

Summary Report of GAs related to Education - Update

Deliverable 3.2.



Deliverable description

This document contains Summary Reports that collect the reports related to the implementation of GAs on Education performed by IFNUL, UNIZG-FAZ, DUTH and ICM-CSIC. It is the result of the activities carried out in the framework of WP3 at the period of M16-M22.

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Summary

This updated Summary Report of GAs related to Education is the collection of the reports related to the implementation of GAs on Education performed by IFNUL, UNIZG-FAZ, DUTH and ICM-CSIC. It is the result of the activities carried out in the framework of WP3 at the period of M16-M22.

It describes how the WP3 partners achieved the project objectives, and progress on specific tasks and the timely delivery of project results. The report includes information about short recall of objective, expected institutional change, target, preparatory activities carried out, implementation (state of the art), communication activities, stakeholders mobilization, obstacles and facilitating factors of GAs implemented by IFNUL, UNIZG-FAZ, DUTH and ICM-CSIC.

Acronyms

Acronyms	Definition
RESBIOS	ResBios Project: Responsible research and innovation
RRI	Responsible Research and Innovation
GA	Grounding Action
GAPI	Grounding Actions Project Ideas
EC	European Commission
H2020	Horizon 2020 funding programme
RPOs	Research Performing Organizations
UNITOV	University of Rome Tor Vergata (IT)
UG	University of Gdansk (PL)
IFNUL	Ivan Franko National University of Lviv (UA)
EUSEA	European Science Engagement Association (AT)
K&I	Knowledge and Innovation Srls (IT)
AU	Aarhus University (DK)
UBREMEN	University of Bremen (DE)
DUTH	Democritus University of Thrace (GR)
ICM-CSIC	Institute of Marine Sciences of the Spanish National Research Council (ES)

UNIZG-FAZ	University of Zagreb, Faculty of Agronomy (HR)
UP	University of Primorska (SL)
ABI	AgroBioInstitute (BG)
MBG	The Department of Molecular Biology and Genetics
NGOs	Non-governmental organizations

Introduction

Institutional framework

The RESBIOS Project has the primary and overall objective to deeply embed Responsible Research and Innovation (RRI) practices through the implementation of a set of RRI Grounding Actions (GAs), related to RRI keys (Education, Gender, Public engagement, Ethics, Open access, Governance). In this framework, the RESBIOS specific objectives are:

- 1) To introduce concrete and measurable institutional changes in four RPOs, to make them more porous to the needs and dynamics of society and more responsible
- 2) To promote the establishment of new partnerships between the implementing RPOs and other stakeholders, based on the «quadruple helix» model
- 3) To contribute to enhancing the culture of RRI in the bioscience field.

RESBIOS is implemented by a consortium, coordinated by Tor Vergata University, with 12 partners from 11 countries in various regions of Europe with complementing expertise.

The Deliverable 3.2 contains the Detailed Summary of the work done in the frame of WP3 in the months 16-22. The WP3 is focused on the implementation of GAs related to RRI key Education which concerned many forms of educational activities, such as combining formal and informal education at university level; life-long learning activities; capacity building on RRI for students and researchers; science education in schools carried out by researchers; and establishment of strategic alliance between research organizations and schools.

Participants of WP3 are four educational institutions: Ivan Franko National University of Lviv (IFNUL), the Faculty of Agriculture (UNIZG-FAZ), Democritus University of Thrace (DUTH), The Institut de Ciències del Mar (ICM-CSIC).

Ivan Franko National University of Lviv (IFNUL) is a classical higher educational establishment with powerful scientific schools, old traditions, and modern innovation approaches. IFNUL units 19 faculties, Institute of extended and pre-university training, 3 colleges, 7 scientific and research institutes, 6 museums, Observatory, Botanical Gardens, Scientific libraries, as well as a number of scientific objects and objects forming the national heritage of Ukraine, and other scientific divisions. 144 Departments and 2 general University Departments there are at the University. The Department of Biochemistry is responsible for the implementation of the RESBIOS project. It is part of the Faculty of Biology.

A core team involved in implementation of the WP3 activities is composed by 4 members: PhD, Dr. Sc., Prof., Nataliia Sybirna (Team leader), PhD, Ass. Prof., Olena Stasyk, PhD, Ass. Prof., Mariia Nagalievska, PhD, Ass. Prof., Mariya Sabadashka.

The Faculty of Agriculture (UNIZG-FAZ) is organized into corporate and departments and is directed by a Dean and four Vice-deans. The deanery consists of the Dean's Office, corporate, legal, students' and human resources services, maintenance service, accounting, Central Agricultural Library (CAL), International Relations Office (IRO), and the Department of Physical and Health Education. The Faculty of Agriculture has a total of 28 departments, organized according to scientific and educational fields of interest and activities.

The assoc. prof. Nikica Šprem, PhD., assist. prof. Toni Safner, PhD. and Andrea Rezić mag. eng. agr. represent the team directly in charge of designing and implementing the GAs. Apart from the core team, there is an extended team supporting the grounding actions: Sunčica Stipoljev, mag. oecol. et prot. nat., assoc. prof. Tea Tomljanović, Ph.D. (editor in chief of Department journal), and assist. prof. Daniel Matulić Ph.D. (editor in chief of Department journal).

Democritus University of Thrace (DUTH) is spread in 4 cities (Komotini, Xanthi, Alexandroupolis and Orestiada), includes 7 campuses and 21 Departments distributed in 8 Faculties covering a large spectrum of fields from the Exact Sciences and Engineering to Health Sciences, Social Sciences and Humanities. The Department of Molecular Biology and Genetics (MBG) of Democritus University of Thrace (DUTH) dedicated to providing a curriculum in Molecular Biology and Genetics, two fast growing scientific disciplines that lie in the heart of innovation in health, food, environment and agriculture. Nowadays, MBG numbers 23 faculty members, 722 undergraduate students, 76 M.Sc. students, 37 Ph.D. students.

The Core Team at DUTH consists of the following MBG faculty members: assoc. prof. Aglaia Pappa (PI of the DUTH team in RESBIOS project), assoc. prof. Katerina Chlichlia, assoc. prof. Alex Galanis, and assoc. prof. Raphael Sandaltzopoulos.

The Institut de Ciències del Mar (ICM-CSIC), belonging to the Spanish National Research Council (CSIC), is the largest marine research centre in Spain and also one of the most important marine research centres of the north-western Mediterranean basin. The CSIC is the largest public institution in Spain dedicated to research and one of the most renowned of the European Research Area (ERA). It is ascribed to the Spanish Ministry of Science, Innovation and Universities through the General Secretariat of Scientific Policy Coordination.

The ICM-CSIC staff, approximately 300 people, includes researchers, management workers, technical support assistants and students.

The core team of ResBios at the ICM-CSIC is composed of: Dr Josep-Maria Gili, Dr Albert Calbet, Dr Esther Garcés, Vanessa Balagué, Janire Salazar.

Structure of the deliverable

The Introduction, Chapters 1 and 2 were written by Nataliia Sybirna, Olena Stasyk, Mariia Nagalievska and Mariya Sabadashka (IFNUL). The following chapters were written by the implementing partners responsible of the GAs described therein and internally reviewed by UNITOV and ABI.

More in particular, the authors of the various chapters are the following:

- Chapter 3: Andrea Rezić, Nikica Šprem, Suncica Stipoljev, and Toni Safner for UNIZG-FAZ
- Chapter 4: Aglaia Pappa and Alexis Galanis for DUTH
- Chapter 5: Janire Salazar and Josep-Maria Gili for ICM-CSIC.

Chapter 1.

Summary of the work done under WP3 in the months 16-22

1.1. General Description

WP3 is focused on the implementation of GAs related to the RRI key «Education» and consist of six GAs in four Tasks:

Task 3.2 Implementation of GAs on Education - IFNUL

GA n. 1. Experimenting and establishing informal education activities at the Department of Biochemistry (GA leader - IFNUL);

GA n.2. Developing a workshop on pharmaceutical and house chemicals for schools (GA leader - IFNUL);

Task 3.3 Implementation of GAs on Education - UNIZG-FAZ

GA n. 3. Promoting long-life learning program on fisheries, apiculture, wildlife management and zoology (GA leader - UNIZG-FAZ);

GA n.4. Developing capacity building module on RRI for students and researchers (GA leader - UNIZG-FAZ);

Task 3.4 Implementation of GAs on Education - DUTH

GA n. 5. Establishing cooperation with schools on the forefront issues of Molecular Biology and Biosciences (GA leader - DUTH);

Task 3.5 Implementation of GAs on Education - ICM-CSIC

GA n. 6. Establishing a network of oceanographic schools (GA leader - ICM-CSIC);

1.2. WP activities (from M16 onwards)

IFNUL as WP leader organized and conducted three meetings with WP3 partners (DUTH, UNIZG-FAZ, ICM-CSIC). The main aim of these meetings was discussion of current state of art of activities, problems and difficulties of implementation of the activities, agreed on a schedule of future meetings.

As WP leader Core Team of IFNUL collected Monitoring forms of state of art of conducted activities of all WP3 partners.

The WP3 leader conducted reporting coordination by supervising the specific reports prepared by the RPOs implementing the GAs on the Education, and gathering these reports in a single report, and providing a summary (Deliverable D3.2).

During report period by IFNUL were launched:

GA n.1.1c - round table on discussing the results in project groups (Discussion of Questionnaire after «Practical seminars» and trainings),

GA n.1.2a. - workshop on planning research;

GA n.1.3. - short course for students about current opportunities and perspectives of bioinformatics as a science: 2 panel discussions;

GA n.1.4. - preparation of videos on basic biochemical methods for Video-blog «Basic Techniques in Biochemistry and Molecular Biology»;

GA n.1.5. - preparation of 2 presentations «Biology of viruses. Our friends or enemies.» and «Viruses and the immune system of a multicellular organism»;

GA n.1.6. - Summer School for students and PhD Students «Functional foods - new challenges for balanced nutrition and the treatment of metabolic disorders».

GA n.2.1 Part 1 of Workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry»

GA n.2.3 Practical group workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry»

Team of UNIZG-FAZ conducted:

UNIZG-FAZ#3 - 3.2. Conclusion of the planning activities of LLL activities on RRI promotion in the Department and Faculty;

UNIZG-FAZ#3 - 3.3. Conclusion of Postgraduate Expert Studies of Fisheries and in the Modern apiculture involved in the Promotion of RRI practices in LLL programs was implemented only for LLL - Modern apiculture. There were no registered participants/students in Postgraduate Expert study Fisheries in academic year 2020/2021. / Promotion of RRI practices in the theoretical part and in the practical courses of the LLL program already established in the Department («Botanical and geographical origin of honey»).

UNIZG-FAZ#3 - 3.4. Starting promotion of RRI practices in new LLL programs (establishment of a new LLL program «Wildlife management»)

UNIZG-FAZ#3 - 3.5. Promotion activities for the implementation of RRI through the LLL program (core team meetings, organizations of events, etc.)

UNIZG-FAZ#3 - 3.6. Enhance the visibility of the RRI and LLL programs on the organized by the UNIZG-FAZ (Green touch of Medvednica; III International Rupicapra Symposium; Training program for members of emergency wild boar shooting teams - special part)

UNIZG-FAZ#3 - 3.7. Second course for hunters on RRI

UNIZG-FAZ#4 - 4.3. Conclusion of teaching on RRI in summer semester.

UNIZG-FAZ#4 - 4.4 Conclusion of the first presentation activities on RRI to the Hunting student group;

UNIZG-FAZ#4 - 4.5. Teaching session on RRI principles to PhD students

UNIZG-FAZ#4 - 4.7. Starting the preparation of the poster/webinar for the Carrier day or PhD Day;

UNIZG-FAZ#4 - 4.8. Poster presentation/webinar at the Carrier day.

UNIZG-FAZ#4 - 4.9 Poster presentation/webinar at the PhD day will be presented during September 2021. The Faculty committee decided to perform it “in live” if will be allowed due to epidemiological measures. / Poster and oral presentation at the Ph.D. day (2021)

UNIZG-FAZ#4 - 4.10 Drafting report of promotion activities at the Carrier day and PhD Day
The report will be done during October 2021 since the PhD day will be held on September. / Writing the report about Carrier day and Ph.D. day promoting activities

UNIZG-FAZ#4 - 4.11. Evaluation of the students knowledge about RRI (end of summer semester 2020/2021)

UNIZG-FAZ#4 - 4.12. Evaluation of the knowledge of the students involved in the Hunting group

UNIZG-FAZ#4 - 4.13. Writing the report about the results of the evaluation process (Activities 4.11 and 4.12)

UNIZG-FAZ#4 - 4.14. Poster presentation or webinar at the Open door day (2021)

UNIZG-FAZ#4 - 4.17. Promotion of RRI at the dissemination events

DUTH Team conducted:

DUTH#5. 3. 1st annual workshop for 2nd grade high school students

DUTH#5. 4. Organization of science projects on annual basis

DUTH#5. 5. 1st Open Day Event

DUTH#5. 6. Organization of two annual workshops for school educators with direction to teaching biosciences

ICM-CSIC Team conducted:

ICM-CSIC#6 - 6.1.a. Training of the Network of Marine schools – first formative action;

ICM-CSIC#6 - 6.5. Twinning with similar projects (twining established)

ICM-CSIC#6 - 6.0.b. Establishing a network of oceanographic schools (first nucleus of the network)

Chapter 2.

Summary of the work done under

Task 3.2. in the months 16-22

2.1. General activities on Task 3.2 Implementation of GAs on Education – IFNUL

GA 1. «Experimenting and establishing informal education activities at the Department of Biochemistry»

Task leader: Ivan Franko National University of Lviv (IFNUL)

Task participants: Associate Professors of Department of Biochemistry, Research and Development Department of Ivan Franko National University of Lviv, Scientific Center for Medical and Biotechnical Research of the National Academy of Sciences of Ukraine, students and PhD students of Faculty of Biology

Table 2.1: Task implementation of GAs-IFNUL

Objective of the task	<p>The main aim of Grounding Action «Experimenting and establishing informal education activities at the Department of Biochemistry» is to improve different forms of education (formal and informal) in order to respond to individuals' and organizations' needs. In the frame of GA n.1 «Practical seminar», project groups, workshop on planning research and round table on start-ups, Summer School on Nutrition will be used as tools for implementation of informal education for students at the Department of Biochemistry. Short course for students about current opportunities and perspectives of bioinformatics as a science and Video Blog «Basic Techniques in Biochemistry and Molecular Biology» for students, PhD students, lecturers and researchers will be the basis for development of new courses and for modification of existent ones at the Department of Biochemistry. Presentation on the themes «Stress in uncertainty», «Biology of viruses. Our friends or enemies» and «Viruses and the immune system of a multicellular organism» and brochure to accompany the videos will be applied for public engagement and for popularization of Biosciences.</p> <p>It will be created Notes of rules, measures, standards adopted inside Faculty of Biology of IFNUL for promoting RRI governance. The acquired experience will be subsequently applied at other departments of the Faculty of Biology and other Faculties of IFNUL</p>
Preparation activities	<p>Promotion of short course for students about current opportunities and perspectives of bioinformatics as a science.</p> <p>Preparing scenario of Video Blog «Basic Techniques in Biochemistry and Molecular Biology» and preparing presentations on theme «Biology of viruses. Our friends or enemies.» and «Viruses and the immune system of a multicellular organism», organizing technical support of videos and Video-Blog.</p> <p>Detailed scheduling Summer School on Nutrition, preparing registration forms, booklets, notebooks, agreements with participants, invitations for lecturers, certificates for participants and gratitude for lecturers of Summer School</p>

Implementation

GA n.1.1c. It was conducted 1 round table on discussing the results in 3 project groups consisting of 4 students in each (Discussion of Questionnaire after «Practical seminars» and trainings) in which participate students, Scientific society of students, PhD students, lecturers, researchers (Figure 2.1). It was held on 30.03.2021.

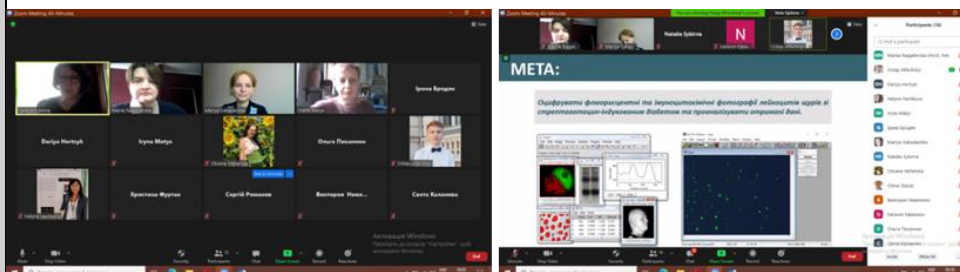


Figure 2.1. Round table on discussing the results in project groups

GA n.1.2a. It was conducted Workshop on planning research. In activity, participate students, Student's association, PhD students, lecturers, researchers (Figure 2.2). It was held on 15.04.2021. Main speaker was Ass. Prof. Mariya Sabadashka (Department of Biochemistry, IFNUL).

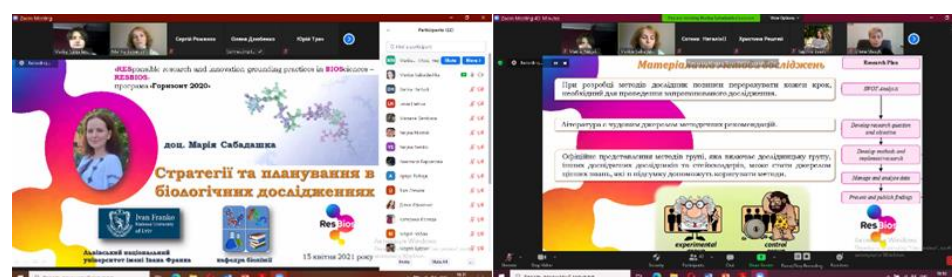


Figure 2.2. Workshop on planning research

GA n.1.3. It was conducted short course for students about current opportunities and perspectives of bioinformatics as a science: 2 panel discussions. In activity took part students, Student's association, PhD students, Lecturers, Researchers (Figure 2.3). It was held on 29.04.2021. Invited speaker was Prof. Bohdan Ostash (Department of Genetics and Biochemistry, IFNUL)



Figure 2.3. Short course on current opportunities and perspectives of bioinformatics as a science

GA n.1.4. Preparation of videos on basic biochemical methods for Video-blog «Basic Techniques in Biochemistry and Molecular Biology» is in progress. All videos are presented to students and released on YouTube

channel «Кафедра біохімії ЛНУ імені Івана Франка / The Department of Biochemistry IFNUL» (Figure 2.4)

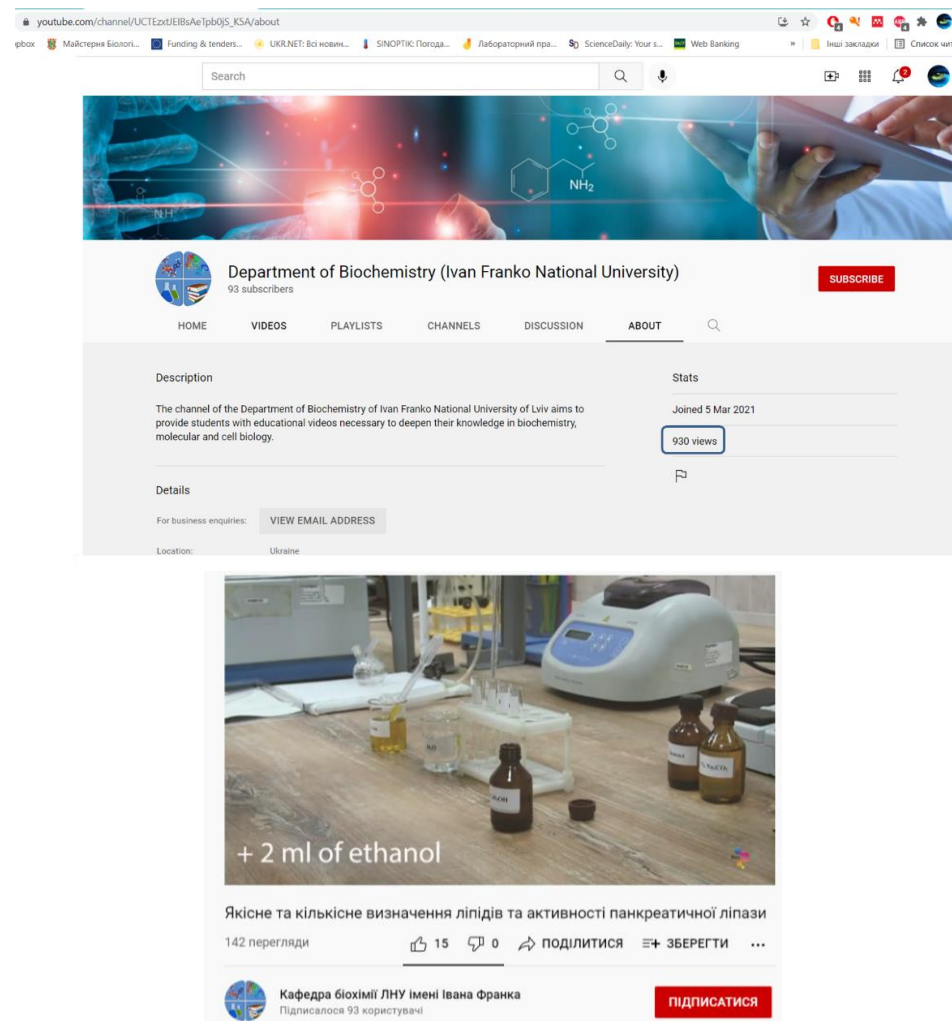




Figure 2.4. Video on YouTube channel «Кафедра біохімії ЛНУ імені Івана Франка / The Department of Biochemistry IFNUL»

GA n.1.5. It was prepared 2 presentations «Biology of viruses. Our friends or enemies» and «Viruses and the immune system of a multicellular organism» and were discussed with pupils of Lviv secondary schools and stuff of Junior Academy of Sciences (Figure 2.5).



Figure 2.5. Discussion of presentations with pupils of Lviv secondary schools

GA n.1.6. Summer School for students and PhD Students «Functional foods - new challenges for balanced nutrition and the treatment of metabolic disorders» was held on 28 June – 02 July 2021 in Lviv, Ukraine. In activity students, Student's association, PhD students, lecturers, researchers took part (Figure 2.6). Invited lectures were: Dr.Sc., Professor Leonid Kapreliants Odesa National Academy of Food Technology, Dr.Sc., Professor Małgorzata Dżugan University of Rzeszow, Dr.Sc., Professor Andrii Sybirny Institute of Cell Biology of NAS of Ukraine, Andriy Smaglo Halychpharm Corporation Arterium, Mariya Goloyda Halychpharm Corporation Arterium, Dr.Sc., Professor, Natalia Sybirna Ivan Franko National University of Lviv, PhD Liudmyla Glushchenko Research Station of Medicinal Plants of Institute of Agroecology and Environmental Management of National Academy of Agrarian Sciences of Ukraine

	 <p>Figure 2.6. Summer School for students and PhD Students (lectures and interactive discussion as well as practical group workshops)</p>
Communication activities	<p>Diffusion of information among internal and external stakeholders, promotion of Videos, Video-Blog, and Summer School on Nutrition using social networks, Web-site of the Department of Biochemistry, local press and during meetings with stakeholders and potential participants. Propagation of RRI principles in society via Core Team participation in OpenLab Scientific Festival (Figure 2.7)</p>  <p>Figure 2.7. OpenLab Scientific Festival, 25th September, 2021</p>
Number of participants in the task	<p>GA n.1.1c. 10 students, 1 student's association, 3 PhD students, 7 lecturers, 1 researcher GA n.1.2a. 30 students, 1 Student's association, 5 PhD students, 3 Lecturers, 2 Researchers GA n.1.3. 40 participants GA n.1.6. 53 participants</p>
Stakeholders mobilisation	<p>Students, Scientific society of students, PhD students, lecturers, researchers as internal stakeholders participated in round table on discussing the results of «Practical seminars», Workshop on planning</p>

	research, Short course on current opportunities and perspectives of bioinformatics as a science. In creation of videos took part members of Scientific society of students, graduate students, doctoral students and young scientists. Preparation of presentations on the subjects «Biology of viruses. Our friends or enemies.» and «Viruses and the immune system of a multicellular organism» were supported by Vitaliy Kukharsky (Ivan Franko National University of Lviv Vice-Rector for Research, Teaching and IT-Development) and Ivanna Borodchuk (Director of Lviv Regional Junior Academy of Science). Some of the activities of Summer School for students and PhD Students «Functional foods - new challenges for balanced nutrition and the treatment of metabolic disorders» were prepared with participation of Doctor of Technical Sciences, prof. Leonid Kapreliants (Odesa National Academy of Food Technology Vice-rector for Research and International Relations, Head of the Department of Biochemistry, Microbiology and Nutrition Physiology), Ph.D. Liudmyla Glushchenko, (Research Station of Medicinal Plants of Institute of Agroecology and Environmental Management of National Academy of Agrarian Sciences of Ukraine, Deputy on Scientific Work).
Obstacles and facilitation factors	none
Future directions towards achieving sustainability	In the next period it will be continued working on organisation and holding of: <ul style="list-style-type: none"> GA n.1.2b Round table on start-ups GA n.1.6 2nd Summer Schools on Nutrition (Summer, 2022) Also, it will be finished preparation of videos on basic biochemical methods and its uploading on YouTube «Кафедра біохімії ЛНУ імені Івана Франка / The Department of Biochemistry IFNUL».
Self-evaluation	All planned activities were conducted according to phasing and scheduling presented in «ResBios Project: Collection of GA Detailed Plans».

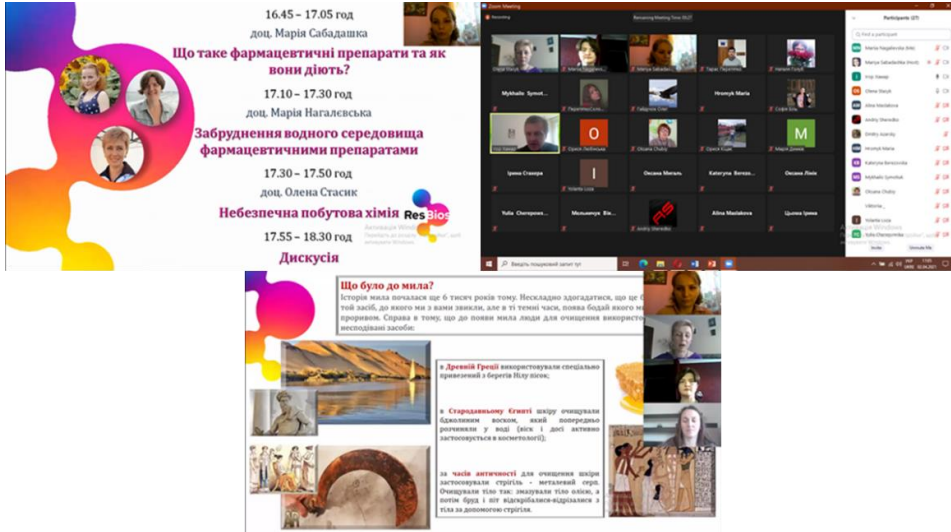
GA 2. «Developing a workshop on pharmaceutical and house chemicals for schools»

Task leader: Ivan Franko National University of Lviv (IFNUL)

Task participants: Associate Professors of Department of Biochemistry, teachers of the local schools, Lviv Regional Junior Academy of Science, students and PhD students of Faculty of Biology

Table 2.2: Task implementation of GAs-IFNUL

Objective of the task	The overall objective of the Grounding Action «Developing a workshop on pharmaceutical and house chemicals for schools» is to contribute to the development of an RRI mission statement for the Faculty of Biology and other Faculties of Ivan Franko National University. The purpose is to familiarize schoolchildren and teachers with the chemical properties of pharmaceuticals, household chemistry, cosmetics and their effects on the
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	human and animal body, and environment. In the frame of Grounding Action workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry», practical group workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry» and training activities for teachers and students of secondary schools will be used as tools for popularization of biological sciences in society and citizen engagement.
Preparation activities	<p>Preparing worksheets, notebooks, and certificates of participation in the workshop and training for school teachers</p> <p>Promotion of workshop and training for teachers in local schools</p> <p>Organizing technical support of the workshop and training for school teacher</p> <p>Scheduling workshop and training for school teacher, preparing registration forms, booklets, notebooks, agreements with participants, invitations for lecturers, certificates for participants and gratitude for lecturers of workshops</p>
Implementation	<p>GA n.2.1 Part 1 of Workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry» was held on 02.04.2021. (Figure 2.8). On workshop were presented topics:</p> <ol style="list-style-type: none"> 1. Toxicity classification and evaluation of four pharmaceuticals classes: antibiotics, antineoplastics, cardiovascular, and sex hormones» 2. Public Health Care Management of Water Pollution with Pharmaceuticals: Environmental Classification and Analysis of Pharmaceutical Residues in Sewage Water 3. Dangerous Household Chemicals 4. Surfactants: Chemistry, Toxicity and Remediation <p>Main speakers were Ass. Prof. Mariya Sabadashka, Ass. Prof. Mariia Nagalievska, Ass. Prof. Olena Stasyk (Department of Biochemistry, IFNUL).</p>  <p>Figure 2.8. Workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry»</p> <p>GA n.2.3 Practical group workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry» was conducted</p>

02.04.2021 (Figure 2.9). In GA Detailed Plan it was indicated that in frame of this activity it was planned to conduct practical group workshop on the theme «Quality control (pH, inorganic ions content, organic and microbial pollutions) of water with and without household chemistry and drugs». But due to COVID-19 spread and lockdown in Lviv region the format was changed to on-line meeting via Zoom. On the meeting were discussed the ways to reduce chemical exposures at home: opportunities for action.

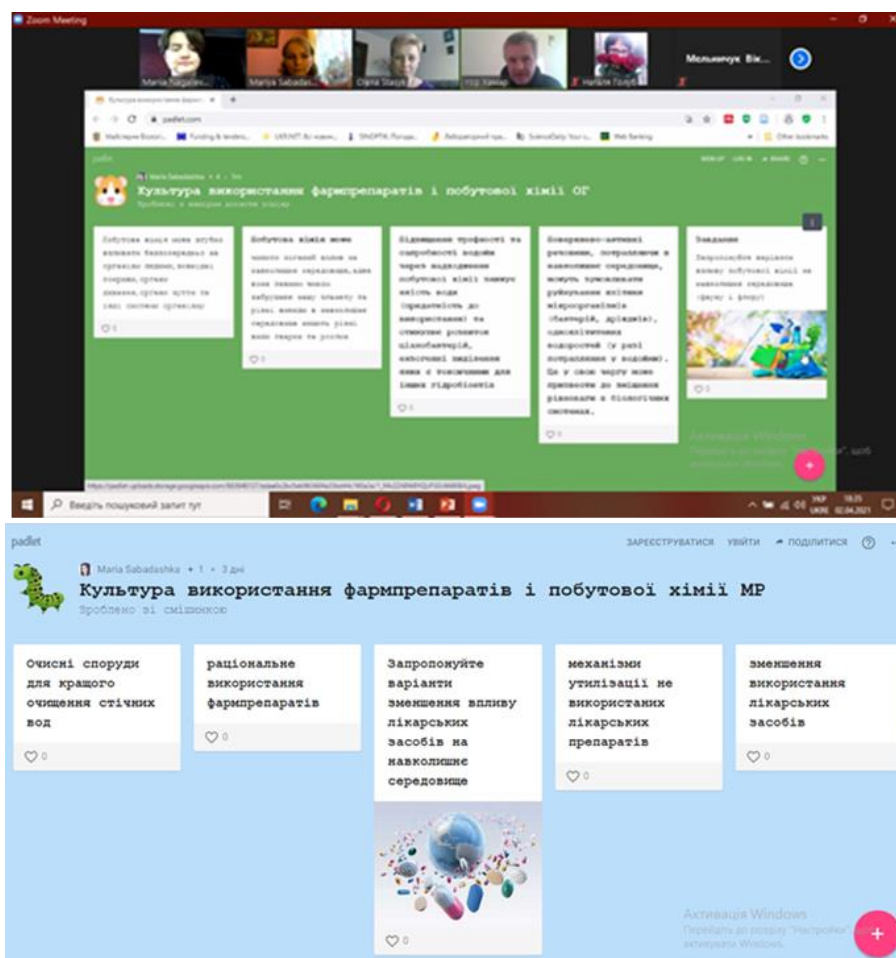


Figure 2.9. Practical group workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry»

Communication activities	Diffusion of information among internal and external stakeholders, promotion of workshop and training for school teachers using social networks, Web-site of the Department of Biochemistry, local press and during meetings with stakeholders and potential participants
Number of participants in the task	GA n.2.1. 25 pupils, 8 teachers, 8 students, 7 lecturers, 1 researcher GA n.2.3 22 pupils, 8 teachers, 7 students, 6 lecturers, 1 researcher
Stakeholders mobilisation	In preparation and conducting of workshop for pupils and teachers of secondary schools on «The culture of usage of pharmaceuticals and household chemistry» and training activities for teacher and students of secondary schools, on the same issues of the workshop took part an active part of teachers of the local schools: Lesia Yaropud, Andrii Tsygan (Lyceum No 37), Andriy Savchuk (Lviv Physics-Mathematics Lyceum),

	Valentyna Yaremko (Verhniobilkivska secondary school), Liubov Halajba, Myroslava Ivaschyshyn, Oksana Cherepanych (Lviv gymnasium «Prestige» with advanced study of foreign languages), also Ivanna Borodchuk (Director of Lviv Regional Junior Academy of Science).
Obstacles and facilitation factors	none
Future directions towards achieving sustainability	<p>In the next period it will be continued working on organisation and holding of:</p> <ul style="list-style-type: none"> GA n.2.2 Part 2 of Workshop for pupils and teachers «The culture of the use of pharmaceuticals and household chemistry». Main topics of this part of workshop are: Biochemical, Pharmacological, and Ethnicity Aspects of cosmetics The biochemistry of beauty. The science and pseudo-science of beautiful skin Herbal Cosmetics and Cosmeceuticals Anti-aging cosmetics: true or false GA n.2.4 Training activities for teachers and students of university, as to prepare and follow-up the workshop «The culture of the use of pharmaceuticals and household chemistry» in ordinary school classes
Self-evaluation	<p>Almost all planned activities were conducted according to phasing and scheduling presented in «ResBios Project: Collection of GA Detailed Plans».</p> <p>Exception is GA n.2.3. In GA Detailed Plan it was indicated that in frame of this activity it was planned to conduct practical group workshop on the theme «Quality control (pH, inorganic ions content, organic and microbial pollutions) of water with and without household chemistry and drugs». But due to COVID-19 spread and lockdown in Lviv region the format was changed to on-line meeting via Zoom.</p>

Chapter 3.
Summary of the work done under
Task 3.3. in the months 16-22
(UNIZG-FAZ)

3.1. General activities on Task 3.3 Implementation of GAs on Education – UNIZG-FAZ


GA 3. «Promoting long-life learning program on fisheries, apiculture, wildlife management and zoology» and GA 4 «Developing capacity building module on RRI for students and researchers»

Task leader: University of Zagreb Faculty of Agriculture (UNIZG-FAZ)

Task participants: UNIZG-FAZ core and extended team; researchers; department and faculty high level representatives; lecturers; undergraduate, graduate, and PhD students; civil society organizations, after work groups, elderly groups; research group leaders at Department and Faculty level; students' associations; University of Zagreb, International Relations office; NGOs; representatives of government bodies (Ministry); Faculty of Veterinary medicine; Faculty of Agrobiotechnical Sciences Josip Juraj Strossmayer University of Osijek; hunters and gamekeepers; Croatian Science Foundation; Faculty of Forestry and Wood technology, and Technology; Faculty of Food and Biotechnology; Centre for Student Support and Career Guidance

Table 3.1: Task implementation of GAs

Objective of the task	This task is focused on the implementation of GAs related to the RRI key «Education». Many forms of education activities are included in this task such as lifelong learning activities and capacity building on RRI for students and researchers. The main objective of GA#3 is providing education and learning following RRI practice to a diversified student population within the LLL program. The main aim of GA#4 is to improve the current education process to provide Department researchers and other stakeholders with new capacities in taking responsibility in the formal and non-formal education process.
Preparation activities	Activity No. 3.4: The core team contacted and organized a meeting with the new Faculty leadership to present the project activities already implemented and future activities Activities No. 3.5/4.6/4.10/4.13: The core team organized meetings several times a month to identify actions to be implemented, monitor implementation progress, and manage activities. Activity No. 3.6: For the organized events, PPT presentations, poster prints, announcements, and online promotional materials (texts for the Faculty website, ResBios website, and social media) are produced. Activities No. 3.3/3.7/3.8: A learning material (PPT presentations, worksheets, assignments, etc.) was prepared for the participants of the LLL program. Activities No. 4.7/4.8/4.9/4.17: The core team prepared a poster or PPT presentation on the basic principles and rules of RRI for events organized by webinar or in person.

	<p>Activities No. 4.3/4.4/4.15/4.15: PowerPoint presentations about fundamental principles and rules of RRI were prepared for the courses held during the summer/winter semesters and for students involved in the Hunting group.</p> <p>Activities No. 4.11/4.12/4.16: A survey was prepared at the end of the 2020/2021 summer semester to assess student knowledge of RRI principles.</p>
Implementation	<p>For the GA#3 following activities were performed:</p> <p>Activity No. 3.3: From 02 to 03 July 2021, the Head of the Department of Fisheries, Apiculture, Wildlife management and Special Zoology prof. Dragan Bubalo, Ph.D. (internal) and assist. prof. Saša Prđun, Ph.D. (internal) performed a LLL program «Botanical and Geographical Origin of Honey» for 11 employees of Departments for honey quality control (external stakeholders).</p> <p>Activity No. 3.4: The core team contacted the new Faculty leadership, who began work on October 5, 2021. The ResBios project and project activities were presented to the new Vice Dean for Science and Infrastructure, assoc. prof. Klaudija Carović - Stanko, Ph.D. (internal). The meeting was organized twice. At the second meeting, held on 15 October 2021, the K&I partner participated with the presentation of the project, planning and preparation of the Sustainability Plan.</p> <p>The process for establishing a new LLL «Wildlife Management» program is ongoing. Assoc. prof. Nikica Šprem, Ph.D., members of the Faculty committee, members of the University committee, the Croatian Hunting Association, the Ministry of Science and Education and the Agency for vocational education and training are involved in implementation of this activity.</p> <p>Activities No. 3.5/4.6: The core team organized meetings several times a month (Figure 3.1).</p>  <p>Figure 3.1. The meeting of the core team and the extended team. Meetings are organized several times a month. Each meeting is used to plan, implement, and monitor the activities listed at GA</p>

At each organized meeting, the core and extended team monitored and analysed progress of already implemented activities, and planned future activities for GA#3 and GA#4. These activities included organizations of events in Activities 3.6/3.7/4.5/4.7/4.8/4.9/4.17. One of the example is organization of the «III International Rupicapra symposium» in collaboration with colleagues and mentors from the University of Primorska (UP FAMNIT) (Figure 3.2).



Figure 3.2. Organization of the «III International Rupicapra symposium» in collaboration with UP FAMNIT partner

Activity No. 3.6: the RRI aspects in LLL training program for members of emergency wild boar shooting teams - special part was organized in collaboration with the Slovenian Ministry of Agriculture, Forestry and Food from 09 to 15 July 2021. The aim of the program was to educate hunters and hunting associations in Slovenia on how to control African swine fever by controlling wild boar population (Figure 3.3).



Figure 3.3. The LLL training program for members of emergency wild boar shooting teams - special part organized in collaboration with the Slovenian Ministry of Agriculture, Forestry and Food from 09 to 15 July 2021

Activity No. 3.7: The second course for hunters and gamekeepers following RRI principles was organized and performed from 01 to 17 June 2021. The course was organized by the Faculty of Agriculture (internal), the Faculty of Veterinary medicine (external stakeholder) and the Faculty of Agrobiotechnical Sciences Josip Juraj Strossmayer University of Osijek (external stakeholder).

For GA#4 following activities were performed:

Activity No. 4.3: In the summer semester of the academic year 2020/2021, the core team prepared lectures and taught students about RRI-related issues. In the following courses student learnt about the fundamental principles and rules of the RRI:

- Wildlife Management (169510),
- The scientific research system (173845),
- Caninology (197689).

Activity No. 4.4: Assoc. prof. Nikica Šprem, Ph.D. (core team leader) and Krešimir Kavčič, mag. eng. agr. from the Department of Fisheries, Apiculture, Wildlife Management and Special Zoology created a «Hunting Group» as an extracurricular activity. In the academic year 2020/2021, a total of 14 students have applied to participate in this activity (Figure 3.4). Students learn about hunting methods that respect the ethics of hunting and are introduced to animal welfare.

Activity No. 4.5: Sunčica Stipoljev (Ph.D. student), as a member of the extended team, presented the Resbios project and ethics in research and publishing at the «PhD coffee #8». This event was organized in collaboration with the Croatian Science Foundation on September 8, 2021.



Figure 3.4. The «Hunting Group». In the beginning 7 students applied and conducted fieldwork from April 12-17, 2021

Activity No. 4.8: RRI principles were promoted through Career Day, attended by students and employers. With the aim of connecting academia with the business world, the Centre for Student Support and Career Guidance at the Faculty of Agriculture organized Career Days for the sixth consecutive year. Due to the epidemiological situation, the event was moved to the online environment. The date for the Career Day was May 10-14, 2021. The Faculty of Agriculture is particularly proud that the presenters were former students who now have enviable careers. They showed how diverse the employment opportunities are for agronomists. Regardless of where they are employed, they pointed out that the expertise gained at the Faculty of Agriculture is the foundation for their success. They also stressed the importance of lifelong learning. In addition to professional knowledge, the lecturers cited motivation as a key skill for success in the job market. English language skills are also considered desirable. Students were advised to take advantage of the opportunities for international exchange and practice abroad.

Activity No. 4.9: The Faculty of Agriculture in collaboration with the Faculty of Forestry and Wood technology, and Technology the Faculty of Food and Biotechnology organized the «PhD Day». This event is organized as a small conference where Ph.D. students had the opportunity to present their research. PhD students presented their research in the form of posters or oral presentations and all studies were published in a book of abstracts. Sunčica Stipoljev gave an oral presentation to the attendees about the ResBios project and the ethical principles she followed during her studies, research and publication of the results. Ethics in research and publication was presented by Andrea Rezić in a short presentation in the poster section (Figure 3.5).



Figure 3.5. The «PhD day» event. Sunčica Stipoljev gave an oral presentation to the attendees about the ResBios project and the ethical principles she followed during her studies, research and publication of the results (right picture). Ethics in research and publication was presented by Andrea Rezić in a short presentation in the poster section (left picture).

Activity No. 4.10: The core team wrote the report about the results of the promotion at the Carrier days and Ph.D. day.

Activities No. 4.11/4.12: Students enrolled in the courses and the «Hunting group» were evaluated using a survey. The survey included questions about Education, Open Access and Ethics. Before the ResBios project, the undergraduate, graduate and Ph.D. students weren't introduced with the concept of the RRI. To date, 25 responses have been collected. When we asked students what they want to improve in education at Faculty of Agriculture, the following answer were recorded:

- More practical classes at field that will last for several days,
- Education in sense of better employment opportunities and showing students the examples of employment,
- Collaboration of the Faculty of Agriculture with other faculties, so that they can participate in other lectures and practical courses, not only those at their home institution, and to give them the opportunity to write and publish scientific papers together with students from other faculties,
- Students think there is insufficient information about the projects that are being carried out at the Faculty (students are not invited to participate),
- They need more information about the possibility of employment after graduation and the benefits of participating in extracurricular activities,
- The courses/lecturers should be designed to encourage critical thinking and not just focus on learning facts and figures that change very quickly. The Faculty should apply the approach of creating scientists on the faculty, not employees with the

necessary information. Also students would like to have the opportunity to participate in projects.

- According to the students' opinion the better promotion of the lifelong learning program is necessary.

Activity No. 4.15: At the beginning of the winter semester 2021/2022, the RRI principles were implemented in the course «Hunting (169203)».

Activity No. 4.17: The 1st Scientific Conference with International participation «Medvednica Green Touch» was organized by the Public institution «Nature Park Medvednica» (external), under the auspices of the Ministry of Economy and Sustainable Development (external). The assoc. prof. Nikica Šprem, Ph.D. (internal, core team leader) was member of the scientific committee and presented RRI principles through studying the effect of climatic changes on wildlife (Figure 3.6).



Figure 3.6. The presentation of the ResBios project and RRI principles at 1st Scientific Conference with International participation «Medvednica Green Touch»

Activity No. 4.17: In accordance with the RRI principles, the core team and the extended team, in collaboration with the University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, and the Biokovo Nature Park (external), organised the «III International Rupicapra symposium» from 14 to 18 June 2021. The UNIZG-FAZ team and the UP FAMNIT team promoted the ResBios project and RRI through plenary lectures and oral communications (Figure 3.7).

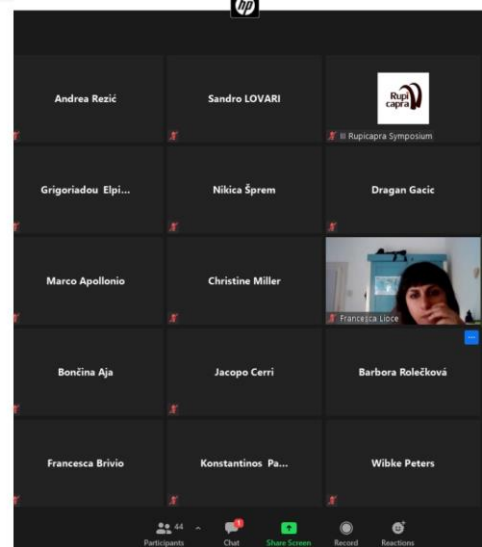


Figure 3.7. «III International Rupicapra Symposium» was conducted online due to the Covid 19 pandemic. The results of the scientific studies presented at the symposium are published in the Book of Abstracts.

Activity No. 4.17: «Little school of Mammalogy 2021» was held on 9 and 10 October in Mrkopalj in Gorski kotar. The event was organized in collaboration with the Association of Biology Students Association - BIUS, Mammalogy Section (Figure 3.8).



Figure 3.8. Assis. prof. Toni Safner, Ph.D. teaching participants of the „Little school of Mammalogy 2021» methods often used in research respecting ethics in biosciences

The project is organized by BIUS Mammalogy Section once a year since 2016. The project brings together all kinds of university students, from those studying biology or a related subject to those who have chosen a completely different career path but are interested in learning about mammals, and brings them together with experts in the field of

	<p>mammalogy. The idea behind this project is to share knowledge, give students an insight into their possible future careers and encourage debate, through lectures and fieldwork.</p> <p>Two lecturers introduced students (external stakeholder, students studying biology) with topics rarely covered in conversations involving mammal research:</p> <ul style="list-style-type: none"> - Assis. Prof. Toni Safner, Ph.D. (lecturer, internal stakeholder) talked about planning research and methods often used in research as well as ethics in biosciences - Mladen Zadravec, mag. biol. exp. (lecturer, external stakeholder) presented Guide for Legislation and Nature Conservation <p>Particular mammal groups also presented:</p> <ul style="list-style-type: none"> - mr. sc. Daniela Hamidović (Senior expert advisor for monitoring the state of nature, Ministry of Economy and Sustainable Development; external) presented Croatian bat species - Krešimir Kavčić, mag. ing. agr. (Ph.D. student, assistant, internal) talked about mountain artiodactyls and field research regarding them (ethics in research) - Vedran Slijepčević, (lecturer, external stakeholder) dr. vet. med. provided an update on the LIFE Lynx project
Communication activities	<p>The core team used the Zoom platform, in person (meetings), email and telephone to conduct meetings with internal and external stakeholders. Email correspondence, phone calls and in person meetings were used for activities preparations.</p> <p>The Faculty website was used to announce events.</p> <p>The events «III International Rupicapra symposium» and «Carrier day» were performed via Zoom platform.</p> <p>The «PhD day» was performed in the hybrid mode.</p> <p>Slack was used as a communication tool with ResBios partners.</p> <p>Students were assessed via a survey. Other mentioned events were performed in person.</p>
Number of participants in the task	<p>Number of participants included in the meetings: 5 internal and 4 external (K&I and UPFAMNIT teams).</p> <p>Number of participants in the LLL training program for members of emergency wild boar shooting teams - special part - The training program was conducted in two terms. The program was attended by a total of 650 external participants.</p> <p>Number of participants in the LLL program «Botanical and geographical origin of honey» – 2 lecturers (internal) and 11 attendants (external)</p> <p>Number of participants at the «PhD coffee #8» – 4 lecturers (1 internal, 3 externals from the Croatian Forest Research Institute, and the Faculty of Food Technology and Biotechnology) and 15 attendants (external).</p> <p>Number of participants at the «PhD day»: 71 [9 members of organizing committee (3 internal, 6 external), 5 representatives of Faculty leadership (1 internal, 4 external), 1 representative of University leadership (external), 3 professors (internal), 1 representative of Horizon Europe NCP for Marie Skłodowska-Curie Actions and Joint Research Centre</p>

	<p>(external), 1 Senior Adviser for International Academic Cooperation (external) and 51 Ph.D. students (9 internal and 42 external)]</p> <p>Number of participants at the «Carrier day»: ~ 40 participants (8 representatives of external companies and private small businesses). The other participants are internal stakeholders such as Faculty employees and students.</p> <p>Number of participants at the 1st Scientific Conference with International participation «Medvednica Green Touch»: 80 participants [1 internal (assoc. prof. Nikica Šprem, Ph.D.) and 79 external stakeholders – researchers; citizens; representatives of NGOs and governmental agencies]</p> <p>Number of participants at the event the «III International Rupicapra Symposium» (from 14 - 18 June 2021):</p> <p>9 members of organizing committee:</p> <p>Nikica Šprem (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Luca Corlatti (Albert-Ludwigs-Universität Freiburg, Germany- external)</p> <p>Slavo Jakša (Nature park Biokovo, Croatia- external)</p> <p>Laura Iacolina (University of Primorska, Slovenia - external)</p> <p>Toni Safner (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Krešimir Kavčić (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Andrea Rezić (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Sunčica Stipoljev (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Igor Ilić (NGO Help Nature, Zagreb, Croatia - external)</p> <p>8 members of the Scientific committee:</p> <p>Luca Corlatti (Albert-Ludwigs-Universität Freiburg, Germany)</p> <p>Marco Apollonio (University of Sassari, Italy; external)</p> <p>Nikica Šprem (University of Zagreb, Faculty of Agriculture, Croatia)</p> <p>Sandro Lovari (Italy; external)</p> <p>Juan Herrero (University of Saragossa, co-chair of the Caprinae Specialist Group, Spain; external)</p> <p>Francesco Ferretti (University of Siena; external)</p> <p>Elena Bužan (University of Primorska, Slovenia; external)</p> <p>Luca Rossi (University of Torino, Italy; external)</p> <p>Marco Festa-Bianchet (University of Sherbrooke, Canada; external)</p> <p>Sabine Hammer (University of Veterinary Medicine Vienna, Austria - external)</p> <p>In addition to the committees, 80 participants attended this event (39 oral and 10 poster presentations - 2 oral presentations were given by the core team and the extended team). The remaining participants were students, scientists, national representatives (Ministries, governmental agencies), NGOs (Help Nature, Croatian hunting association, Nature park Biokovo).</p> <p>Number of participants in the "Little school of Mammalogy 2021" – 25 students (external students) and 5 lecturers (2 internal and 3 external)</p> <p>Number of participants at the second course for hunters and gamekeepers: 1 internal and 2 representatives of the external organizations and 47 attendants</p> <p>Number of participants in the «Hunting group» – 14 students (internal)</p> <p>Number of students attending courses:</p> <ul style="list-style-type: none"> - Wildlife Management (169510), summer semester 2020/2021 - 14 graduate students
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	<ul style="list-style-type: none"> - Caninology (197689), summer semester 2020/2021 – 54 graduate and undergraduate students - The scientific research system (173845) academic year 2020/2021 – 25 PhD students - Hunting (169203) winter semester 2021/2022 – 90 undergraduate students <p>Number of participants completed a survey: 25 students (internal)</p>
Stakeholders mobilisation	<p>The ResBios project and activities were presented to the new Faculty leadership (dean and vice-deans, internal).</p> <p>The head of the department (prof. Dragan Bubalo, Ph.D.) in cooperation with lecturer of the same department (assist. prof. Saša Prđun, Ph.D.) were involved in the implementation of the LLL program for employees of the honey quality control departments (external).</p> <p>A member of the Faculty Council, members of the University Committee, the Croatian Hunting Association (external), the Ministry of Science and Education (external) and the Agency for Vocational Education and Training (external) are involved in the establishment of the new LLL programme «Wildlife Management» by giving the green light.</p> <p>The Slovenian Ministry of Agriculture, Forestry and Food (external) in collaboration with Faculty of Agriculture organized the LLL programme for hunters and hunting associations.</p> <p>The hunters and gamekeepers (external) participated in the course.</p> <p>Students were taught ethical behavior in regular lectures and classes. A survey was conducted to assess student knowledge of RRI and to gain insight into the current state of Education in the Faculty of Agriculture. Also, students were involved in the «Hunting group».</p> <p>Ph.D. students participated at the «PhD caffe» and «PhD day».</p> <p>The Centre for Student Support and Career Guidance at the Faculty of Agriculture in collaboration with business sector organized «Carrier day».</p> <p>The Faculty of Agriculture in collaboration with the Faculty of Forestry and Wood technology (external), and Technology the Faculty of Food and Biotechnology (external) organized the «PhD Day». Professors (internal), representatives of Horizon Europe NCP (external), Senior Adviser for International Academic Cooperation (external) gave presentations on the challenges of doctoral studies and opportunities for student exchange abroad.</p> <p>The Faculty of Agriculture in collaboration with the Public institution «Nature Park Medvednica» (external), and under the auspices of the Ministry of Economy and Sustainable Development (external) organized</p>

	<p>The 1st Scientific Conference with International participation «Medvednica Green Touch».</p> <p>The Faculty of Agriculture, the partners from University of Primorska and Nature park Biokovo (external) organized the «III International Rupicapra symposium».</p> <p>Little school of Mammalogy 2021» was organized in collaboration with the Association of Biology Students Association - BIUS, Mammalogy Section. Three external lecturers introduced students (external stakeholder, students studying biology) with topics rarely covered in conversations involving mammal research.</p>
Obstacles and facilitation factors	<p>Carrier day and the «III International Rupicapra symposium» were performed online due to COVID 19. The survey was sent to students of all three levels of studies but low number of responses were recorded.</p> <p>For GA #3, low general interest in LLL programs during the project period due to the Covid 19 pandemic can present obstacle as well as low student interest in newly established LLL programs.</p> <p>For GA #4, the obstacle may be a lack of interest by professors to implement RRI practices in their modules.</p>
Future directions towards achieving sustainability	<p>The evaluation of the educational activities will be performed continuously. Students' responses collected in the survey provided some insights into the gaps in the educational process at the Faculty of Agriculture. Efforts will be made in collaboration with the Faculty leadership to improve the educational system. Further inclusion of RRI-related issues as a part of the lectures will enhance RRI knowledge in the education process at Faculty among teaching staff and students (undergraduate, graduate and postgraduate students).</p>
Self-evaluation	<p>The activities in GA #3 and GA #4 were successfully implemented. Core team and extended team members performed all assigned tasks. Assessing students' knowledge using a survey was not the best choice because students do not show interest or do not have time to fill out the form. Another approach should be considered.</p>

Chapter 4.

Summary of the work done under

Task 3.4. in the months 16-22

(DUTH)

4.1. General activities on Task 3.4 Implementation of GAs on Education – DUTH

GA 5. «Establishing cooperation with schools on the forefront issues on Molecular Biology and Biosciences»

Task leader: Democritus University of Thrace - DUTH

Task participants: Department Faculty members and researchers, undergraduate and postgraduate students, high school students, high school educators, members of Secondary Education Office of the Prefecture of Evros

Table 4.1: Task implementation of GAs

GA number	GA n. 5. Establishing cooperation with schools on the forefront issues of Molecular Biology and Biosciences.
Objective of the task	The main objective of the GA is to establish a life-long cooperation program with schools on the forefront issues of Molecular Biology and Genetics. To achieve this, changes in the ways of communicating with the relevant stakeholders are required that will enable also bottom-up approaches for the co-design of educational activities. These new changes will facilitate the fruitful collaboration between the stakeholders and the positive outcome of such collaboration will be monitored and followed by essential institutional changes that will enable the direct connection of the Institution with the Society. The creation of a new departmental committee responsible for the communication with the stakeholders, the organization of workshops with the school educators and the organization of educational events on an annual basis as part of the RRI institutional approaches are proposed. Sustainability of the life-long cooperation program with school education will be achieved through the assignment of collaboration protocols between MBG-DUTH and the Secondary Education Office.
Preparation activities	For the organization of the science projects (DUTH#5.4.) several rounds of meetings were held between the MBG-DUTH Core Team and the Head of the Educational Activities of the Secondary Office of Education of the Prefecture of Evros, Ms. Sofia Tsiropoulou. For the design of the science projects we decided to follow the 5E inquiry-based instructional model as presented in the previous report (Deliverable 3.1). The plan for the science projects was described in detail in the previous report. The first annual workshop for school educators with direction to teaching biosciences (DUTH#5. 6.) was initially scheduled between the months Feb. 2021 – March 2021. However, due to COVID-19 situation, and following discussions with the school teachers and the Head of the Educational Activities of the Secondary Education Office of the Prefecture of Evros, we decided to move the workshop in October 2021. The agenda and the programme of the workshop were also prepared.
Implementation	The work implemented under Task 3.4 and GA n.5 is covering the period from April to October 2021 (months 16-22). DUTH#5. 4. Organization of science projects on annual basis.

The first three meetings that took place on March 2021, were described in our previous report (Deliverable 3.1). A total of 7 students from 5 high schools from the Evros region were participated in this action. The students were divided in two 2 groups and trained in searching information and evaluating the sources, as well as, in the design and the creation of a poster presentation on a Bioscience topic (Microbiome: An unknown «organ» and Our «weapons» against the pandemic COVID 19). Three meetings were organized, and took place virtually using Microsoft Teams, on 04.04, 11.04 and 18.04.2021. At the end of the action, the posters prepared by the groups were printed and given for posting in their schools. The posters were presented by their creators to their classmates and all involved students in the science projects received the book «The Essence of Life», an illustrated presentation of Genetics and DNA as a participation award in the RESBIOS program. The books were a kind a courtesy of the Academic Publications J. Basdra & Co. supporting the educational activities of the RESBIOS program. Moreover, the posters were presented during the first annual Bioscience Fair Day that took place virtually on 07.06.2021, in the context of GA n.12 «Developing citizen engagement program and methodology».

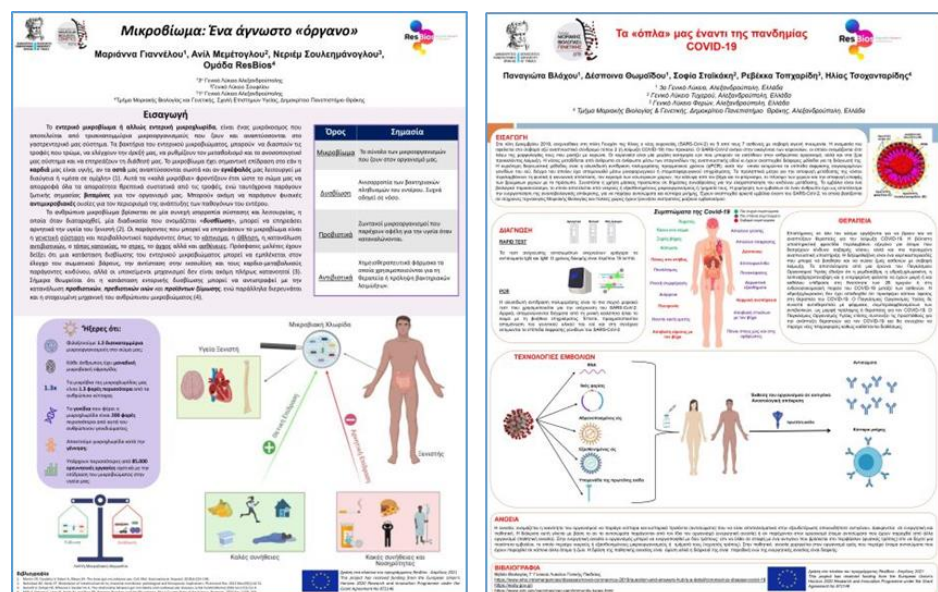



Figure 4.1. The posters designed and prepared by the high school students in action DUTH#5.4



Figure 4.2. The posters prepared by the groups under the science projects were presented by their creators to their classmates. All involved students in the science projects received the book «The Essence of Life» (Academic Publications J. Basdra & Co) as a participation award in the RESBIOS program

DUTH#5. 6. Organization of two annual workshops for school educators with direction to teaching biosciences.

The first annual workshop took place on Saturday 09.10.2021 in physical presence, following all health and safety protocols against COVID-19 transmission, at the Department of Molecular Biology and Genetics. The duration of the event was 4 hours. Fifteen school educators with direction to teaching biosciences (Biology or Chemistry), were participated in the event. The event was co-organized with the Secondary Education Office of the Prefecture of Evros. The workshop included 3 thematic areas: Microscopy, Flow cytometry and Molecular Diagnostics (Real Time PCR) and participants were informed on the basic principles of these methodologies. The workshop also involved a hands-on practical course in contemporary molecular biology techniques, such as agarose Gel electrophoresis and PCR. Then, in a round table members of the Core Team presented the dimension of RRI in Biosciences and their incorporation in the teaching methodology of biosciences to high school students. Moreover, pillars of potential cooperation between the Department of Molecular Biology and Genetics and the high schools were identified and actions were jointly planned for the new academic year.

	 <p>Figure 4.3. Pictures of the first annual workshop for school educators with direction to teaching biosciences (DUTH#5.6.), that took place on Saturday 09.10.2021 at the Department of Molecular Biology and Genetics</p>
Communication activities	<p>All the activities under this GA is available at our dedicated website (www.resbios.mbg.duth.gr). The Microsoft Teams platform was used for the organization of the meetings for the science projects. Communication with students and school educators were made by email. Communication with the Head of the Educational Activities of the Secondary Office of Education of the Prefecture of Evros, Ms. Sofia Tsiropoulou was made by phone, email or in person.</p>
Number of participants in the task	<p>7 students from 5 high schools of Evros participated in GA 5.4 15 high school teachers participated in GA 5.6</p>
Stakeholders mobilisation	<ul style="list-style-type: none"> ✓ Secondary Office of Education of the Prefecture of Evros (co-organization of Open Day event and school activities) ✓ School Units Administration (supporting educational activities) ✓ Undergraduate and Postgraduate student associations (supporting educational activities) ✓ Department of Molecular Biology and Genetics (faculty members implementing the GA)

	<ul style="list-style-type: none"> ✓ Directorate of MSc program «Translational Research in Biosciences» at MBG-DUTH (participating in the workshops aiming at advancing teachers scientific knowledge) ✓ Directorate of the MSc program «Infectious Disease: From Bench Side to Clinical Practice» (participating in the workshops aiming at advancing teachers scientific knowledge) ✓ Directorate of MSc program «Didactics in Biosciences» at MBG-DUTH (seeking advice in educational activities) ✓ Academic Publications J. Basdra & Co. (Alexandroupolis, Greece) (Publishing house donating books of biology content as participation awards to high-school students involved in science projects) <p>Communications with the Secondary Office of Education of the Prefecture of Evros were made by phone calls, virtual meetings and meetings in person. Both interesting parties shared a common vision and a strong sense of the importance of strengthening the educational activities on RRI at school level. Interested faculty members, were conducted by phone or email and arranged meetings in physical presence or virtually where the objectives of the RESBIOS project were discussed. We came in contact with the student associations (undergraduate and postgraduate) directly by organizing small group meetings of their representative members. We thought that their involvement would be critical to seek for voluntary help to frame out team efforts in case of work overload with the educational activities and also because high school students interact better with people closer to their age like university students, who would also serve as role models for them. On the other hand, our students' involvement in such activities would give them the opportunity for them to practice RRI in active teaching. We contacted Directors of the MSc programs by phone and meetings in presence to help us with the organization of the school educators' workshop and provided trainers who co-organized with the core team the training educational sessions addressed to school educators. We also contacted the faculty member, Associate Professor of Didactics of Biosciences and Director of the M.Sc «Didactics of Biosciences» (Prof. Katerina Kedraka) to advise us on the outcome of the school activities and further help us with the improving our planned activities in the future.</p>
Obstacles and facilitation factors	<p>Obstacles were set from the very beginning and were related to COVID-19 situation. Due to the pandemic, many of the activities had to be rescheduled or redesigned. The workshop with the school educators were postponed and were carried out at a later time, since they requested to be held in live presence. Science projects attracted a rather small number of students, which was attributed to the fact that the 2nd year high school students have a very tight and busy working schedule with little available time between extra curriculum activities. Meetings had to be planned during the weekends, as it was hard to find available time. Moreover, at the beginning, school educators did not show great interest in active participation in the on-line activities with the students. Although the available on-line platforms gave the possibility to work with the school virtually, still we faced difficulties, as the communication with the students was not as interactive as it would have been working with them live. However, at the end of the science projects, students talked very</p>

	<p>positively about their unique opportunity to engage in depth with methods and techniques «at University level» as they commented and shared their enthusiasm with their classmates. The enthusiastic climate that was communicated by the participating students together the great efforts of the Head of the Educational Activities of the Secondary Office of Education of the Prefecture of Evros, who is in liaison with the RESBIOS Core Team, further supporting and communicating the educational values of the RESBIOS objectives, are expected to serve as facilitator components for our future activities.</p>
Future directions towards achieving sustainability	<p>We keep seeking ways to improve our communication and efficiency in engaging school educators in our activities. The live workshop with school educators that took place in October 2021 has helped us greatly to instill the values of RRI to the school educators, and to communicate better the educational values of RESBIOS objectives. The positive input by the participant students in the first cycle of activities worked as a good initiative to continue our efforts and explore the possibilities in expanding the educational activities to the 1st grade of high school, as well as different grades of middle school depending on the raise of interest amongst the school educators. We will continue our efforts in co-organizing the educational events with the active participation of school educators and we are planning to seek for further advice and support with faculty members that have expertise in education of biosciences and have long-standing collaboration and co-operation programs with the school units of our area.</p>
Self-evaluation	<p>Based on the General Formative Evaluation Grid provided by Aarhus University and with the support of K&I self-evaluation has been carried out. We will be continuing our efforts for GA n.5, mainly: i) building a strong network with the school educators teaching the subject of biology, ii) co-designing educational activities with school educators, iii) exploring the possibilities of expanding the activities at other educational levels as well (middle schools and 1st grade of high schools). So far, we have been following the planned implementation schedule with application of necessary small process deviations due to COVID-19 pandemic situation.</p>

Chapter 5.
Summary of the work done under
Task 3.5. in the months 16-22
(ICM-CSIC)

5.1. General activities on Task 3.5 Implementation of GAs on Education – ICM-CSIC

GA 6. «Establishing a network of oceanographic schools»

Task leader: ICM-CSIC

Task participants: Core Team at the ICM-CSIC for scientific education efforts (conformed by the Deputy Director on Communication and Outreach and 5 representatives of the Marine Science Literacy Committee), Marine Science Literacy Committee, Director and directorate team, 9 High-schools of Barcelona, high-schools from other locations, Department of Education of the Generalitat (Catalonia government), Barcelona administration, neighbourhood associations, IFNUL, DUTH, UBREMEN, Marina Berhault as a representative of the Blue Schools Erasmus+ project, Evy Copejans as a representative of the Neetwork of European Blue Schools, Vanessa Salvo (Office of Support to Research at the ICM-CSIC), Monica Moraleda as a representative of Reeducamar (spanish initiative about marine education).

Table 5.1: Task implementation of GAs

Objective of the task	Establish an official institutional network of educational centres committed with marine sciences at the Institut de Ciències del Mar (ICM-CSIC).
Preparation activities	<p>The formative action continued its planning already started and reported in Del. 3.1. For the different activities it was required to mobilize internal resources and also contacting to the staff and invite them to participate. For organizing an activity on the beach, it was also required to ask for a permit to local authorities. The formative action was recognised by the Department of Education (local government) and it was necessary to contact them at the beginning and at the end of the formative action for ensuring to meet the requirements for accreditation and obtain it. Contact with the educational centres was kept via email. During all the period virtual dialogues specially, were kept both internally with members of the MSLC and staff and externally with educational centres for detecting initiatives (internally) and needs and requirements (externally).</p> <p>Also, conversations with national and international stakeholders related to Ocean Literacy were kept for ensuring the connection to other educational and outreach activities related to the ocean in the Spanish and European context. The ICM-CSIC participated in the follow-up sessions organized by IFNUL and in the mentoring sessions organized by UBREMEN.</p>
Implementation	During the reporting period, this task continued the efforts on GA6 for establishing the official network of marine schools at the ICM-CSIC level.



Figure 5.1. Presentation of the Network of Marine Schools and project ResBios in the European Research Night, specifically in Casa Golferichs (30 participants).

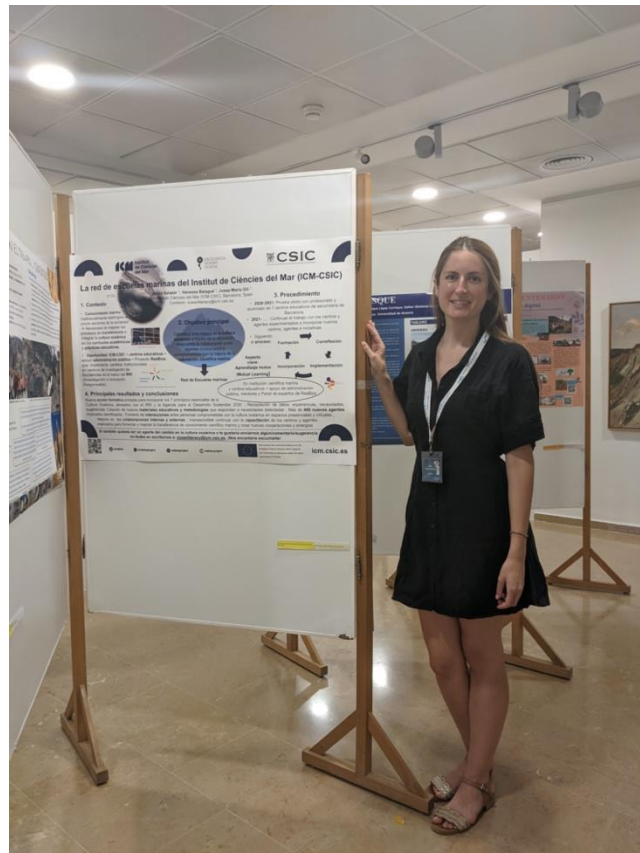


Figure 5.2. Presentation of the Network of Marine Schools at the XXIV Bienal of the Real Spanish Society of Natural History in Valencia (Spain)

The formative action associated to the scholar year 2020-2021 continued and finished and a new formative action associated to the scholar year 2021-2022 was prepared and asked for recognition by the Department of Education in Generalitat (Catalan government). During reporting period, the different educational centres asked to the ICM-CSIC for providing resources, solving doubts, giving talks, participate in activities or organize special days in the beach. It is important to mention that one of the petitions included the celebration of a special day on the beach consisting on a set of activities with researchers from the ICM-CSIC, which was highly appreciated and very meaningful for both students and teachers after the Covid-19 period. Also part of the staff non-previous involved was involved in the preparation and dynamization of the session. This petition emerged from the educational centre who in the next scholar year 2021-2022 contacted again with the institute for organizing a similar activity as a new recurrent activity in their educational centre. For organizing this special day with set of activities in the beach it was necessary to ask for a permit which was obtained thanks to the support provided by local administration of Barcelona.

Figure 5.3. Whoever wants to organize an event (including for educational purposes) must get a permit from the local government of Barcelona. In the photo appears the name and reference of the permit needed for organize an event with a school. Thanks to this experience the ICM-CSIC will provide in the future the instructions and accompany any other school willing to organize an activity in the beach.



Figure 5.4. Activities of the special day at the beach with the high-school “Voramar”. (Top, left: Activity for re-discover urban beaches consisting on thinking about the characteristics of marine ecosystems and the different uses of a beach. Top: Right: Activity about marine geology and rethinking about the sand of the beaches).

Another participant (INSRambla Prim) organised also activities in the outside exploring the participation with other stakeholders.



Figure 5.5. One of the activities of the special day at the beach with the high-school “Voramar”. Activity about biodiversity associated to algae.

Two high-schools asked for specific materials of support and the ICM-CSIC facilitated the loan of this kind of materials that are often out of the reach of most of the educational centres due to the high price and difficulties to find them.

MEMÒRIA DE L'ACCIÓ FORMATIVA "XARXA D'ESCOLES MARINES" **D'ICM-CSIC DINS DEL PROJECTE "ResBios"(CURS 2020-2021)**

NOM I COGNOMS (PROFESSOR/A)

Nom i cognoms del/la professor/a implicat/da i el seu DNI. Aquesta informació la necessitem per tramitar el reconeixement de crèdits.

DESCRIPCIÓ DEL GRUP CLASSE

En aquest apartat ens interessa caracteritzar el grup classe. Breu descripció de l'escola i els seus valors i metodologies i en concret els que afecten directament al(s) grup-classe participant(s) de la "xarxa d'escoles marines", núm. d'alumnes per sexes del(s) grup-classe, treball previ a la "xarxa d'escoles marines" envers el mar.

TREBALL DUT A TERME DINS DE L'ACCIÓ FORMATIVA DE LA "XARXA D'ESCOLES MARINES"

Núm. de sessions, organització, continguts, competències...

PRINCIPALS OPORTUNITATS I DIFICULTATS SORGIDES DURANT EL PROCÉS

En aquest apartat s'espera una valoració per part del professorat en quant a (si han sorgit), les oportunitats que han sorgit, així com les dificultats i com s'ha pogut o no fer front a elles.

CONCLUSIONS I PERSPECTIVA AL FUTUR

Conclusió final de l'experiència: Ha sigut una bona experiència per repetir més endavant? Ho repetiries però amb alguns canvis, ho faries de nova completament diferent...? Tens pensat que formi part ja el mar dels continguts de classe, ha suposat algun canvi l'acció formativa de la "xarxa d'escoles marines" en quant a la presència de continguts marins a les accions formatives futures?

FOTOGRAFIES

Agrairiem si poguéssiu incloure alguna fotografia que il·lustri l'aplicació de l'acció formativa amb el grup-classe.

Indiqueu-nos si us plau si podem o no utilitzar-la(les) als canals de difusió oficials d'ICM-CSIC i del projecte europeu "ResBios".

ALTRES COMENTARIS O ACLARIMENTS

Si es volen fer més comentaris, fer algun aclariment, es pot fer en aquest apartat


Figure 5.6. Template for the educational centres participating in the Network of Marine Schools for providing information and context about their activities and get feedback for improvement. All the schools agreed on the importance of the activities done and expressed the willing for continuing the efforts to bring the ocean to their groups and also to their educational centres.

Three of the high-schools decided to explain concepts and organise experiments explained during the sessions of the initial training on OL provided by the ICM-CSIC.



Figure 5.7. One of the activities of the special day at the beach with the high-school “Vorammar”. Activity about plankton.

5 different high-schools contacted independently to the ICM-CSIC asking for more information about the network of marine schools and also one of them offering experiences for explaining to other schools about working the sea from a humanistic point of view. This need of communication among schools had been previously detected during the evaluation of the training sessions on Ocean Literacy and decisive for be considered for the website. The characteristics of the website including the specific requisites asked to educational centres for being part of the network, the different spaces and resources and opportunities found there were worked and detailed during the reporting period.



Secció 1 de 2

Valoració de la 4a sessió de la Xarxa d'escoles marines de ResBios

El present formulari serveix com a evaluació de l'acció formativa "Xarxa d'escoles marines" del projecte ResBios de l'Institut de Ciències del Mar (ICM-CSIC).
 T'agradem que dediquis uns minuts per donar-nos la teva opinió, la tindrem molt en compte! Moltes gràcies.

Adreça electrònica *

Adreça electrònica vàlida

Aquest formulari recull les adreces electròniques. [Canvia la configuració](#)

Figure 5.8. Google surveys like the one shown in the photo were used along the formative action for compiling more information and feedback from the teachers. The objective was to consider all the possible opinions and suggestions of potential users for the network of marine schools.

At the end of the reporting period, it could be said that the website will be able to be officially presented at the institute and launched and active in the following months.

During these months, an opportunity to create a Magnet alliance with high-schools from Barceloneta neighbourhood emerged during continuous dialogues with neighbourhood associations and will be further explored in the future. This initiative is very important in the context of the institute and Barcelona because there is a plan already started and developed in front of the institute with the main objective of redefining the relationship among citizenship and the urban coastal environments. This opportunity will contribute to empower local actors for ensuring that science and social justice are present in this area.



Figure 5.9. Photos of the implementation phase of the formative action of the Network of Marine Schools by the INS Rambla Prim



Figure 5.10. Experiments with ocean circulation in the high-school Maria Espinalt



Figure 5.11. Due to the difficulty to find exemplars of some books and their high price it is difficult for schools to get access to some rigorous contents. The ICM-CSIC's library provided exemplars on loan of the Atlas about Ecosystems from Països Catalans to two of the high-schools participants in the Network of Marine Schools. Photo retrieved by: todocoleccion.net

One of the main objectives of GA6 for the ICM-CSIC was also to connect with national and international initiatives and for that have been organized several talks and participations in different conferences (detailed in the next section). Resources for studying biodiversity and plastics on the sea have been prepared and will be available in the new website.

Specific resources and tips for adapting talks and activities to the public have been prepared thanks to collaboration of K&I and UBREMEN and will be spread among the ICM-CSIC's staff and will be better structured in the following months.



Figure 5.12. For the dissemination purposes about efforts of Ocean Literacy (OL) by the ICM-CSIC, a chronogram summarising main milestones of OL at the institute has been prepared with the collaboration of diverse members of the staff of the institute. This chronogram allows to put together disaggregated efforts and create a sense of a common effort at the institution, including ResBios project. During internal communication the importance of providing further suggestions for improvement of the chronogram has been stressed. This effort has been repeatedly appreciated by several persons of the staff.

Communication activities

- Mailing for both internal (among core team members, MSLC members, stakeholders from the ICM-CSIC and all the staff) and external communication (with high-schools, with international stakeholders, department of education of Generalitat, members of ResBios project, etc.)
- Dissemination via ppt or poster about the scientific education activities by the ICM-CSIC in ResBios project in different workshops, conferences and other spaces: Ocean Cities under UNESCO program (virtual), ICYMARE conference (virtual), NMEA annual conference (virtual), XXIV Bienal of the Real Spanish Society of Natural History in Valencia (Spain) (in presence), Congreso de Comunicación Social de la Ciencia in Barcelona (Spain) (in presence), European Research Night in Barcelona (Spain) (in presence), presentation in a TEMA (a series of topics for discussion) in the department of Biology of the ICM-CSIC (virtual, internal level).

	<ul style="list-style-type: none"> Share of activities via official ICM accounts: website, social media, newsletter and ResBios accounts including the post about Ocean Literacy in ResBios blog. <p>On overall, the attention given was correct and is important to highlight the internal interest on marine education activities with more petitions to be part of the MSLC. This increase of participation also implies less efficiency for pragmatic decisions but it is well solved with core teams for specific tasks and then shared with the rest of the group.</p>
Number of participants in the task	It is very difficult to quantify the total number of participants but more than 2000 persons have been involved during the specific process of the Task “Establishing a network of marine schools”.
Stakeholders mobilisation	<p>A total of 7 schools and their educational communities participated directly and/or benefited from the participation in the first scholar year of the network of marine schools. The educational centres will continue working marine contents and in contact with the institution. At least 7 more will participate in the second scholar year of the network. 6 persons participate in the core team of the ICM-CSIC for ResBios actions in scientific education. Other members of the MSLC are also involved in the actions (7 more participants). More than 1000 attendants to the different conferences. 3 representatives of neighbourhood associations, the ICM-CSIC’s director and directorate team (5 persons), international and national representatives (more than 3), government representatives (2), ResBios partners DUTH, IFNUL and UBREMEN (>3 persons/partner).</p> <p>The overall experience with all the stakeholders is very satisfactory during the reporting period and it needs to be mentioned the high commitment of participants for promoting marine knowledge and perform high-quality activities related to marine education.</p>
Obstacles and facilitation factors	<p>Most activities were organised online due to Covid-19 limitations, an aspect that was obstacle but several times also a facilitator at the same time. As a matter of example, this new virtual reality allowed to explore other contexts or publics difficult to be reached in other situations, as the attendants of the National Marine Educators Association annual conference or the attendants of ICYMARE conference. To organise an in-presence activity in a difficult period forced to contact the local government, an aspect that at the same time offered the opportunity to be closer to them and strengthen relations with them. Also, the educational centres were very appreciative for the confidence and support given during difficult times and provided very useful feedback for the future development of the website of the Network of Marine Schools. Some teachers expressed their interest in participating in training activities during summer on marine ecosystems. In urban beaches it is not normally allowed to ask for permission for organising this kind of activities due to tourism and an over use of the beaches. It is an obstacle but also an opportunity to start a conversation and a debate with administration and other stakeholders about what are the uses given to urban beaches and the uses that we would like that they had. Language barrier is an important aspect that act as an obstacle and needs to be highlighted when the connections with other movements are explored.</p>

Future directions towards achieving sustainability	Facilitate the communication with involved stakeholders is very important for achieving sustainability and for the feeling that everybody's on board. For this purpose a website will be created (following a participatory approach) that will allow different participants to connect among them and find all the resources and opportunities developed at the institute, including information about how to participate in the citizen science projects. Also, information in how to contact with the ICM-CSIC itself, with its projects and researchers will be further explained and facilitated. For ensuring sustainability it is very important to work on the feeling of belonging of the own staff of the institute and that will be worked on depth in the next months. For this purpose, different meetings with members of the staff will be organised as well as mailing and also it will be explored to include information about the network and other information about scientific education materials and opportunities in different spaces of the own institute. More participants will be encouraged to participate in the network of marine schools and further twinnings will be explored and if possible consolidated.
Self-evaluation	During GA6 implementation the main objectives of the Grounding Action has been more than achieved. With this GA, the ICM-CSIC wanted to start a common framework at the institute for connecting actors committed with marine science education. A first pilot phase has been conducted with near educational centres, which was a concern of the institute, not be connected with very close educational centres. Also, other educational centres expressed their willingness to participate in the network. This petitions arrived also via other members of the staff of the institute, which is possibly an indicator that the staff appreciates the network and recommend it. Appreciation and recognition by the ICM-CSIC's staff about the nature of the network as an institutional network was one of the main goals of the ICM-CSIC's GA6. In general, due to the very difficult situation overcome during the process, the results are far better than expected but it is true that to create a network of this characteristics in this context is very demanding and requires a lot of effort by different stakeholders. Some of the actions expected in the implementation phase will continue during the following months in order to achieve completely the planned objectives.



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