Grant Agreement Number 612367

Including Responsible Research and innovation in cutting Edge Science and Inquiry-based Science education to improve Teacher's Ability of Bridging Learning Environments

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Executive Summary

This is the first management report covering the period November 1 2013 until October 31 2014.

This report describes the activities that were carried out in the project.

Except for one, all deliverables have been uploaded more or less on time.

The project is well underway.

Participants of the kickoff meeting in Groningen 2013

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Glossary

Acronym/Abbreviation	Description
EC	European Commission
IRRESISTIBLE	Including Responsible Research and innovation in cutting Edge Science and Inquiry-based Science education to improve Teacher's Ability of Bridging Learning Environments
FP7	Seventh Framework Programme
DoW	Description of Work
PC	Project Coordinator
PSC	Project Steering Committee
WPL	Work Package Leader
WP	Work Package
IBSE	Inquired Based Science Education
RRI	Responsible Research and Innovation
CoL	Communities of Learners

1. Introduction

Management
Report 1

Grant Agreement number:	612367
Project acronym:	Irresistible
Project title:	Including Responsible Research and innovation in cutting Edge Science and Inquiry-based Science education to improve Teacher's Ability of
Funding Scheme:	FP7-CSA-SA
Date of latest version of Annex I against which the assessment will be made:	07/07/2014
Period number:	1st
Period covered - start date:	01/11/2013
Period covered - end date:	31/10/2014
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Project website address:	http://www.irresistible-

2. MAIN PART

Project objectives,

In the project 14 partners work together to raise awareness to responsible Research and Innovation through Inquiry Based Science Education. In order to do this Universities work together with Science Centers and schools.
In the 10 countries participating in this project 'Communities of Learners' are formed in which researchers, teachers, educational specialists and specialists in informal learning from science centers work together. If possible specialists from industry are added to the CoL.
Within each country a central theme was chosen as the theme for the material to be developed by the CoL. The CoL's will develop educational material that can be used in schools in the age range from 10 to 18. The educational material uses a methodology based on Inquiry Based Science Education as a guideline in the development of the material.
In this particular case the so-called 5 E method was adapted to include a sixth E, Exchange. In the first three steps (Engage, Explore and Explain) the scientific knowledge is discussed. In the second part (Elaborate and Exchange) focus is on Responsible Research and Innovation aspects. Students are asked to develop an exhibit that demonstrates these aspects to the public. These exhibits are displayed in the science centre. In the Evaluation phase the material is reviewed and students are tested on their scientific knowledge.
The material produced in each CoL will be tested with at least one group of students. This way each CoL will reach at least 5 teachers and 125 students during the first year
The material of the first round of CoL's will be collected and translated in English. Each country will be able to use the material from its partners.
In the second round of CoL's each teacher will be coach for at least 5 other teachers in using one of the modules developed in the first round. That way each country will have reached at least 25 teachers and 5 coaches with around 900 students.

Dissemination

Dissemination will take place on both national and international scale using platforms like the division of chemical education of EUCHEMS, the Committee on Chemistry Education of IUPAC as well as ECTN. On the next page an example of a poster presented at a meeting in Rome is shown.

www.irresistible-project.eu

Responsible Research and Innovation in Science Education

Eugenio Bertozzi, Margherita Venturi
University of Bologna, Italy

PI: Jan Apotheker, *University of Groningen, Netherlands*

Partners

Finnland Ilkka Ratinen (University of Jyväskylä)
Antti Laherto (University of Helsinki)
Germany Lorenz Kampschulte (IPN-Leibniz Institute for Science and Mathematics Education)
Paul Hix (Deutsches Museum)
Greece Dimitris Stavrou (University of Crete)
Greece Christina Troumpetari (Eugenides Foundation)
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Margherita Venturi (University of Bologna)
Poland Iwona Magiejowska (Jagiellonian University)
Portugal Pedro Reis (Universidade de Lisboa)
Romania Gabriel Ghorghiu (Valahia University Targoviste)

the goal of the project

is to design activities that foster the involvement of students and the public in the process of Responsible Research and Innovation (RRI). To raise the awareness on RRI the project aims to increase students content knowledge about research by bringing cutting edge research into school programs, and to foster the discussion among students about RRI issues by the introduction of relevant topics. By using formal (school) and informal (science center, museum or festival) teaching we familiarize schoolchildren with science.

project course

In each of the ten countries a Community of Learners (CoL) will include school teachers, education experts from universities, exhibition experts from museums / science centers and researchers from the thematic field. Each CoL will develop a thematic module which will be used by the teachers with their students.
Additionally the students will visit relevant university labs and translate results from their programme into an exhibit, that sheds light on the relationship between research and society.

RRI: six key issues

Engagement: joint participation of researchers, industry and civil society in the research and innovation process
Gender equality: unlocking the full potential of society
Science education: creative education to foster the future needs of society
Ethics: Including societal relevance and acceptability of research and innovation outcomes
Open access: free, online access to the results of publicly funded research
Governance: the responsibility of policy makers to develop harmonious models for RRI

After phase I of the project there will be ten modules on various RRI-topics that have been tested in five to ten classes each. In phase II, the teachers from the first phase will each train five colleagues. The teaching modules will also be available online in different languages. The best exhibits from the project will be presented to the European public during a special session at an international conference. Ultimately, this project will teach almost ten thousand students to consider the social impact of scientific research.

topics

- Healthy ageing (Netherlands)
- Genomics and oceanography (Portugal)
- Oceanography and climate change (Germany)
- Climate change (Finland)
- Renewable energy sustainability (Israel)
- Solar energy and specific nanomaterial (Romania)
- Nanoscience (Turkey)
- Nanoscience applications (Greece)
- Nanotechnology (Italy)
- Nanotechnology (catalysis) (Poland)

Italian partners

will design a module where knowledge on chemistry and physics will promote the understanding of uses and implications of nanoscience and nanotechnology. Ethical issues and historical background on atomic and molecular theories will be part of the module.

IRRESISTIBLE is a project on teacher training, combining formal and informal learning focused on Responsible Research and Innovation.
It is a coordination and support action under FP7-SCIENCE-IN-SOCIETY-2013-1, ACTIVITY 5.2.2 Young people and science: Topic SiS.2013.2.2.1-1 Raising youth awareness to Responsible Research and Innovation through Inquiry Based Science Education.
This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 612367.

Work progress and achievements.

Milestones

The milestones we have set have been reached more or less as expected.
The kick off meeting for all participants was organized at the University of Groningen on 25 and 26 November 2013. A short report of that meeting can be found in appendix 1.
The project website has been opened and can be found at the following URL: http://www.irresistible-project.eu/index.php/en/

screenshot from website of the project

All partners have set up a local website with local information. Work is still in progress to include pages on the project website in the local languages.
In all countries Communities of Learners have been formed and have started their work.
March 10 and 11 2014 the coordinator of WP4 held a workshop on the use of web 2.0 applications, social media and the use of the website. This workshop was organized at the IPN in Kiel.
October 16 and 17 2014 the coordinator of WP3 organized a workshop on the development and use of exhibits at the University of Lisbon.

In Jyväskylä on July 3 and 4 2014 the group met again. On July 5 the coordinator of WP 2 organized a workshop on RRI. A short report of the meeting is included in appendix 2.

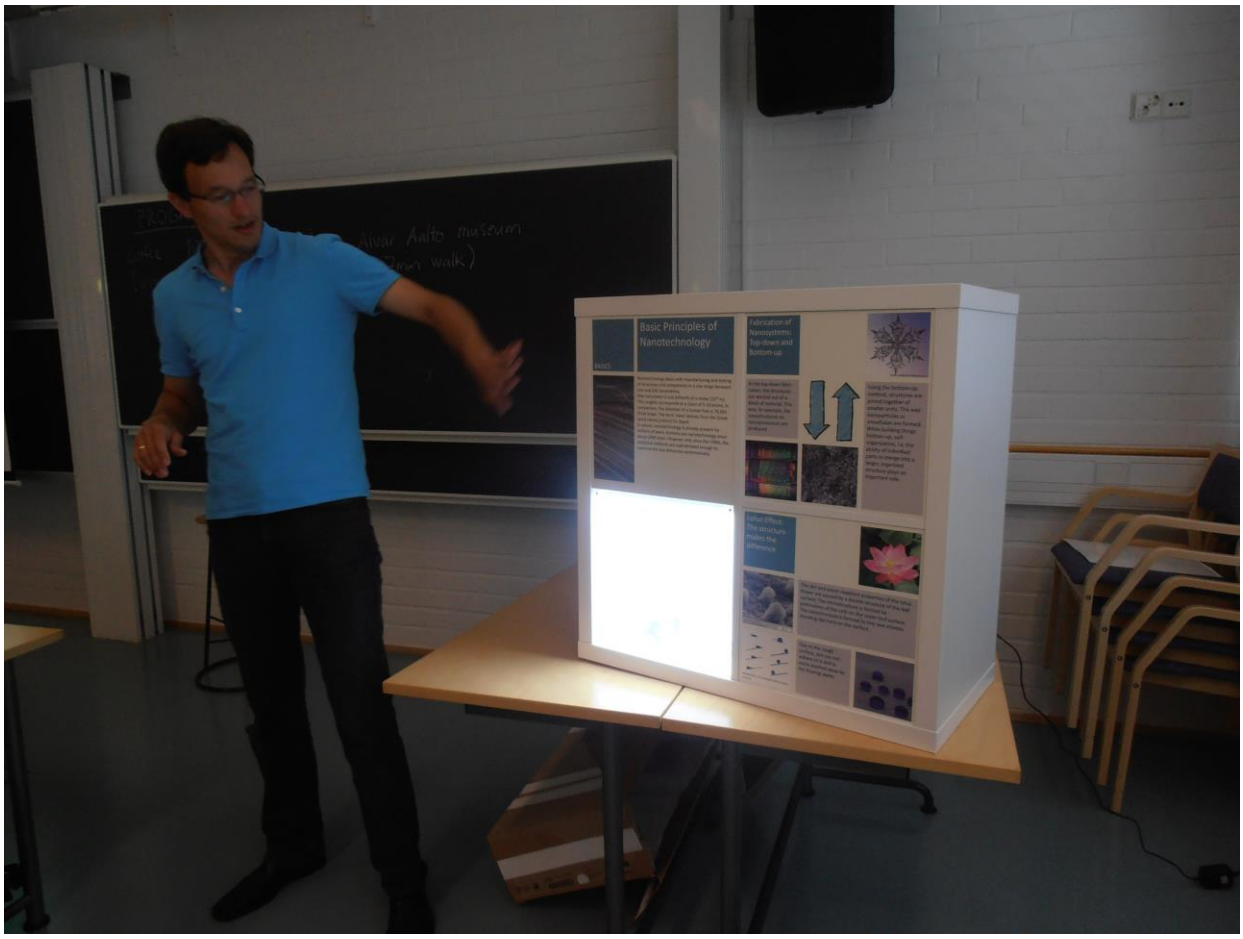
Work packages.

In the next paragraphs the reports of the work packages 2 through 6 are included in this report.
In general the deliverables have been submitted more or less in time.
During the first year of the project the focus in WP2 has been on developing strategies for constructing a CoL. During the kick off meeting time was allocated to this strategy.

Photo from workshop organized by WP2. Jyväskylä

Also during the monthly video meetings using scopia, the strategies were part of the discussion.
A second important issue was the development of a framework for the introduction of RRI in the project. During the second consortium meeting in Jyväskylä time was allocated to discuss how RRI might be introduced in the project. A questionnaire was set up and discussed as well.
WP 3 has worked on a part of the questionnaire for the CoL members. In October 2014 a workshop was organized to discuss the way a CoL can

introduce the making and development of exhibits into the educational material.
The coordinator of WP 4 decided to organize a workshop about the use of web 2.0 applications. The workshop organized by WP 4 helped in demonstrating the possible applications that can be used in the project



Example of exhibition presented by Lorenz Kampschulte

The coordinators of WP5 have developed both a questionnaire for teachers at the beginning of participation in the CoL in order to measure the professional development of the teachers during the project. They have also developed a framework for the evaluation of the modules.
In WP6 dissemination manual was developed. From the activities it becomes clear that both at the national level as well as in international scale the project was presented. Internationally the project had a symposium at the ECRICE conference in Jyväskylä. At the ICCE conference in Toronto the project was introduced as well. During a meeting of the national representatives of OPCW the project was introduced as an example of introducing RRI in secondary education.

Achievements

The consortium has been able to develop a well working set of CoLs in all countries. We have developed a working relationship with the University of Limerick in Ireland in which the University has agreed to work along the same lines as the consortium and will exchange materials with the consortium.
The introduction of the six key aspects of RRI has led to intensive discussions among the partners. It is not always easy to introduce all six key issues in the modules. Focus is specifically on the relationship between society and research and innovation. We think we have found a way to introduce these issues into the classroom.

Project management during the period

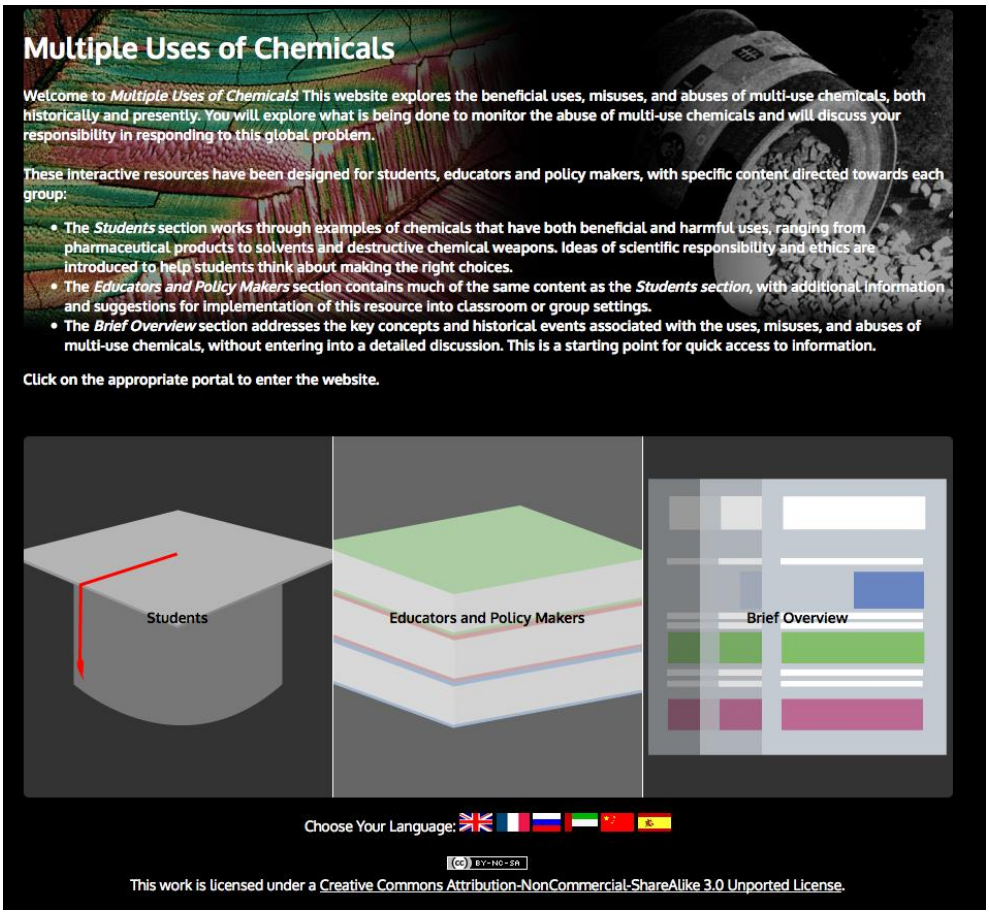
At the kick off meeting of the project a steering committee was formed chaired by Jan Apotheker, in which Lorenz Kampschulte, Ron Blonder and Antti Laherto participate.
The steering committee has discussed issues and proposals using e-mail.
The participants board has met monthly, on the first Monday of the month at 11:00 am CET, using a video platform, 'Scopia' which was available through the 'Weizmann Institute'.

Screenshot from videomeeting Decmeber 2 2014.

The external evaluator has been present during the kick off meeting and the meeting in Jyväskylä. He has participated and commented on both meetings, as well as the strategies for developing a CoL.
Extra meetings have been organized in March 2014 in Kiel and in October 2014 in Lisbon in which specific subjects have been discussed in workshops.
The consortium agreement was signed in March 2014 by all participants.
The project has been approached by similar projects.

External liasons

The project has been represented at a meeting in Paris in September 2014, organized by the 'Engage' project, and at a conference meeting in Rome in November 2014.
July 7th 2014 an amendment was agreed between the project officer and the consortium. In the amendment the persons involved in the project were redefined. Also some details in the budget were changed.
The next meeting of the participants will be March 12 and 13 2015 in Bologna. Other meetings are planned in October 2015 in Targoviste and October 2016 in Istanbul. Most likely there will also be a meeting in March 2016.
The project has been introduced to www.scientix.eu
Within the Committee of Chemistry Education the concept of RRI was discussed. Most likely RRI will be discussed during the World chemistry Leadership Meeting, part of the General Assembly of IUPAC in August 2015 in Busan, Korea.
Discussions within the OPCW have shown that within OPCW similar concerns are raised. Within OPCW the discussion focuses on the awareness of double use of chemicals. OPCW is developing a plan for educational and outreach activities, in which participants of the project have played a role. See http://multiple.kcvs.ca/site/index.html of which a screenshot is shown below.



Ethics

On March 10 2014 we received word from the ethical committee Pedagogical and educational Sciences indicating they see no fundamental objection to the proposal. (see appendix 4). All members have used the forms that were shown in the DOW for the members of the CoL and the participating schools.

Financial management

At this moment an inventory is taken of the finances of the partners. The partners have been asked to report about the expenditure in the first year of the project, including personnel cost and management. This way we will be sure there are no problems for the mid term review.

Interim report WP-2

The goal of WP-2 is to coordinate the establishment of the teacher training effort for the Irresistible project, using the Community of Learners (CoL) approach.

At the kickoff meeting Work Package Leader (Weizmann) delivered a workshop in which template for the 5E+ model for IBSE that can be used by the CoL was presented and delivered. In this workshop Work Package Leader (Weizmann) coordinated the planning of the two-phase professional development programme of the partners, by developing a schedule and a plan for the work in the CoLs in the different countries. This stage was reported in the first WP-2 report that was delivered on month 3.

All the partners established a CoL in their county and started to work on their Irresistible modules. All Cols include science educators, an informal expert from a science museum, scientists and teachers. The number of the teachers varies from 7 to 41. The total number of teachers that are involved in the first cycle of the Irresistible CoL is 120. It is interesting to note that in the project proposal we planned to recruit 50 teachers in this stage of the project. The high number of teachers shows that the project is very relevant and attractive for them. In the following tables we will portrait the stage of development of the different CoLs and point out the changes that were made from the primary program and the challenges for the future in WP-2.

Table 1: Meetings of the different CoLs

Country	Date of the first meeting of the CoL	Number of meetings of the CoL that were done	Total hours of the CoL meeting that were done	How many more meetings are expected?
1 The Netherlands	Sep. 2014	3	12	7
2 Israel	Dec. 2013	10	40	4
3 Germany	Oct. 2014	5	31	5
4 Turkey	Jan. 2014	20	40	10
5 Portugal	March, 2014	12	37	8
6 Italy Bologna Palermo	April 2014 April 2014	3 2	12 5	6 6
7 Finland	Sep. 2014	4	12	6-8
8 Greece	April 2014	10	46	5
9 Poland	April 2014	4	20	8
10 Romania	Feb. 2014	10	40	3

Table 2: Irresistible modules in the different countries

Country	Topic of the module	Length of the module: number of contact hours with students	Planned date for finalizing the module	Planned date to start working with students
1 The Netherlands	Carbohydrates in milk; how specific carbohydrates in human milk are beneficial for the development of the gut microbiota of babies, and how these are produced in industry for use in milk powder	Around 12	January 2015	February-March 2015
2 Israel	Photovoltaic cells and Perovskite	Around 16	Nov. 2014	Jan. 2015
3 Germany	Oceanography Sub-topics: Plastics in our ocean, ocean acidification, resources of the ocean (for example manganese nodules), the problem of overfishing, offshore windparcs	Every sub module: 5 to 15 hours, depending on the topic	Feb. 2015	Oct. 2014
4 Turkey	Nanoscience	13	Jan. 2015	Feb. 2015
5 Portugal	Genomics, oceanography, polar science and climate geo-engineering	7-8	Nov. 2014	Nov. 2014
6 Italy; Bologna Palermo	Nanoscience and Nanotechnology Sub-topics: nanomaterials for energy production and nano-sensors to improve our perception of the world	12-19	May 2015 June 2015	Oct. 2014 Oct. 2014

7 Finland	Climate Change	8	Dec. 2014	Oct. 2014
8 Greece	Nanoscience applications (size-dependent properties)	8-12	Oct. 2014	Nov. 2015
9 Poland	Catalysis in environmental protection, nanotechnology	10	Jan. 2015	Feb. 2015
10 Romania	Nanomaterials	20-40	Dec. 2014	Dec. 2014

Several changes have been made since the month 3, in which we delivered the first WP-2 report. The changes included changes in the length of the module (contact hours), building the students' exhibition in a different manner from the primary plans, delays in the date of having the ready module and changes that were done to adapt the module to the school curriculum.

These changes were done when the partners adapted the proposal to their local educational contexts. The changes also reflect the dynamic nature of the CoLs. The authentic process of joint knowledge-building that takes place in the CoL meetings leads to the building of novel modules that differ from the ones that were suggested at the beginning of the process (month 3).

The partners also describe challenges they still have to face. The challenges deal with the integration of RRI to the module, the adaptation of the module to different age groups, the use of the exhibition in the project, the integration of the module in the formal curriculum, and the next step of the project, namely the construction of the CoL in the second phase of the project. In the next period of the project we will try to address these challenges.

REPORT – ACTIVITIES IMPLEMENTED WITHIN WP3 (Exhibitions)

Instituto de Educação da Universidade de Lisboa

During the first year of the IRRESISTIBLE Project almost no deliverables were planned within Work Package 3 (WP3). However, several activities were implemented in order to support other Work Packages and prepare future deliverables. So, within WP3 the following activities have been organized:

1. A literature review on: (a) the educational potential of building exhibitions by students; and (b) the concepts of interactivity and interactive exhibition. Part of this review was integrated in the "Development Guide for an IRRESISTIBLE Exhibition" prototype and submitted to the partners' analysis and feedback.
2. The definition of a strategy for the implementation of the exhibitions by each partner's Community of Learners (CoL) during the project implementation. This strategy was defined during two workshops realized at Groningen and Jyvaskyla meetings.
3. The construction of a "Development Guide for an IRRESISTIBLE Exhibition" prototype aimed at supporting each partner's CoL during the process of planning, implementing and evaluating exhibitions addressing the concept of Responsible Research and Innovation. This guide prototype addresses the following themes: a) the potential of student planned and designed exhibits about responsible research and innovation; b) different phases for creating and implementing an exhibition; c) how to develop interactive exhibitions; d) different possible scenarios for exhibits; e) general guidelines for all scenarios; f) how to use text in exhibitions; g) how to evaluate exhibitions. This prototype was submit to the partners' analysis and feedback.
4. The realization of an extra workshop in Lisbon, on the 17th and the 18th of October, with the aim of developing CoL members' expertise on how to address different aspects of Responsible Research and Innovation (related to cutting edge scientific and technological issues) through the construction of interactive exhibitions centred on these issues (see attached program of the workshop). During this workshop, science educators, school teachers and science centre specialists from different countries discussed: a) ways of involving students and teachers in planning and developing exhibitions addressing the concept of Responsible Research and Innovation; b) several examples of Responsible Research and Innovation exhibits developed specially for the workshop; c) instruments and methodologies for evaluating the impact of this process on teachers' and students' competences. The workshop was also used to discuss and validate the content of the "Development

Guide for an IRRESISTIBLE Exhibition" prototype.

5. The construction and validation of items to be included in the students' questionnaire to evaluate the impact of exhibitions' planning and development on students' perceptions regarding their competences;
6. The elaboration of several articles (for the project's newsletter and blog) on:
    a. The potential of student planned and designed exhibits about responsible research and innovation:
        i. Introducing teachers and students to a borderline science;
        ii. Students: becoming learners with visitors;
        iii. Empowering students.
    b. Interactive exhibitions:
        i. Social interaction as a crucial factor for visitors' engagement and learning
        ii. Interactive artefacts – what characteristics?

IRRESISTIBLE WP4 (Web 2.0 applications, social media and website)

Report on Progress 11/2013 – 10/2014

03/11/2014

The objective of WP4 is to support the IRRESISTIBLE project in terms of web and app tools. This includes for the reporting period the development and maintenance of the project web page, as well as the development of a Web2.0/App guide and the dissemination and training on these tools in a workshop for all partners.

Logo competition

To develop a logo for the project, a logo competition was started. In total, 24 logo suggestions were submitted. The selection procedure was two-stage, leading to the final version of the IRRESISTIBLE project logo.

Project website

For the project website, a content management system was set up to present the page at www.irresistible-project.eu. A design template was created to frame the content consistent with the project logo and leaflet design. Major focus was laid on a responsive design of the template, i.e. the website scaling nicely from smartphones to large screens. The content and coverage of the website were discussed with all partners during the Kick-off meeting and subsequent in more detail questioned with the website survey (Deliverable 6.2).

The website blog offers new facets of all partners of the irresistible project roughly bi-weekly and thus gives a nice overview on the current state of the project.

For information exchange, a mailing list was set up in form of a google group (irresistible-all@googlegroups.com).

Web2.0/App Guide

The aim of the Web2.0 / App Guide is to support the Community of Learners in each country to include Web2.0 / App tools in the module. Following the idea to use these technologies all way along the IBSE path, the guide offers various tools for different requirements in the respective phases. The threefold structure of the guide offers:

- A brief introduction on smartphone usage in general, on how many smartphones are in use in the relevant age group, and on the marked shares of the different operating systems
- A list of 30 relevant, tried-and-tested Web2.0 / App tools that could be appropriate for use in the modules, covering eight fields of application: Project Tools, Image Work, Measuring, Mobile Office, Collaborative work, Knowledge, Tools, Exhibition
- A quick start guide to the open-source ePortfolio system Mahara.

The most relevant tools of the guide were presented at the Web2.0/App Workshop in Kiel early March 2014. The guide is available for download on the irresistible homepage. It will be updated and expanded during the project, including new tools used in the partner modules.

Workshop

The main goal of the workshop was to share knowledge on Web2.0/App tools with the partners. The workshop took place in March 2014, at the IPN Leibniz Institute for Science and Mathematics education in Kiel, Germany. In the first part of the workshop various tools and possibilities to use Web2.0/App technologies were presented. In the second part participants worked in small groups and used different technologies on a fictitious module. The workshop gave room to share the media knowledge of all participants.

Deliverable D4.3

The deliverable D4.3 "Module-related web 2.0 application / tool / …", describing the Web2.0/App tools used in the different RRI-modules couldn't be delivered as planned in month 8. In many countries, the module development is still in progress, and thus a closer specification of which tools will be used not yet possible. The deliverable will be provided in January 2015.

IRRESISTIBLE WP5 (Evaluation)

Report on Progress 11/2013 – 10/2014

23/10/2014

Overview of the progress in WP5 during the first year

As outlined in the IRRESISTIBLE Description of Work (DoW), evaluation in the project consists of three components: 1) Evaluation of the teacher professional development programme, 2) evaluation of the modules, and 3) final project evaluation (including also an evaluation of exhibitions). During the first year of the project (11/2013 – 10/2014), the evaluation components were planned further to form a coherent whole, and the specific instruments for components 1 and 2 were designed, constructed and put into operation to collect first sets of data. Tentative results have already been presented in two science education conferences.

The co-leaders of WP5, UH and IPN, have collaborated closely through email, video meetings and also two personal meetings (in March in Germany and in July in Finland). Communication has also been active with the project coordinator, who participated in both meetings and many email discussions. Furthermore, as planned in the DoW, evaluation has been designed and implemented in collaboration with all IRRESISTIBLE partners, especially with the leaders of WP2 and WP3. The WP2 leader (Weizmann) took responsibility of the development of a questionnaire measuring conceptions and attitudes to Responsible Research and Innovation (see below) for CoL members and for students. The WP3 leader (IE-UL) provided questionnaire items addressing social aspects of science education and student-curated exhibitions as working method. The development and implementation of the evaluation instruments has been discussed with all IRRESISTIBLE partners via e-mail, monthly video meetings and during the evaluation session at the annual project meeting in Jyväskylä in July, 2014.

Using the ideas and feedback gained through these communications, the WP5 leaders developed the detailed evaluation plan that was published in two framework papers (deliverables D5.1 and D5.2). Overview of evaluation instruments, including their target group and when they are implemented, is presented here as Appendix A. The progress in evaluation components 1 and 2 during the first year is described in the following sections.

In sum, WP5 has progressed according to the DoW (IRRESISTIBLE Description of Work, 2014) and all the deliverables have been delivered on schedule. During the second year of IRRESISTIBLE, the instruments will be developed further on the basis of the results and feedback.

Evaluation of the teacher professional development programme

In the first phase of the project, existing instruments for evaluations of educational innovations were analysed. The standardized questionnaire "Stages of Concern, SoC", based on the Concern-Based Adoption Model and employed in many comparable projects during last 30 years, was chosen for the evaluation of teacher professional development in IRRESISTIBLE. This allows us to compare results with those from other projects and ensures the scientific quality of the instruments. The WP5 leaders adapted the original SoC questionnaire to measure RRI innovation concerns of all CoL members. Additional items asking for the expectations towards inquiry-based teaching and learning (the 6E-phases) were developed and added to the questionnaire as a separate block. Furthermore, the WP3 leader designed items on social aspects of science education and on student-curated exhibitions as a working method. For detailed description and background information on the evaluation instruments, see IRRESISTIBLE Deliverable D5.1 (2014).

In May 2014, all these blocks of questions were set up as a single on-line questionnaire, administered by the UH, with different versions for the different CoL members. After that, partners have translated the questionnaire into their own languages and the UH has implemented them as online versions. Currently (October 2014) there are 9 language versions online and one language version translated on paper, and altogether ca. 120 CoL members from all countries have completed the questionnaire. Tentative results have been presented in one international conference (ECRICE 2014) and in one Finnish science education conference.

Another instrument used in evaluating the teacher professional development programme, a questionnaire on conceptions and attitudes to Responsible Research and Innovation (RRI), was developed by the WP2 leaders. The questionnaire addresses views on all the six dimensions of RRI (IRRESISTIBLE Description of Work, 2014). The first version of the questionnaire was sent to all

partners for expert validation in April 2014, and the WP2 leaders have since developed the questionnaire further according to the feedback. Currently (October 2014) the final first-round version of the RRI questionnaire has been translated into different languages and the first responses from CoL members have been collected.

Evaluation of the modules

In February 2014, WP5 leaders developed and sent all partners the first version of Criteria of the Modules (see IRRESISTIBLE Deliverable D5.2, 2014). This document was then iteratively revised according to the feedback. As described in the DoW, this document is a major instrument in the evaluation of the modules: All partners are supposed to self-evaluate their module by writing short answers to all questions in the Criteria for Modules document. In addition, a table combing the 6E-steps with the chosen RRI-aspects was discussed during the project meeting in Jyväskylä and developed as a tool of orientation for the CoL-members.

The answers will be used to evaluate *if* and *how* specific elements were incorporated in the modules. Hence, these criteria are used as a checklist during the module development and adaptation in every CoL: it is presented and discussed in early CoL meetings and then repeatedly returned to, in order to have the objectives in mind throughout the process. Furthermore, when the module is implemented in another country during round 2, the partners in that country will assess the module again against the same set of criteria.

Impact on students

As described in the DoW, the main instrument of assessing the modules' impact on students will be a pre-post-questionnaire on students' attitudes to RRI. This instrument, developed by the WP2 leaders, is essentially the same questionnaire that has been developed for teachers' and other CoL members' use (see above). Yet, some changes are needed to adapt the questionnaire for students' level. In addition to questions on RRI, the student questionnaire includes questions on exhibit development and social aspects of science education (e.g. questions that investigate how much teachers encourage the students to take an active role in society later in their lives). These items have been developed by the WP3 leader and are related to similar questions in the CoL online questionnaire (see above). Currently the IRRESISTIBLE partners are translating and adapting the student questionnaire, after which the instrument will be iteratively developed according to the

feedback from the first tryouts. The instrument will be finalized until the second round of IRRESISTIBLE, and the main data for module evaluation will be collected during the second round.

Finally, in order to evaluate the process of students' exhibitions planning and construction, the WP3 leader has given instructions for each partner to carry out two case studies (one in each phase of the project). For details on this and other parts of module evaluation, see IRRESISTIBLE Deliverable D5.2 (2014).

References

IRRESISTIBLE Deliverable D5.1 (2014). Framework paper for teacher professional development programme evaluation.

IRRESISTIBLE Deliverable D5.2 (2014). Framework paper for module evaluation.

IRRESISTIBLE Description of Work (2014). Including responsible research and innovation in cutting edge science and inquiry-based science education to improve teacher's ability of bridging learning environments.

Overview of evaluation instruments, their

target group and when they are implemented

(updated July 11th 2014)

During the first round of IRRESISTIBLE, the evaluation instruments are developed and validated. During the second round these validated instruments are employed to conduct the project's main research.

Instrument	**For whom?**	**When?**	**Analysis**
Online questionnaire, incl. • States of Concern • IBSE • Exhibit Design • Social aspects of science education	All CoL members: • teachers • scientists • science education experts • museum staff	2 (optionally 3) times during both rounds of CoLs: * pre: during early CoL meetings * (intermediate: after the initial design of the module) * post: after testing with students	Descriptive results (means) for the first round; statistical analyses (SPSS) for the second rund

RRI questionnaire for CoL members	All CoL members: • teachers • scientists • science education experts • museum staff (+ 10 teachers outside the CoL in the first round)	Once during round 1 Twice during round 2 (pre: during early CoL meetings; post: during the last meeting)	Descriptive results (means) for the first round; statistical analyses (SPSS) for the second round
Criteria for modules checklist	One representative of each partner (country)	At the end of the module development (round 1) and during module implementation (round 2)	Qualitative content analysis
Student questionnaires • **RRI** • Exhibit design • Social aspects of science education	School students participating in the module (separate questionnaires for primary/secondary school)	Twice (pre-post) during module implementation in both rounds	Statistical analyses (SPSS)
Case study on exhibition development, incl. • interview with 1 teacher • focus group interview with students	A teacher and a group of students	At the end of exhibition development in both rounds (and possibly using observations and interviews during the exhibit development phase, for those who are interested in the systematic analysis option)	Simple analysis & formative report Optionally: Systematic analysis leading to a research report
Project evaluation questionnaire	One representative of each partner (country)	In 2016	Simple statistical analysis

WP6 - Dissemination Report Year 1 (01.11.2013 - 31.10.2014)

During the first year of the project, various dissemination activities were conducted by the partners of the project. The newsletters published once every 6 months described how the project has proceeded.

In the beginning of the project, a *Dissemination Manual* (Deliverable D6.1) was prepared by the dissemination workpackage (WP6) leaders, and the dissemination activities were guided accordingly throughout the project.

The main channel of dissemination has been planned to be the project website. Before launching the website, a website survey (Deliverable D6.2) was conducted. Based on the results of the website survey, the website was designed and published in February 2014, at the URL of www.irresistible-project.eu.

When the partners started to have meetings with their Community of Learners, they started to use different types of Social Media as described in Deliverable D6.3. The partners of the project also used different (both electronic and mass) media tools to announce and publicize the project nationally and internationally as described in Mass Media Report Deliverable D6.4.

During the first year of the project, partners performed various activities to disseminate the project. These activities include conference presentations (both oral and poster) at national and international levels, plenary talks, workshop organizations, flyers, use of digital and mass media. Table 1 summarizes the type of dissemination activities performed by each country and the total number of them.Table 2 gives the detailed explanation of these activities.

Table 1. Type of dissemination activities performed by each country

YEAR 1 ACTIVITIES	NUMBER	COUNTRIES
NATIONAL CONFERENCES	15	Greece (1), Italy (2), Netherlands (2), Poland (7), Turkey (1), Finland (1), Romania (1)
INTERNATIONAL CONFERENCES	20	Finland (3), Greece (4), Germany (1), Israel (1), Italy (1), Poland (3), Portugal (1), Romania (3), Turkey (2), Netherlands (1)
DIGITAL MEDIA	19	Germany IPN (1), Greece UoC (2), Greece EF (2), Israel (2), Italy (1), Netherland (2), Portugal (1), Romania (6), Turkey (2)
MASS MEDIA	2	Romania (2)
PUBLICATIONS	5	Finland (2), Greece UoC (1), Netherlands (1), Poland (1)
OTHERS WORKSHOPS FLYERS MEETINGS PLENARY TALK	16	 Poland (1), Romania (4), Greece-UoC (2), Poland (4), Turkey (1) Israel (3) Greece-UoC (1)

Table 2. Project Irresistible Dissemination Activities for Year 1 (01.11.2013 - 31.10.2014)

Country-Partner	Conference Presentations		Media		Publications	Others
	National Level	International Level	Digital Media	Mass Media		
Netherlands -– RUG	**Oral Presentation:** KNCV Voorjaarsbijeenkomst (May 8, 2014, Bussum) *" Introducing RRI in secondary education"* **Oral Presentation:** Meeting 'vaksteunpunten' chemistry, (September 10, 2014) *" Project Irressistible"*	**Oral Presentation:** OPCW Education and Outreach Conference, The Hague, Netherlands, (September 22-23, 2014) *" Raising awareness about RRI in secondary education"*	Science LinX Website and newsletter: http://www.rug.nl/sciencelinx/nieuws/20140925_irresistible and http://www.rug.nl/sciencelinx/nieuws/20141028_lissabon		Groningen (October 2, 2014): *"Article title: Project IRRESISTIBLE in Nederland van start / Project IRRESISTIBLE kicks off in the Netherlands"*	**Workshop:** Teacher Training Day at University of Groningen, (December 17, 2104)

Israel – Weizmann		**Oral presentation:** University of Jyväskyla, Finland (July 9, 2014): Presenting the use of the Facebook group in the Israeli Irresistible CoL.	**Local webpage of the project:** http://stwww.weizmann.ac.il/g-chem/irresistible/ **A Facebook group in Hebrew** was created for the local audience (December 2013). Various text chunks have been drafted for the page. The Facebook group is used for discussion of the CoL members: https://www.facebook.com/#!/groups/482734615173219/			**Meeting with the Inspector of Chemistry Education in the of the Israeli Ministry of Education.** Receiving official recognition to teach the Irresistible module in chemistry lessons **Meeting with the coordinator of "Nahshon" program for excellent students.** Receiving official recognition to teach the Irresistible in the program **Meeting with the Israeli PI of**

						other EU projects dealing with RRI (engage and Parris). Sharing articles and establishing a common language.

Germany – IPN		**Oral presentation:** University of Jyväskyla, Finland (July 9, 2014): *"The Student Curated Exhibition – a New Approach to Getting in Touch with Science"*	**Announcement:** Newsletter of IPN: IPN-Blätter, page 2 (January 1, 2014): *"Am IPN startet ein neues EU-Projekt"* Newsletter link: ftp://ftp.rz.uni-kiel.de/pub/ipn/ipn-blaetter/IPN_Blaetter_1_2014.pdf			
Turkey – BU	**Oral Presentation:** National Science and Mathematics Education Conference, Çukurova University, Adana, Turkey (September 13, 2014): *"Öğrenci, öğretmen, uzman ve toplumu birleştiren köprü: Sorumlu araştirma ve inovasyonun fen eğitimine entegrasyonu"*	**Oral Presentation:** İstanbul University Congress Center, Istanbul, Turkey (April 26, 2014): *"Integrating Responsible Research and Innovation in Science Education through International Collaboration"* **Oral Presentation:** University of Jyväskyla, Finland (July 9, 2014): *"Teachers' Perceptions of the Community of Learners: The Case of Turkey"*	The project is announced in the web page of Bogazici University: http://www.boun.edu.tr/tr-TR/Content/Duyurular/Duyurular?LoadModule=News&NewsID=1119&Filter=true **Local webpage of the project:** http://www.irresistible-turkiye.com/ **A Facebook group in Turkish** was created for the local audience			**Flyers:** National Science and Mathematics Education Conference, Çukurova University, Adana, Turkey (September 11, 2014): *"Öğrenci, öğretmen, uzman ve toplumu birleştiren köprü: Bilimde ve inovasyonda sorumlu araştirma"*

			(February 2014). Various text, pictures and video have been shared with this page. The Facebook group is used for discussion of the CoL members: https://www.facebook.com/groups/580300538713742/			
Portugal		**Oral presentation:** Eleventh annual conference on Hands-on Science, HSCI'2014, Aveiro, Portugal, (July 21- 25, 2014): Science Education *with* and *for* Society *"IRRESISTIBLE project -Portuguese community of learners: teachers' perceptions"*	The project is announced in the web page of Education Institute of Lisbon University: http://www.ie.ulisboa.pt/portal/page?_pageid=406,1812940&_dad=portal&_schema=PORTAL			

Finland – UH & JYU	**Oral presentation:** Symposium of the Finnish Mathematics and Science Education Research Association (FMSERA) 2014, Oulu, Finland, (September 1, 2014): *"Teachers' interests and concerns about teaching of 'Responsible Research and Innovation'"*	**Oral presentation:** Nordic Research Symposium on Science Education (NFSUN), Helsinki, Finland (June 5, 2014): *"Research-based development of out-of-school learning environments on contemporary research"* **Poster presentation:** HOPE Annual Forum 2014 – Inspiring young people to study physics (August 29, 2014): *"IRRESISTIBLE – Engaging the Young with Responsible Research and Innovation"* **Oral presentation:** European Conference on Research in Chemistry Education 2014 (July 9, 2014):			**Article** in LUMA Sanomat (LUMA.fi) (September 23, 2014): Article title: *IRRESISTIBLE- "hanke: huippututkimuksen yhteiskunnallisuutta tiedeopetukseen"* **Article** in LUMA News (LUMA.fi/news) (September 24, 2014): Article title: *"STEM education with a focus on responsible research"*	

		" Teachers' interests and concerns about teaching of "Responsible Research and Innovation""				
Italy – UNIPA & UNIBO	**Oral presentation:** SPAIS Training School for Teachers of Experimental Sciences, (July 21 – 25, 2014, Palermo.): *"Congegni e macchine a livello molecolare" (Molecular devices and machines)* **Oral presentation:** Teacher Training Course at the Museo of Balì, (September 3, 2014, Saltara, PU) *"I limiti estremi della miniaturizzazione:*	**Poster Presentation:** GIREP - MPTL 2014 Teaching/Learning Physics: integrating research into practise (July 7 – 12, 2014, University of Palermo): *"Responsible Research and Innovation in Science Education: The IRRESISTIBLE Project"*	The project is announced in the web page of the University of Bologna: http://www.unibo.it/en/research/projects-and-initiatives/Unibo-Projects-under-7th-Framework-Programme/capacities/science-in-society			

	congegni e macchine a livello molecolare" (Extreme miniturization: molecular devices and machines)					
Greece - UoC	**Oral presentation:** 9th National Conference on ICT in Education, University of Crete, Greece, (October 4, 2014): "***Χρήση Εργαλείων*** *web 2.0* ***για την***	**Poster Presentation:** Corfu, Greece (May 30, 2014): *"Responsible Research and Innovation in Science Education: The IRRESISTIBLE Project"* **Oral presentation:** University of Jyväskyla, Finland (July 9, 2014):	The project is announced in the web page of the University of Crete: http://irresistible-greece.edc.uoc.gr/index.php/el/		**Article in Proceedings (in Greek):** Kalogiannakis, M. & Stavrou, D. (2014). "***Χρήση Εργαλείων*** *web 2.0* ***για την επιμόρφωση εκπαιδευτικών σε θέματα Νανοτεχνολογίας. Το***	**Plenary Lecture:** 1st National Conference of the EU-Project Chain Reaction Heraklion, Crete (March 29, 2014) "***Διδασκαλία των Φυσικών***

	επιμόρφωση εκπαιδευτικών σε θέματα Νανοτεχνολογίας. Το πρόγραμμα *IRRESISTIBLE" ("Using Web 2.0 tools in teachers' training activities about Nanotechnology. The Irresistible-project")*	*"Irresistible-Project: The Community of Learners in Greece"* **Plenary Lecture:** ESERA 2014 Summerschool, Kapadokya Turkey (August 24, 2014) *"The Model of Educational Reconstruction as a Research Framework for Teaching and Learning Modern Science Topics"* **Oral Presentation:** ESERA 2014 Summerschool, Kapadokya Turkey (August 27, 2014) *" Teachers' Training in Developing Nanoscience and Nanotechnology Teaching Modules"*			***πρόγραμμα*** *IRRESISTIBLE" ("Using Web 2.0 tools in teachers' training activities about Nanotechnology. The Irresistible-project").* In: P. Anastasiadis, N. Zaranis, V. Ikonomidis & M. Kalogiannakis. Proceedings of the 9th National Conference "ICT in Education", (pp. 263 – 270), Rethymno, 3-5 October, University of Crete, Greece	***Επιστημών με Διευρεύνηση*** *" (Teaching Science with Inquiry)* **Flyer** CoL Meeting: Heraklion – Rethymno, Crete, Greece (June 26-28) "Responsible Research and Innovation in Science Education: The IRRESISTIBLE Project" **Flyer** CoL Meeting: Eugenides Foundation, Athens, Greece (October11-12, 2014) "Responsible

						Research and Innovation in Science Education: The IRRESISTIBLE Project"
Greece - EF			1st announcement on the project was produced and uploaded on the EF portal (July 2014): http://www.eugenfound.edu.gr/frontoffice/portal.asp?cpage=RESOURCE&cresrc=4003&cnode=89 A Facebook page in Greek was created for the local audience (September 2014). Various text chunks have been drafted for the page: facebook.com:irresistible- project-Greece			
Poland	**Oral presentation**	**Oral Presentation:**			**Publication:**	**Flyers:**

	Conference for Science teachers, Krakow FCh JU, 22.11.2013 , "Co nowego w projektach skierowanych do nauczycieli przedmiotów przyrodniczych w ramach 7. Programu Ramowego ESTABLISH, SAILS oraz IRRESISTIBLE? **Oral Presentation:** 6th Conference "Interaction-Integration", Science Center Experiment, Gdynia, Poland (March 14, 2014): *"Exhibition 2.0. Project IRRESISTIBLE in the Jagiellonian University Museum"* **Oral Presentation:**	3rd International Seminar Science-Society-Didactics "New Society-New Professions" Kraków, Poland (April 8, 2014): *"Raising youth awareness to responsible Research and Innovation through Inquiry Based Science Education"* **Poster Presentation:** 6th International Conference on Research in Didactics of the Sciences, DidSci 2014, Krakow (June 25, 2014): *"Community Of Learners And Its Role In The FP7 Irresistible Project – Jagiellonian University Example"* **Oral Presentation:** 2nd INTERNATIONAL CONGRESS OF SCIENCE EDUCATION, 27-30 August 2014, Foz do Iguacu			Orbital, Magazine of Polish Chemical Society (June 2, 2014): article title: *"Pomiedzy Nauka, Technologia iEdukacja"*	Annual meeting of Polish Chemical Society, Czestochowa (September 17, 2014): **Workshop:** Congress of the Polish Association of Teachers of Science Education, Toruń (September 13, 2014): *"Odpowiedzialne badania i innowacje – moda czy konieczność?"* **Flyers:** Congress of the Polish Association of Teachers of Science Education, Toruń

	XIV Meeting of the Club of Physics Demonstrators, Rzeszów University of Technology (June 24, 2014): *"Project IRRESISTIBLE. The interactive exhibition as a sum of the student projects"* **Poster Presentation:** Annual meeting of Polish Chemical Society, Czestochowa (September 17, 2014): *"Zastosowanie WEB2.0 w kształceniu nauczycieli elementem projektu 7PR IRRESISTIBLE"* **Oral Presentation:**	(August 30, 2014): *"Museum education as a part of science teaching and learning"*				(September 13, 2014): **Flyers:** School of Didactics of Chemistry, Janów Lubelski (June 20, 2014): **Flyers:** 2nd INTERNATIONAL CONGRESS OF SCIENCE EDUCATION, 27-30 August 2014, Foz do Iguacu (August 30, 2014):

	Conference for science teachers, FCh JU Krakow (April 11, 2014): *" I.Maciejowska, Stosowanie metod IBSE w kontekście odpowiedzialnych badań i innowacji. IRRESISTIBLE - nowy projekt realizowany na WCh UJ."* **Poster Presentation:** Science picnic, Warszawa (May 31, 2014): *"Projekt IRRESISTIBLE"* **Poster Presentation:** Science picnic, Rzeszów (June 7, 2014): *"Projekt IRRESISTIBLE"*					
Romania	**Oral Presentation:**	**Poster Presentation:** University of	Media article (in Romanian) -	TV Videoclip during News-		**Workshop:** Workshop

	Valahia University Targoviste, Romania (June 15, 2014): *"Stimularea interesului elevilor pentru învăţarea Ştiinţelor prin activităţi desfăşurate în contexte non-formale"* English translation: *"Stimulating the students' interest for learning Science, through activities developed in non-formal contexts"*	Jyväskyla, Finland (July 8, 2014): *"Related Applications of Nanotechnology and Nanomaterials in Medicine Presented in Formal and Non-Formal Learning Contexts"* **Poster Presentation:** University of Jyväskyla, Finland (July 8, 2014): *"Promoting Responsible Research and Innovation through a Specific Teaching Module on Nanomaterials"* **Oral Presentation:** Doga School, Atasehir Campus, Istanbul, Turkey (October 17, 2014): *"Enhancing the Young Students Competences in Science and Technology in Formal and Non-formal*	published in an electronic journal (Gazeta Dâmboviţei): - http://www.gazetadambovitei.ro/educatie/irresistible-un-nou-proiect-international-de-cercetare-la-universitatea-valahia-din-targoviste (in "Gazeta Dâmboviţei" (February 6, 2014) journal - title: *"IRRESISTIBLE - un nou proiect internaţional de cercetare la Universitatea Valahia din Târgovişte") / English translation: "IRRESISTIBLE - A New International Research Project in Valahia University Targoviste".* Media article (in Romanian) - published in an	time (in Romanian) - broadcast at Columna TV: - http://www.columnatv.ro/tv/nanostiintele-si-cercetarea-responsabila / http://www.youtube.com/watch?v=uBY0PrMUdtw (April 9, 2014) Clip title: *"Nanoştiinţele şi cercetarea responsabilă" / English translation: "Nanoscience and Responsible Research"*		organized at History Museum Targoviste, Targoviste, Romania (April 9, 2014): *"Nanoştiinţele şi cercetarea responsabilă" / English translation: "Nanoscience and Responsible Research"* **Workshop:** Workshop organized at Prahova Natural Science Museum, Ploieşti, Romania (May 14, 2014): *"Instrumente multimedia pentru promovarea conceptului de Cercetare*

		Educational Contexts	electronic journal (Dâmboviţa) and in the printed edition of "Dâmboviţa" journal: http://ziardambovita.ro/uvt-a-lansat-un-nou-proiect-cu-finantare-europeana (in "Dâmboviţa" (February 7, 2014) journal - title: *"UVT a lansat un nou proiect cu finanţare europeană") / English translation: "UVT Has Launched A New Research Project Having European Funding"* Media article (in Romanian) - published in an electronic journal (Gazeta Dâmboviţei): - http://www.gazetadambovitei.ro/ed			*şi Inovare Responsabilă în cercetarea muzeală" / English translation: "Multimedia Instruments for Promoting the Concept of Responsible Research and Innovation in Museum Practices"* **Workshop:** Workshop organized at Dambovita County "Ion Heliade Rădulescu" Library, Targoviste, Romania (June 4, 2014): *"Cercetare şi inovare responsabilă în domeniul Nanotehnologiilor" / English*

			ucatie/elevii-au-invatat-ce-inseamna-nanostiintele-in-cadrul-proiectului-irresistible (in "Gazeta Dâmboviţei" (April 10, 2014) journal - title: *"Elevii au învăţat ce înseamnă Nanoştiinţele, în cadrul proiectului IRRESISTIBLE" / English translation: "The students learnt about Nanoscience in the frame of IRRESISTIBLE Project")* Blog article (in Romanian) - published by National College "Constantin Cantacuzino" Targoviste, in the school blog: - http://cncc-tgv.blogspot.ro/20			*translation: "Responsible Research and Innovation in the Area of Nanotechnology"* **Workshop:** Workshop organized at National College "Constantin Cantacuzino", Targoviste, Romania (October 9, 2014): *"Nanobiomimetica şi cercetarea responsabilă" / English translation: "Nanobiomimetics and Responsible Research"*

			14/04/nanostiintele-si-cercetarea-responsabila.html (April 9, 2014) title: *"Nanoştiinţele şi cercetarea responsabilă" / English translation: "Nanoscience and Responsible Research"* Media article (in Romanian) - published in an electronic and printed journal (Prahova): - http://www.ziarulprahova.ro/stiri/cultura/174977/cele-mai-avansate-tehnologii-utilizate-in-muzee-vor-fi-prezentate-la-ploiesti (in "Prahova" daily journal) (May 12, 2014): journal title: *"Cele mai avansate*			

			tehnologii utilizate în muzee vor fi prezentate la Ploieşti" / English translation: "The Most Advanced Technologies Used in Museums will be presented in Ploieşti" Media article (in Romanian) - published in an electronic journal (Telegrama): - http://www.telegrama.ro/cultura/item/25332-educatie-pentru-cercetare-si-inovare (in "Telegrama" daily journal) (May 16, 2014) journal title: *"Educaţie pentru cercetare şi inovare" / English translation: "Education for Research and Innovation"*			

3. Deliverables and milestones tables

Table 3.1.. List of milestones achieved

Milestone number	Milestone name	WP involved	Expected date	Means of verification
MS1	Kick off meeting of all participants	All	1	Management report 1
MS2	IRRESISTIBLE project website	4	3	
MS3	Project website in the partners' local language	4	4	
MS4	Formation of first phase CoL	2	8	
MS5	Work in first phase CoL	2,3,4	16	
MS6	Second meeting all participants	1	12	Management report 1

Table 3.2 list of deliverables submitted.

Deliverable number	Deliverable name	WP no	Nature	Dissemination level	Delivery date
1.1	Definitive consortium agreement and work plan as agreed with EC	1	R	PU	1
2.1	Strategies for constructing Community of Learners in the different countries	2	P	PP	3
4.1	Overview Guide on existing web 2.0 applications that could be used in the RRI modules	4	O	PP	3
4.2	Workshop "Exchange on possibilities	4	O	PP	3
4.5.	website	4	P	PU	3
5.1	Framework paper for teacher professional development programme evaluation	5	O	PP	6

5.2.	Framework 2: Framework paper for module evaluation	5	P	PP	9
5.3	Questionnaire 1:Questionnaire on attitudes to RRI	5	O	PP	12
5.4	Questionnaire on attitudes to RRI	5	O	PP	12
6.1	Dissemination manual: a document describing goals, method and strategies used in the project for various target audiences	6	P	PP	3
6.2	Website survey: describing the goal, the strategies, and the materials for various target audiences.	6	O	PP	3
6.3	Social media	6	D	PU	6
6.4.	Mass media	12	R	PU	12

Appendix 1

Project Irresistible Kickoff Meeting

Groningen

2 December 2013

IRRESISTIBLE is a project on teacher training, combining formal and informal learning focused on Responsible Research and Innovation.

It is a coordination and support action under FP7-SCIENCE-IN-SOCIETY-2013-1, ACTIVITY 5.2.2 Young people and science: Topic SiS.2013.2.2.1-1 Raising youth awareness to Responsible Research and Innovation through Inquiry Based Science Education.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 612367.

Day 1 – November 25, 2013

General aspects of the project: see Jan's powerpoint with information that is still needed.

Decisions on that:

- Executive committee: agreed
- Ireland as partner: becoming a formal partner is merely impossible, but becoming a virtual "associate" partner is possible. Agreed.

Dates for next meetings:

- Setup Skype meeting for participants: each Monday 12.00 (noon) Amsterdam time (GMT+1), once a month. Start December 16, then every first Monday of the month
- Jyvaskyla 2014, July 3 and 4, prior to conference. Conference starts 7th July, shift to 5 and 6 July?
- Bologna March 2015
- Extra meeting in between? Determine location → Targoviste, March April 2016
- Istanbul September/October 2016

WP2 discussion:

How many modules will be tested/used per country? Probably only 2-3 will be translated into local language, so we have to choose.

Further discussion in small groups:

1) What are the essential characteristics of a CoL (according to the definitions)
2) What are the basic challenges of creating CoLs in the irrestible projects

Conclusion from group discussions: what are the challenges?

- Slide from Paul Hix (in dropbox)
- Time and amount of work input
- Learn to cooperate
- How can teachers put modules in their curriculum
- Modules should be about equal length
- Slide from Lorenz (in dropbox)

Conclusion discussion WP2:

- Everybody sees the module different, so we need to make a guideline for common rules, common grounds, how many hours we will work with the community of learners.
- The Weizmann team will prepare the template for a structural document made that will be sent around and that everyone can comment on
- We did not touch on the RRI yet, the Weizmann team will give a workshop on RRI in our next meeting
- How will we deal with the fact that upon free choice, some modules might not be chosen and will therefore not be evaluated correctly? Will a solution be to make groups of three countries select each others modules? Or do we prefer free choice by teachers? Something to address in the future
- Setup Skype meeting for participants: each Monday 12.00 (noon) Amsterdam time (GMT+1), once a month. Start December 16, then every first Monday of the month.

Other points:

- If you want to hire subcontractors, you always need to ask for three offers, no matter about budget, etc. If you don't choose the cheapest party, you have to give decent arguments why you don't choose that party. EU regulations.
- Make project calendar with dates instead of designations like '18 months', but 'April 2014'

Day 2 – November 26, 2013

Discussion on WP3: the exhibitions

Idea for now is to put the first exhibits of the 5 teachers at school, and the second round will be a selection (contest) of the best exhibits in a science center. An exhibit can be a poster, but preferably something more hands-on or interactive.

One person from the science center should be involved in the total process, to develop a product that can stay, has sustainability and can get a place in the science center. That won't work with student-only projects, but if the science center is really involved from the beginning, students could help in developing a (prototype for) a real exhibit that is sustainable

The traveling exhibition could be based on the best of each partner (translated into English).

A visit to the science center for teachers and students could be part of the module, to learn about 'how to make an exhibit'.

Student-curated (nano)-exhibition based on IKEA Expedit.

Very cheap (550 euro) and easy-to-make exhibit/module.

Advantage: fixed framework limits choices for students, which makes it easier for them to develop the exhibit.

WP4: Web2.0/Apps

Discussion on Apps: Question: did people already use apps for measuring things, and if so, share. Specifically apps and other applications for informal learning, to be used in the modules.

Proposal for workshop in Kiel on web/apps in February (latest March) 2014.

Result = a guide for using apps in the modules.

The use of Social Media (Facebook, twitter) has to be discussed in each country separately. Closed groups and/or pages can be used, that also will get students more aware of privacy issues.

Discussion on Website: see powerpoint Lorenz

Decision on URL: www.irresistible-project.eu

Also needed: a logo with good design. Could be made by a commercial designer, or by a competition between partners. Decision on competition where students can design a logo, followed by a top-3 by every partner. Start with that in January.

Balance content local language and general content (in EN)

Local pages for communities in Local Language or Facebook pages…? Depends on country. Use flags to navigate to different subpages. Compare www.establish.fp7.eu . Local pages can be in local languages, but a summary in EN needs to be provided.

Also include: member login for 'intranet-like' pages (member sections) for unpublished results and communication. Like a forum, or something. Email notifications on messages are necessary to ensure that people actually know that things are posted. For sharing documents dropbox is used, but also the member section can be used to upload 'finished documents'.

Within community of learners, of course other platforms like google docs can be used.

Project blog and/or newsletter? Every two weeks an article on our project blog needs to be published. Take turns with the 10 partners, describe anything you want about progress of the process.

Short calendar or put announcement in blog: meetings.

Include: a calendar with marks which projects are finished and when deadlines are coming up, including color codes. Discussion about whether or not this is needed? Some partners think it is necessary, some partners don't. Lorenz will think about the solution. Maybe something with a google-calendar that includes warnings. This should be in the closed section of the website.

WP5: Evaluation

Three aspects: CoL evaluation, modules evalution, and project evaluation

<u>CoL</u>:

questionnaires for CoL members (teachers, researchers…)+ some additional qualitative methods.

- Video recordings maybe not a good idea, it limits that people will speak up freely.
- Analysis of learning diaries (of CoL leaders) and short feedback forms (asking each CoL members' perceptions of the meeting: what worked and what didn't etc.) would work better
- Ron: suggestion to use the PMIQ-questionnaires for evaluation.
- Evaluate after each meeting? Works better than only evaluating afterwards.
- Jan has a template that he will distribute.
- Ron: it would be good to also survey the CoL members' expectations of the project BEFORE the CoL work starts -> the schedule of WP5 + deliverables should be brought forward?

<u>Modules</u>:

1) WP5 leaders (together with WP2) will develop a set of criteria for module evaluation, which the partners will use as a guideline in module development and in self-evaluation of modules.

2) WP5 leaders will develop a questionnaire on attitudes to RRI.

- Discussion: questionnaire should be used not only for students but for teachers and researchers too (multiple versions of questionnaire are needed)

- Discussion: Will only attitudes or also conceptual knowledge about the modules be evaluated? Probably both.

Discussion: how to compare the evaluations between countries, evaluations will be in local languages. Partners should analyze their own data, and summaries will be provided to the group. Also using Likert scales can be used so that answers can be compared.

Project: no need for discussion now

Discussion: focus and methods: what and how to evaluate?

Antti + Ilka will provide a framework of the CoL evaluation and module evaluation.

Jan: Ethics

We need agreement from the ethical committee from the RUG. All partners should have approval from their local ethical committees before November 1st.

There needs to be consent from schools and parents for participation in the project, and parents should be able to restrict their children from participating without it influencing their school progress.

Every partner writes a few pages, and the total document will be submitted by Jan.

WP6: Dissemination

General: Information platform (IP) as dissemination tool will be taken out, we need to describe that that will be in the closed section of the website

First year: (Nov. 2013 – Nov. 2014)

Local dissemination:

- Common template for local newsletters in national language
- Use posts from blog, translate them into local language and use for newsletter (every three months), plus room for local information.
- Also for project newsletter: use articles from blogs.
- Maybe introduce one teacher from different country in newsletter, to give it personal touch
- Facebook: open page for dissemination purposed, closed group for CoL.
- Also make twitter-account, maybe linked to irresistible@gmail.com or something.
- Make sure that blog-posts are automatically uploaded to Facebook and Twitter
- Local journal could be a teachers journal, doesn't have to be a research journal
- International : articles should be published in open-access journals – those are not the best ones and sometimes you have to pay to publish
- One local and one international article by the end of the first year – Journal of Chemical Education?

International dissemination:

- What do we want in the manual: list of journals, ask around and coordinate who is going to publish in which one?
- A list of possible conferences to attend (ASTEC, ESERA, BCCE, ICCE, ESOF, …) with dates and names of people who are going (anyway)
- Make a poster template that everybody can use.
- A template for the newsletter will be prepared until February,

- Dissemination manual will be published until February,
- The newsletter will be guided once by Turkish Team (Bogazici) and once by Bologna Team.
- Short video describing the project Jan can find students who will do that

Second year: (Nov. 2014 – Nov. 2015)

Local dissemination:

- Newsletter in national language (LL) (Every 3M)
- Module (LL)
  - Own (May 2015)
  - Taken (Nov. 2015)
- Exhibit (LL)
  - 1st Round (May 2015)
  - 2nd Round (Nov. 2015)
- Local Workshops & Seminars (LL) (May 2015)
- Journal article (LL)
  - Results of 1st Round (Nov. 2015)

- Changes in the schedule: 1st exhibit is now planned in May, 2nd in November, that is too close. We want the first one earlier
- Local journal article by the end of the first year

International dissemination:

- Newsletter in national language (EN) (Every 3M)
- Module (Finalized Version) (Nov. 2015)
- International Conference Presentations
- International Workshops & Seminars
- Journal article
  - Results of 1st Round (Nov. 2015)
- Mid-year Report (May 2015)

Third year: (Nov. 2015 – Nov. 2016)

Local dissemination:

- Newsletter in national language (LL) (Every 3M)
- Local Workshops & Seminars (LL)
- National Conference Presentation (LL)
- Journal article (LL)
    - Results of 2nd Round (Nov. 2016)

International dissemination:

- Newsletter in national language (LL) (Every 3M)
- Publication of modules in the www.scientix.eu (EN) (Nov. 2016)
- Exhibitions
    - Traveling (EN) (Sept. 2016)
- International Conference Presentations
- International Workshops & Seminars
- Journal article
    - Results of 2nd Round (Nov. 2016)
- Final Report (Nov. 2016)

Challenges?

- Publish a letter to Nature? (or International Journal of Science Education, already a challenge)

General/ closure meeting:

→ WP-leaders will make a report of the agreements on their specific WP

→ Jan & Eva will make a general report of the two days

→ Workshop for exhibition (Pedro) could be coupled to conference in Finland, 2014, workshop for 2.0 will be earlier. Also there will be a workshop on RRI at that meeting, given by the Weizmann team and/or Jan.

→ Most countries will start CoL in September, report on plans at meeting in Finland. Next meeting, we can report on the communities, Ron recommended to start earlier if possible.

→ Jan will check on the definitive dates for the meeting in Finland.

→ Dissemination model will be finished soon

→ Ethical issues → reports hand in by September

→ Please report quickly to Jan when he sends documents!

Appendix 2

www.irresistible-project.eu

irresistible

Engaging the Young with
Responsible Research and Innovation

IRRESTIBLE – meeting Jyvaskyla – July 4-6 2014

Day 1: Friday July 4.

Comments on report of previous meeting:

- Change minutes to IRRESTIBLE-layout → updated document in Dropbox
- Jan is in contact with Sarah for partnership Ireland
- Upcoming Project Meetings:
    - Next meeting will be in March 2015 in Bologna
    - Extra meeting will be in March 2016 in Targoviste (in the snow)
    - Final meeting in Istanbul October 2016
- WP2: CoL will come back in this meeting
- WP3: Exhibits will come back in this meeting, also IKEA-Expedit exhibition from Lorenz
- WP4: Meeting web2.0/apps has happened in Kiel in March 2014. An application called MAHARA was chosen to be used in this project
- We have a website and a logo by now
- We need some discussion about the newsletter today
- WP5: a discussion about evaluation is planned for this meeting
- A report on ethics has been agreed upon by the University of Groningen
- WP6: dissemination has been discussed over the past month. If anyone has a talk/presentation/poster about the project, please send to Seville, who will gather everything together.
    - It is an important part of the project to report and collect all presentations.
- Not done yet: making a video about the project → Jan and Eva will take care of that
- First pilot exhibits are planned in September-January in Istanbul in schools. The real exhibits will be in May
- Exhibits in Greece will be a bit earlier, probably in December this year
- It is very important to document the exhibits, so please take photos when they take place
- Newsletter will be discussed later

- Paul is in contact with people from different groups who are doing projects with RRI. We could team up with them to get into international meetings to report on that, as this years ECSITE-session was refused
- Jan is very happy with internal communication and the way things are going at the moment.
- All partners are working hard to get the CoLs starting

Introduction of participants – presence list as addendum 1 to these notes
Administration and finance issues:

- Everybody signed the consortium agreement and received a signed copy
- Financial reports – issues have been solved
    - There is form C to fill in financial things
    - Not all money flows are put under the right 'terms' but according to Paul that should not be a problem as long as the work gets done
- Management report has to be made around November, Jan will do that and send around for everybody to look at
    - Deliverables - you can send them to Jan and he will look at them upload them and they will be OK'd by the EU project officer. We seem to be fairly on schedule
- Ethics
    - Jan will needs a document that the CoL-members signed. Those should be translated in the local language and everyone in the Col should sign that. Jan just need the copy of the translated document and a report that all teachers signed that.
    - This is needed in the management report for this year.
    - It is in part B of the DOW

Discussion on dissemination activities

- Report on website
    - Website has been set up but afterwards not much has been done.
    - Internal communication is very good, but we need to reach out as well
- Ron: suggestion → if every week some of us would send a message/description to Lorenz, he can put it on the website. Every month we can gather these messages into a newsletter.
- Lorenz: this is how we thought of using the blog
- Maybe we should make a schedule with deadlines, to prevent people from waiting for each other
- Jan: would this work better in LinkedIn? Should we make a group on LinkedIn for this?
- Pedro: we could connect the blog/website to such a social network
- But the content is still not happening, that is what needed
- Sherman: we need an issue-related blog. We're paving a road while we're driving on it. Why don't we post on the things we are already interested in? That is better than just writing "we met with our CoL"
- Would a LinkedIn group make the threshold lower?
- Peter: we are communication within the group. But it is another step to communicate to the outside world

- Jan: we can make two layers: for within the group and to the outside world. A schedule is not a really spontaneous thing
- Let's try the LinkedIN group, but make sure to interconnect different social media, like blogs, facebook and the website
- Lorenz can connect all of them, but he has to know about them. It would be the best to link them to the local pages
- Seville made a report on social media, so Lorenz can use that
- Pedro: everything we do needs to go through the website
- With the use of social networks, it would be difficult for people without a social network account to access and comment on the discussions
- Sherman: to stimulate people to take part in discussions in our busy lives we could start up a 'question of the month'. Like: what are we learning in this project? It is all about motivation.
- In addition, there are different communication methods in the different countries for communication between the members of the CoL.
- We need to separate internal and external communication.
    - Channel for internal communication is the google group. This is working very well.
    - If it getting too crowded and we need a group for 'lighter' communications, we can start a second Google group
    - We will also start up a LinkedIn group
- External communication should be the newsletter, but there is not a lot happening there
    - It is not about the tools, but about the content. So we need to make someone do it.
    - Then we're back to the schedule and the deadlines. Someone makes a blog entry every 14 days, and we can couple some entries into a newsletter
    - We can prepare a template for the newsletter, with picture, entry, etc.
- Summarize:
    - local communication → choose whatever you use and send the links to Lorenz
    - internal communication → google group(s) , maybe we try a LinkedIn-Group
    - external communication → blog: we need to make schedule of publications every 2 weeks
    - Pedro, Ron, Lorentz and Eva make a schedule
- Peter: make catchier title than Blog Entry #1. And add 'sharethis'-buttons. Also make the possibility to comment on the blogs (possibly moderated)

RRI. Workshop by Ron and Sherman

- To discover the 6 dimensions of RRI, e.g. Engagement, Gender Equality, Science Education, Open Access, Ethics, Governance. In our group discussion we only didn't come up with Gender Equality and Ethics, not to a surprise for Ron and Sherman
- Second part of the workshop – relating the dimensions of RRI to the issue of Nano Socks.
- See pictures of posters made – addendum 2 to these notes
- Further information on RRI: see presentation in dropbox.
- RRI questionnaire. Requests from Ron about that:
    - In the first round, ask 10 teachers that are not part of the CoL ánd the CoL-members to fill in the questionnaire. Ron will provide a new link to the questionnaire by the end of July

- Local partners can translate the questionnaire and provide them to the teachers in September (or when convenient)

Questionnaires on pre, middle and post

- No notes on the first part …
- Miika:
- Concern-Based Adoption Model (CBAM) – 6 stages of concern: Informational, Personal, Practical, Consequence, Collaboration, Refocusing
- Some countries have already filled in questionnaires as a pre-test about this
- Other countries: please do this
- Miika can send the form for translation, and every country can translate the questionnaire into the local language
- He will also send around how many teachers have filled in the questionnaires from every country
- Note: there is a language problem: it is difficult to translate the documents to local languages, so it might be tricky to compare the countries.

Questionnaires on exhibits by Pedro

- 2 student questionnaires focused on empowerment: exhibit design and social aspects of science education
- Plan to make a workshop in Lisbon in end 2014 about exhibits (presenting, building, involvement of interactivity etc.) for teachers from all countries involved in the CoL.
- Teachers can be accompanied with people from science centers to assist in the training.
- We can plan it maybe a bit later if it would be too soon, and make an online workshop for now – that is a compromise that can be discussed.

Day 2: Saturday July 5.

Report on Newsletter organization:

- Idea is to alternate General newsletters and Special Topic Newsletters every three months, leading to 4 newsletters per year.
- General topic newsletters consist of a few blog entries: Local Story, CoL, Exhibition, 6E, RRI, further announcements
- Special Issue newsletters consist of blog entries on that topic from 4 partners, some links to literature and further announcements.
- Blog entry is ~300 words/2000 characters, with 1-3 photos/graphics if possible
- Extra blog entries can be provided for example by teachers
- List with fixed dates on the door was filled in:
- Task for everybody: make an account on the website to make blogs if you haven't already done that
- Lorentz will make a how-to-write-on-the-website note and send that around

Reports from groups that have started with CoLs:

- Dimitros/Greece:

  - CoL group consist of 14 people: 2 science educations, 2 scientists, 3 science museum experts, 3 leader teachers,
  - Challenge: CoL is taking place in 3 cities (2 on Crete and 1 in Athens)
  - Alternation of skype and face-to-face meetings
  - Every meeting 1 person presents a topic and a synopsis will be made with articles. This documents could be used in the second phase as material to work with.
  - In the CoL are teachers from different levels: primary education, and lower and higher level secondary education
- Iwona/Poland:
  - 6 meetings in 2014: 3 without teachers (3 researchers, 4 chemistry educators, 1 science museum expert), 3 meetings with 8 teachers
  - 1st meeting in April: Introduction to project
  - Each meeting a PMI questionnaire is given for evaluation purposes
  - 2nd meeting was focused on exhibitions, in a science museum
  - 3rd meeting was on the topic: nanoscience, with a visit to a laboratory
  - Points of concern: teachers were 'ashamed' to present themselves in front of others
  - Good: all CoL-members can enjoy the same things and learn something new, and there is growing number of confidence among the participants
- Ron/Israel (presentation in dropbox):
  - Already had 6 meetings, the meetings will be in three parts
  - Part 1 – group building – introduction, building trust, good food, creating the need for the project, visiting the science garden (science museum)
  - Part 2 – IBSE of topic (renewable energy): presentation by scientist on high level, teachers were allowed to ask questions without presence of scientist, questions were collected
  - Teachers were divided in groups, and were asked to find the answers to the questions (IBSE)
  - Part 3 – building the RRI questionnaire
- Gabriel/Romania (presentation in dropbox):
  - CoL has 17 members, 8 academic staff, 6 teachers, 2 museum representatives
  - Also in this CoL: food is very important
  - Three types of activities: for formal learning, informal learning and ICT oriented activities
  - Working platform is Redmine – project management platform
  - Also Facebook-site and national website in both English and Romanian
  - For each workshop they make a leaflet with information about what will happen
  - Teachers have strong requests for models/templates for modules
- Pedro/Portugal
  - 1st session is explanation of the main ideas of the project, also including RRI
  - 2nd meeting centered on connection between IBSE and web2.0-tools
  - Many scientists involved, presenting their research

Working with a community of Learners/ Jan – paper for ECRICE → Normal way: confronting teachers with research on scientific level, and then finding out where the knowledge is lacking

- It is very important to make teachers/participants owner of the project and product
- A training from pedagogical/educational experts about 5/6E-method is very useful
- There are a few important principles in the learning community
- Participants need to agree on a few things, like process and content
- Document that Antti/Jan made about the composition of the Community of Learners with a number of questions that are relevant for the position of the module in the curriculum → in many countries the curriculum is tight and it might be difficult to fit the modules in
- The document by Antti/Jan can be filled in by every country and put in the dropbox also to see what other partners are doing
- Length/duration of the module is something that is to be determined by partners/teachers
- Quick overview of topics of modules/CoLs of other partners

Empowerment

- Empowerment for citizenship – for environmental and societal issues
- Adding a 7th E to the 6E-model?
- Might be a nice spin-off of this meeting

Workshops Nanotechnology

- Paul Hix
    - Demonstration of a couple of great experiments to do with kids to demonstrate the concept of nano (size, usage, concepts, etc.)
    - Descriptions of the experiments in document in dropbox (folder Nano Materials to share)
    - Some movies on nano – links in dropbox as well
- Presentation Nano – Dimitris (in Dropbox)
    - More examples of nanotechnology-experiments to do with students, also about learning the concepts about dimensions and functionalities of nanomaterials

Day 3: Sunday July 6.

Workshop exhibitions – Pedro & Monica

- Documents put in dropbox by Pedro (folder: Exhibition Guidelines)
- Group discussions to formulate:
    - Problems/challenges you might encounter while developing exhibits
    - Some topics to address during a possible workshop with teachers in Lisbon
    - Pictures of posters as addendum to this notes
- Note: not only through ICT you can make an interesting exhibition → even a poster can be rather challenging. Those scenario's are also presented in the document
- Pedro would really like your comments on the documents to improve them further
- Discussion about case studies:
    - 1 case study for the first round
    - 2 case studies for the second round

- Note from Ilka: the case studies might be an extra workload on top of the project, especially when it leads to a real scientific analysis of the case studies. A suggestion might be to do the interviews, in both rounds, and that later partners who have time and are interested can join in a scientific project to analyse and report on the case studies.
- So: at least one case study in the first round

Meeting in Lisbon

- Dates for the meeting in Lisbon: ~~October 10-11~~ or better: October 17-18. Partners can choose how many people to send, at least Science Center expert and at least one teacher should attend. Approximately 2-3 people per partner
- Meeting schedule will be: travelling on Thursday, 1 day at the institute on Friday, ½ at the science center at Saturday morning, travel back on Sunday
- Organization will be by partners from Portugal

Discussion about implementing RRI in the 6E-model

- We can think of ways of naturally talking about RRI-aspects in the different phases of th 6E-model:
    - In the explore-phase, implement the open-access aspect of RRI
    - Also other combinations are possible

Communication:

- Google groups for discussion on certain topics:
- Write an email to Lorenz about which email-address you want to be registered with
- Then go to groups.google.com and you will find the google discussion group
- So we will not create a LinkedIn group, as this would be extra

Demonstration by Lorenz on his IKEA-Expedit-exhibit

- Note: IKEA changed the program, not Expedit anymore but Callax, dimensions are the same

Horizon-2020-call

- There will probably a preparation meeting for the call in Groningen in September, Jan will coordinate that

Comments from Peter Mahaffy ()

- Tasks for everyone (and remember!)
    - Write down what the acronym IRRESISTIBLE stands for
    - What is the motto that comes next to the logo? → Engaging the Young with Responsible Research and Innovation
- ECRICE for Peter:
    - **E**valuation → a lot of work has been done since Groningen
    - **C**ommunication →
        - internal/external, distinguish about what we think is important and what the public might find interesting
        - Motto: Acronym RRI won't work for the general public, think about what the message might be for the public
    - **R**esponsible → This should grow before the next meeting. Make sure that it won't be a commercial project for nanotechnology, include the Empowerment
    - **I**mplementation of Community of Learners → use Science Education Research in the CoLs, work the nature of science in the modules
    - **E**valuation and assesment → continue to think about the purpose of all parts of the evaluation and how to tie that in the purpose of the whole project
- 5 years from now: what will make IRRESISTIBLE into a successful project?

Lunch and closure of the meeting

Addendum 1: Attendance list meeting
Addendum: PDF with posters from RRI workshop
Addendum: PDF with posters from Exhibition-workshop

Appendix 3

rijksuniversiteit groningen

faculty
social s

Drs. J.H. Apotheker
PO.Box 407
9700 AK Groningen

March 4, 2014

Dear Mr Apotheker

research proposal

The Ethics Committee Pedagogical and Educa
the project Irresistible with number 612367.

The Ethics Committee sees no fundamental o
and has approved it.

Yours faithfully

On behalf of the Ethics Committee

Prof. dr. H.W.E. Grietens (chairman)

members
Prof. dr. mr. M.E. Kalverboer (vice- chairma
dr. P.C.M. Bakker (member)
dr. H. Kuyper (member)
dr. D.D.N.M. Kostons (member)
drs. L.C. Hartemink-Bolt (secretary)

4. CONCLUSIONS

The project is well under way in achieving its goals. Deliverables are on time and the ethics report was favorable. All CoLs seem to be well on the way of developing modules.

Most specifically based on a report of the participant to the conference in Rome of similar projects we seem to be advanced as far as the introduction of RRI into secondary education is concerned.

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