Average profile of 2<sup>nd</sup> year student in Marine Biology at the Polytechnic University of Marche.

## FACE TO FACE INTERVIEWS

### *Demographic details*

A total of 29 students participated in the face to face interviews. Of these, 21 of were females and eight were males, unmarried and aged between 21 and 35 years, although one third were aged between 21 and 22 years, and two thirds were 25 or younger. All the students interviewed came from outside of Ancona, with formal residence in cities such as Rome, Milan, and Perugia, among others. Two students came from abroad, specifically France and Greece. Most students were just studying and receiving financial support from their families, in line with responses provided in the questionnaire survey. Half of the students interviewed were enrolled in their first year in Marine Biology, while three were still finishing their bachelor degree (with an intention to enrol in Marine Biology) and two were PhD students in Marine Biology. The remainder (nine students) were enrolled in their last year of specialisation. Only five students were completing or had completed their bachelor degree at the same university, with most having studied elsewhere. The most mentioned bachelors included Biological Sciences and Environmental Sciences, with two students also mentioning that their bachelor course already had a Marine Biology focus.

### *Motivation to study Marine Biology*

In answer to the question of what motivated the students to study Marine Biology, the top answer provided was a passion for the sea since childhood (14 people), followed by contact with the sea (12 people), and water based activities including scuba diving and snorkelling (11 people). Other motivating factors included a passion for animals, curiosity, and contact with museums, aquaria, books, movies and documentaries. When asked if and who/what influenced the students in their choice, the most common answer was relatives (12 people) who were either scuba divers (nine people) or marine biologists (three people). Teachers were also mentioned as a relevant influence by four students. These answers are in line with the results of the questionnaire survey.

### *The choice of Ancona and degree of satisfaction with the course*

In answer to the question of why they selected the Polytechnic University of Marche, the top answer (14 students) was that it was one of the best and with an excellent reputation for its Marine Biology programme. Features originally attracting the students included the study programme (seven people), the reputation of the lecturers (five people), the opportunities for laboratory and fieldwork (five people), and the connections with universities abroad (four people). Six students also selected this university for convenience reasons (it was closer to their place of origin), although not exclusively. The selection of Ancona was mostly based on suggestions and encouragements by bachelor lecturers (ten people), internet searches (nine people), and colleagues (eight people).

All but two students found themselves satisfied with their course of study. In particular, they made reference to the passion transmitted by the lecturers, the good organisation of the course in general, and the timetable. While 13 students declared they would not make changes to the programme if they were able to, others made some complaints and suggestions. Complaints were made in regards to the study material, and the actual content of the modules (five people). Some students were also disappointed in the limited time dedicated to laboratory and field sessions, in the perceived disinterest of some lecturers, and in the study overload, especially during the first semester of the first year.

### *Scuba diving*

Two thirds of the students were certified scuba divers, and the remainder was generally going to certify in the next 12 months, as part of a module offered by the university during the course in Marine Biology. Two people did not dive for medical reasons, although they did in the past. The students had become certified in a period between 2005 and 2014 and were mostly the equivalent of PADI Advanced Open Water Diver or a Rescue Diver. The main reasons for becoming certified included the importance of scuba diving for their career as marine biologists (eight students), a passion shared with family members (six students), curiosity (six students), and the love for the sea (five students). Four students also

mentioned that they had decided to certify upon the opportunity made available by the university.

### *Scuba diving and Marine Biology*

When asked whether there was a connection between the choice to become scuba divers and that to partake in Marine Biology studies, six students claimed that there was no connection at all, five stated that scuba diving influenced their decision to study Marine Biology, and four declared that studying Marine Biology influenced their decision to become scuba divers. Two students claimed that the two decisions sort of grew in parallel. Regardless of whether there was a net influence by scuba diving on Marine Biology and vice versa, ten students declared that practicing scuba diving activities brings benefits to the Marine Biology course, especially by equipping students with additional skills that can be added to their curriculum. Marine Biology was also seen as beneficial to scuba diving activities, by making the students more sensitive towards the environment and allowing them to recognise a variety of species, making the diving more fun and interesting. All students declared they would continue to dive in the future, except for those who were unable to for medical reasons.

### *Career prospects*

At the end of their studies and in a few years, the majority of the students (17) saw themselves having some sort of experience abroad, and mostly doing research (14 students). The students tended to feel that going abroad would increase their opportunities to find a job or to continue with post-graduate education, as opposed to staying in Italy. Six people also wished to work in Marine Protected Areas, either as managers or as researchers. A few students mentioned jobs at laboratories (two), organisations (two), and in scuba diving (two). When asked whether they would consider some sort of career featuring scuba diving, most answered yes, preferring to use the sport for scientific purposes (19 students) including research, monitoring and sampling, and for education purposes (four people), rather than purely in a tourism context (working at the dive centre as staff).

Figure 2 is a Word Cloud (Word Cloud Generator, © Jason Davies 2016), summarising the results of some of the interviews (those conducted in 2015) with the students. The most prominent words are the ones featuring more frequently during the interviews, and they are placed more centrally in the Word Cloud.





by the athenaeum. Scuba diving featured prominently in the life of the students, as an activity which either stimulated the choice to partake in Marine Biology studies, or improved the curriculum.

Some result point to a number of issues which need to be taken into consideration for future planning and management of the course. One key result shows that despite the expectations to find a more practical and applied approach at studying, students found themselves discouraged by the limited time and space dedicated to laboratory and fieldwork. In addition, the students tended to place a strong emphasis on career prospects primarily involving research abroad, without considering other experiences and job alternatives. Their views tended to be shaped by the general discontent with the economic recession in Italy, leading to cuts in research funding and job positions in their field of interest.

The following list includes key elements which may be taken into consideration for future work:

1. Career orientation sessions (school and university);
2. Subsidised English courses (school and university);
3. Selected guest lecturers and classes in English (university);
4. Changes to timetable of first semester in first year of specialisation (university);
5. Thematic sessions (e.g. fisheries, marine policy, governance) (university);
6. Internship orientation sessions (university);
7. Laboratory and fieldwork restructuring, with increased number of hours (school, university);
8. Visits (museums, aquaria, science festivals) (schools);
9. Liaisons with local dive centres and schools to come up with offers for marine biologists (university);
10. Liaisons with scuba diving certifying agencies for the promotion of new or existing courses for marine biologists;
11. Liaisons with organisations and NGOs to promote the integration of marine biologists in the scuba diving industry;
12. Liaisons with Marine Protected Areas to offer internship opportunities (university);
13. Introduction of marine education in schools as part of the Natural Sciences curriculum (e.g. Biology, Chemistry) (school)

## **ACKNOWLEDGEMENTS**

We wish to express our deepest gratitude to all the students who participated in this research; the secretary's office at DISVA; Dr. Daniela Pica; and Dr. Barbara Calcinai.