D15.6

Training for Teachers

WORK PACKAGE 15 – TRAINING COURSE FOR TEACHERS

LEADING BENEFICIARY: ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA (INGV)

Author(s):	Beneficiary/Institution
Giuliana D'Addezio, giuliana.daddezio@ingv.it	INGV
Giovanna Piangiamore, giovanna.piangiamore@ingv.it	INGV

Accepted by: *Jacco Konijn* (WP 15 leader)

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ABSTRACT

This deliverable describes the actions undertaken for the development of Task 15.5. The deliverable is aimed at providing secondary school teachers and students with an e-Training Platform and is based on scientific themes related to Research Infrastructures (RI's) for the Environmental Sector participating to ENVRI-plus project. The actions are also aimed to design, structure, develop and implement a **Training course for teachers** to the use of the multimedia platform.

We describe the products, the actual work done and the ongoing actions. Considering the multiple scientific subjects involving the RI'S, first we identify the themes of focus in specific areas. Then, we build a cognitive reference learning scheme to provide guidelines to help trainers and teachers to help the students fulfil their potential. To design a new effective international multimedia tool we performed an analysis on European schools standards with an overview on different national strategies to implement scientific key competences and investigated the educational resources already available on the web. To improve and better fit the content of the e-Training Platform we prepared a questionnaire. The questionnaire is addressed to teachers in order to fulfil their specific needs and help build a platform with targeted contents.

As part of the results we introduced a first proposal of a learning-portal ("Learning+: Sharing Environment knowledge") to provide educational resources as the main part of a training course for teachers.

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Jacco Konijn	UvA
Laura Beranzoli	INGV

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PROJECT SUMMARY

ENVRIplus is a Horizon 2020 project bringing together Environmental and Earth System Research Infrastructures, projects and networks together with technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research Infrastructures across Europe. It is driven by three overarching goals: 1) promoting cross-

fertilization between infrastructures, 2) implementing innovative concepts and devices across RIs, and 3) facilitating research and innovation in the field of environment for an increasing number of users outside the RIs.
ENVRIplus aligns its activities to a core strategic plan where sharing multi-disciplinary expertise will be most effective. The project aims to improve Earth observation monitoring systems and strategies, including actions to improve harmonization and innovation, and generate common solutions to many shared information technology and data related challenges. It also seeks to harmonize policies for access and provide strategies for knowledge transfer amongst RIs. ENVRIplus develops guidelines to enhance transdisciplinary use of data and data-products supported by applied use-cases involving RIs from different domains. The project coordinates actions to improve communication and cooperation, addressing Environmental RIs at all levels, from management to end-users, implementing RI-staff exchange programs, generating material for RI personnel, and proposing common strategic developments and actions for enhancing services to users and evaluating the socio-economic impacts.

ENVRIplus is expected to facilitate structuration and improve quality of services offered both within single RIs and at the pan-RI level. It promotes efficient and multi-disciplinary research offering new opportunities to users, new tools to RI managers and new communication strategies for environmental RI communities. The resulting solutions, services and other project outcomes are made available to all environmental RI initiatives, thus contributing to the development of a coherent European RI ecosystem.

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REPORT TEXT

1. Introduction

Science teaching plays an important role in connecting the scientific world and School, and Society in general. So teaching effort is required to focalize students' attention towards scientific contents. Teaching methods are usually a healthy mix of all techniques such as: question-answer, problem definition/exercise, guided independent learning, ex cathedra, cooperative learning, video learning clip, learning by doing with hands-on activities by the use of science related technologies such as mobile applications and internet (the computer is principally the mean to visualize powerpoint presentations, articles, pictures, movies, … but also to create original products), as well as various "classic" tools such as workbooks and scientific laboratories. In most countries in Europe, multimedia devices are common at school. Technical equipment and teaching tools are available and can be defined, regardless of their update status, as adequate in supporting specific type of teaching plans. Interactive whiteboards, lap-top computers, tablets and smartphones are examples of precious devices to support lessons. Texts, images, videos, quizzes and serious games are very effective to catch the students' attention and facilitate learning in a modern way, strictly connected to everyday life. To build environmental knowledge together with teachers, students have to be involved in the classroom, and internet is perfect to this purpose, if used in a smart and thoughtful way. Students surf continuously on internet, spending a lot of their time at home, but they very often use the WEB only for social network and online games and not for learning. They need a guide to use the WEB in a responsive way as a host educational support.

For the developing of a secondary school, teachers and students e-Training Platform we design, structure, develop and implement a **Training course for teachers** to the use of the multimedia platform.

Since several international research institutions (including INGV and other partners of the ENVRIplus project) already offer web-based services and materials to support school activities, our effort is the design of a user-friendly website that is in line with the targets we have updated with what European science teachers are looking for and that offers a wide range of teaching 'modules' and incentives for students designed to implement the scientific key competences at school.

The work has been developed through steps summarized in the next section.

2. Method

The design and implementation of the content of the e-Training Platform require different types of information and are based on the following fundamental elements:

I. Selection of RIs cross-cutting appealing scientific subjects: the subjects selection is crucial in catching the interest of the students and at the same time communicating the innovative approach of the RIs;
II. Good Practices Principle adoption: to provide guidelines to help trainers and teachers to get as much as possible from their students;
III. Obtaining the status of Earth Science teaching in European schools: the knowledge of the different curricula is necessary to be effective and inclusive;

IV. Accessible web-based multimedia resources: resources and tools proposed must be freely accessible online or offline to ensure equal opportunity to different school systems despite the economical condition of each country;

V. Teacher Questionnaires: a simple tool to understand specific teaching situations and consequently adapt educational content.

2.I. RIs cross-cutting scientific subjects

We plan the e-Training Platform as an educational facilitator for teachers and students training on issues that fit the RIs main fields: to promote RIs and to increase the awareness of the earth system complexity and environmental challenges for its preservation and sustainability. First of all we selected the most proper themes:

- the scientific method;
- biodiversity and climate change (storms and floods, landslides, ocean acidification, biodiversity loss, ice cover reductions...)
- living with natural phenomena (earthquake, volcano eruption, tsunami), and associated risks (environmental contamination and pollution);
- resources and sustainability of our planet (fishery, food, energy...).

2.II. Good Practices Principles

To achieve a reference teaching structure, we have also identified the basic guiding principles used to improve the content of the e-Training Platform. Good practices motivate, engage and prompt student to learn and achieve competence. Good practice teaching strategies represent an inherent part of a curriculum that exemplifies the connection identified in education research. The actions are designed to develop thinking and problem-solving skills through integration and active learning. Relationships are built through opportunities for communication and teamwork.

Table 1. *Good Practices Principles, description and Teachers/Students (T/S) involvement.*

Principle	**Note/short description**	**T**	**S**
Create active participants rather than passive observer	Laboratorial, technological resources in classroom daily practices, hands-on activity	✓	
Start from near and real case	Identify topics, develop questions, plan inquiry, divide tasks research information and share learning process and content	✓	✓
Start from key-concept	Conceptual framework: change, global, evolution	✓	✓
Connect the use case to the school subjects	Connectivity and interaction among disciplines	✓	
Increase individual consciousness and involvement	Empower students to take ownership of their learning	✓	✓
Include a 'wiki-like' section	Empower students to exploit and share their knowledge	✓	✓
Include competitive environment/actions (e.g., game)	Empower commitment and provide gratification	✓	✓

Create a repository of images, *url* links	Empower students to exploit and share their knowledge	✓	✓
Be inclusive in respect to learning disability	Raise self-esteem and reciprocal respect	✓	
Stimulate students direct production of dissemination material	Increase motivation through exploring individual interest	✓	
Provide tutorials	Create a comprehensive guide	✓	✓

Good Practices Principles description:

- Stimulate active participation rather than passive observation, favouring activities that include the use of laboratory, technological resources in classroom daily practices and hands-on activity. Students should interact with others to identify the meaning in newly introduced ideas and concepts, and connect this meaning to their knowledge. Active learning is fast-paced, fun and personally engaging because students have the opportunity to try things out, use their senses, ask questions and discuss with others. Assignments should be designed to draw upon the skills and knowledge that students have or must acquire.
- Start from real cases that deal with issues close to or directly affecting the students daily lives (such as the possible occurrence of an earthquake in a high hazard area). This approach may stimulate students to identify topics, develop questions, with further inquiry, share tasks in group work, and in researching and sharing information.
- Start from key-concepts, that may provide a conceptual framework. The conceptual framework includes concepts such as change, global, evolution, diversity, interdependence, values and perceptions and sustainable development.
- Connect the use case to school subjects by establishing a connectivity and interaction among disciplines.
- Increase individual consciousness and personal involvement in phenomena that affect society, such as natural hazard, and empower students in taking ownership of their learning process.
- Choose visual content over text content. Visual content has become increasingly popular, coming in many forms. The most common examples are images, videos, slideshows or info graphics. Studies on visual content show that visuals are processed 60,000 times faster than text. Images are better at grabbing the attention of the student in a more effective with respect to text in communicating key information.
- Include a 'wiki-like' section, editable by all registered users, that allows users to create, edit, share and exchange documents directly on the live site, without having to access the full-featured administration interface.
- Include competitive environment/actions, i.e., actions that are focused on the environment, such as games and edutainment that is explicitly designed for educational purposes. This approach can be used to balance a more traditional study of curricula topics with gameplay. Edugames satisfy the important need to learn and have fun, to have passionate involvement, structure, motivation, ego gratification, adrenaline, creativity, social interaction and emotion in the game itself while the learning takes place.
- Create a repository of images, *url* links, to enable students to find their own information and connections, expanding the extent of knowledge also on the basis of personal interests and inclinations and to exploit and share their ability and competence.
- Be inclusive in respect to learning disability. Inclusivity welcomes a full range of human diversity

with respect to ability, language, culture, gender, age and of other forms of human differences. Principles of inclusion will be taken in account to raise self-esteem and respect.

- Stimulate students direct production of dissemination material. Increase students motivation through exploring individual interest and the direct production of multimedia equipment, lectures and presentation, graphic tools, posters and videos, interviews.

- Provide tutorials, to create a comprehensive guide that is complete and easy to use. These tutorials will help the student identify her/his needs, organize content, information, and to find and cite sources.

2.III. Earth Science teaching in European Schools

We developed an analysis on European schools based on the way the different nations plan their educational strategies to increment key scientific competences. The strategies that improve the quality of education take into account the needs of both the individual and Society. This complex process enhances the acquisition of general key competences, and, in particular, of scientific competence (fig.1). Our analysis shows that national strategies specifically devoted to *Science* are not very common in Europe, but we have also found two good examples in the United Kingdom (Wales) and in the Netherlands. Most of the countries that have developed national strategies for scientific key competence have also put in place various large-scale initiatives. In the absence of national strategies, large-scale initiatives are sometimes present to promote scientific key competences. In many European countries the national strategies cover several key competences, mixing science and other subjects.

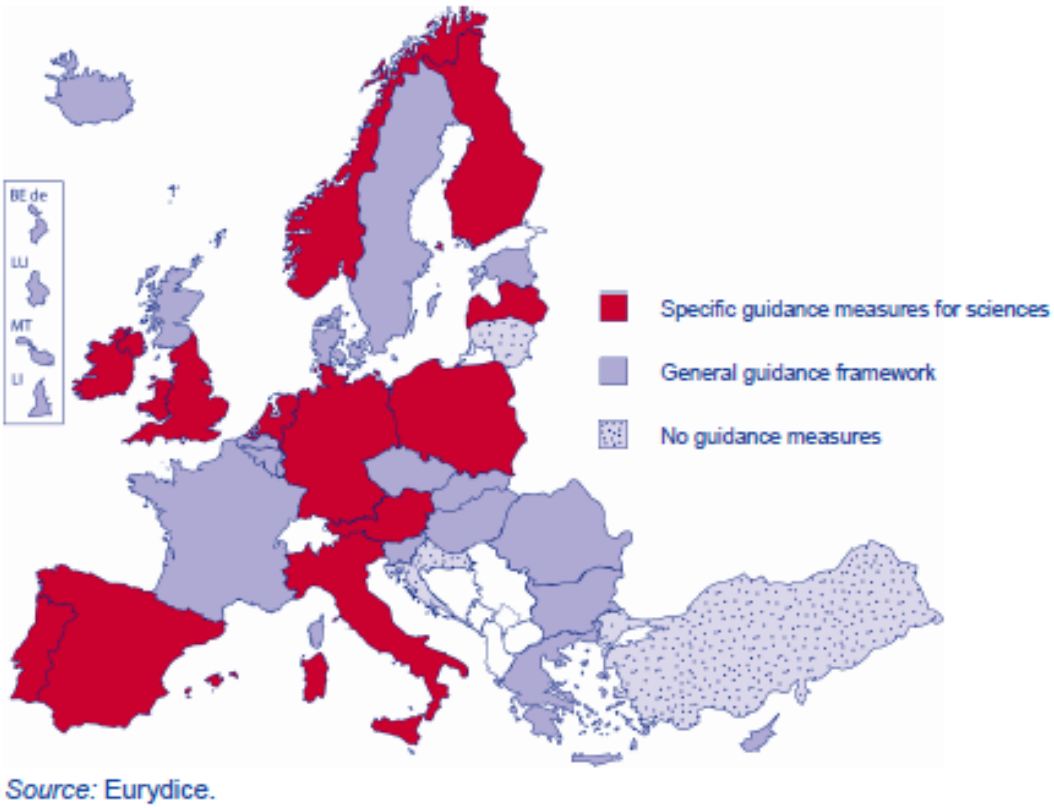


Fig. 1. *Specific guidance measures to encourage careers in Science (ISCED 2-3, Lower and Upper secondary education), 2011/12.*

Generally, European countries encourage students to pursue further study to maintain a sufficient number of graduates in scientific fields and to increase interest in scientific careers, at the same time redressing the gender imbalance.

The analysis of the different national strategies to stimulate scientific key competences in the European schools, indicate that European countries have adopted different approaches, also regarding scientific competences. A common aim in the strategies is to promote a positive image of *Science*, to improve scientific knowledge, to raise students' interest in science subjects and, consequently, increase the number of graduates in these fields providing future employees with the skills they will need.

National plans might concentrate on a single competence or on several key competences. In documents that define strategy, *Science* is sometimes not considered as a separate competence, but it is included in a *Mathematics and Science*, or *Mathematics, Science and Technology* competence.

Most commonly European educational strategies are aimed at cultivating digital competences, integrating ICT in teaching and learning, also providing training for teachers and spread the ICT infrastructure in schools. Almost all European countries have a specific national strategy related to *digital competences*, encompassing several areas such as e-Government, infrastructure and broadband connectivity, or exclusively on ICT in education.

2.IV. Accessible web-based multimedia resources

We have investigated the educational resources that are already available on the web in order to design a new effective multimedia tool. We find, select and collect the available resources on the basis of the main selected topics, scientific method, biodiversity and climate change, living with natural phenomena, and resources and sustainability of our planet.

To create the categories and organise gathered information, a first phase of the study was a quick mapping of the educational resources available online, in the reference websites. We decided to include educational resources that satisfy all the following criteria:

- Includes science topics
- Developed by a research infrastructures involved in ENVRI plus
- Available online or downloadable (easy to be reused in other context)
- Available at least in English or European language

The final data collected are listed in an excel file (Appendix A), that is subdivided by a set of categories:

- Owner
- Type of tool (website, mobile app, teaching notes, educational game, quizzes, etc.)
- Goal
- Language
- Methodology
- Online/offline
- Target (teacher or student)
- Name and description of the resource
- Description
- URL

For each category in the table (excluding descriptive categories), we selected a limited number of options, to facilitate search and selection of data (through filters). All data entered into the excel

file have a direct web link, for more detailed information.
The categories that compose the table are described below:

- Owner

With this category we define who developed or made available the resources

- Type of tool

With this category we have defined the type of resources selected. This category is one of the most important since it allows the understanding of the way in which organizations and agencies "translate" their data and content for educational purposes. This class includes the following sub-categories:

- Video
- Videogame
- Interactive application
- PDF
- Website
- Mobile app
- Quizzes
- Educational game
- Paper
- Live/Classroom activity
- Lesson plan/teaching notes

- Goal

It defines the pedagogical and didactical objectives of the selected resource

- Language

Self explanatory

- Teacher or student

This category allows us to distinguish the educational resources that support the teacher's work from those that can be used autonomously by the student

- Teacher
- Student
- Teacher and Student

- Methodology

This category defines the educational resource methodology chosen by the organisation. This group can help us discover if there is a commonly used international and cross-topic approach and, eventually, its effectiveness.

- Edutainment
- Learning by doing
- Teacher support
- Video learning
- Online learning
- Problem solving
- Cooperative learning
- Classroom activity

- Online, offline

This category is useful to distinguish resources that can or must be used online from those that can be downloaded or, in any case, can also be used offline

- Online
- Offline

- Online, offline

- Name and short description

A brief description of the tool is aimed at providing a first idea of what it does and how it works

- Link

Selected data is linked to the resource analysed, in order to allow a directly review of its contents.

2.V. Questionnaire for the teachers

Finally, we prepared a questionnaire to improve and better fit the content of the e-Training Platform. The questionnaire (Appendix B) is addressed to teachers in order to catch their needs and help in feeding the platform with targeted contents.

The first part of the questionnaire focuses on objective information about the formal, quantitative and qualitative position of science class in schools, and the content and methods of teaching in different countries:

Part I general information
Country
Teaching area
School level and type
In how many years is the high education cycle organized?
At which age do students begin their higher education and at what age do they complete their curriculum?
How many hours per week are for geosciences ?
Is there any didactic relation among the cycles (primary and secondary)?
Is there any relation with other subjects in the teaching approach? Are there any subjects or topics particularly related to geosceinces?
What academic degree is required for teaching geosciences?

The second part of the questionnaire investigates personal teacher experiences and their views on what can improve training offer about environmental science lessons and courses:

Part II specific geosciences teaching
In the geosciences study, what are the prevailing topics? e.g.: Earth interior, plate tectonic, atmosphere and climatology, seismology, geomorphology, hydrography, volcanoes etc…
In the geosciences study, what are, (if any) the prevailing human geography topics? e.g. Natural hazards etc…
In the geosciences curriculum, is the own country's and/or Europe's regional aspects discussed?
What are the main educational goals related to geosciences specified in the cycle curriculum? e.g.: environmental education Any new approach or topics has been recently introduced in the curriculum? If the answer is yes, specify which ones
Which are the most used tools to teach geosciences? Traditional and/or new multimedia technologies
What are the most typical assessment methodologies? e.g. oral presentation, test, quiz, complex evaluations, etc…
Do you use any specific tools in your lessons, as laboratorial experiences, hands-on activity, field experience ……?

The third part investigates on tools teachers have and use and on what they would have:

Part III what you have and what would you need to have
Based on your experience: **what are the tools available in the school, for teachers? for students?** **which are the most useful and efficient tools for teaching geosciences?** **what would you think is the need to be more effective in teaching?**

This part is the one from which we expect results useful for the implementation of the e-platform we want to achieve within this task. The administration of the questionnaire is just started. The distribution, based on the GIFT (Geoscience Information For Teachers, http://www.egu.eu/education/gift/) network and on the collaboration of ENVRIPLUS RI's partners, will reach a large sample of EU teachers.

3. Results

Data collected on the educational resources that are already available on the web are listed in a database that is rich in target scientific contents (Appendix A). Data was organized in a number of excel sheets, each dedicated to one of the ENVRIplus themes.

We have studied more than one hundred web sites and then selected just the useful ones. From a first review we highlighted the following facts:

- The **scientific approach topic is the least covered subject** among the scientific topic covered in the sites. A dedicated investment is necessary to produce an ad-hoc tool.
- **Educational games are used just to teach disaster related topics**, whereas they are, in our opinion, the most useful tools given that the interest for these topics is already very high.
- **Earth sustainability resources** have been realised in most of the cases **just** as a support **to the teachers**, for example as teaching notes.

The next step is the careful selection of the huge amount of material that is available. This is an important and thoughtful phase, since this material needs to be selected with great care, especially online games and 'edutainment'. Resources such as these, need to be carefully integrate with education of curricular topics to avoid a superficial approach. This project, mainly aimed at secondary level education, wants to appeal to a young person that soon will have a more active role in society, by making them aware on the way they spend their time online.

The actions taken for the developing of Task 15.5, revealed a treasure of teaching materials already present on the web. To design an innovative and useful teaching tool we have planned an ad hoc e-knowledge platform (Appendix C).

The learning portal we have in mind will follow the look&feel of the ENVRIplus website and will act as a main container for all educational resources we have found in the first part of our work. The portal will be first developed in English, Italian and French and in a second stage of the project will be then translated also in Spanish and German. The Multilanguage approach is considered as essential since the main targets of this portal are the European secondary schools and most of all their teachers and students.

The home page of the portal will provide an overview of the purpose of the website and a quick look of its content, but most of all it will allow to directly search for a specific learning object, simply choosing keys from predefined categories (fig. 2).

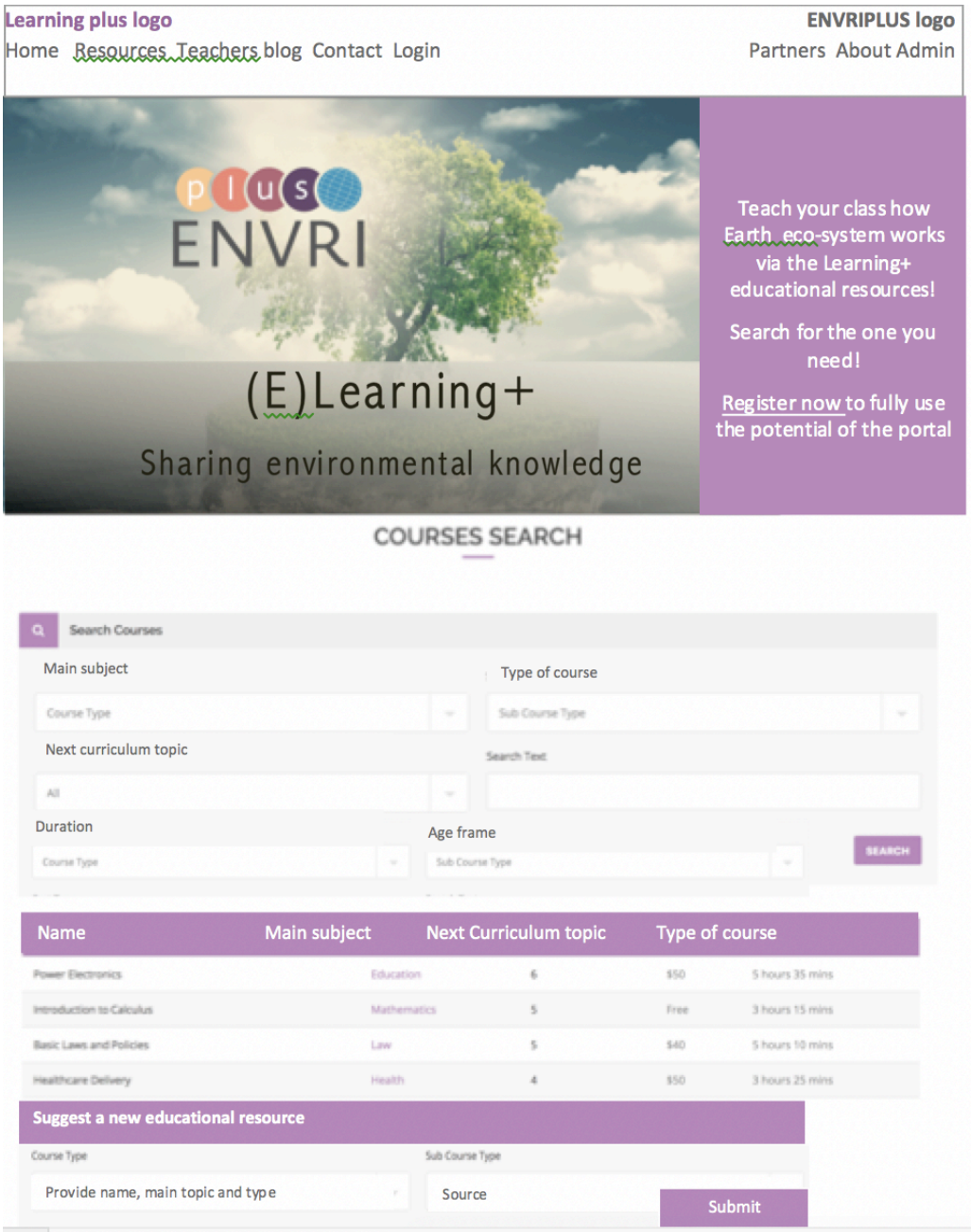


Fig. 2 - *Draft of the layout of the home page.*

A presentation of the front-end and the back-end of the portal are in Appendices D and E, respectively. The home will also list the newest resources added on the portal and some example of use of the resources discussed in the blog. The blog will also be used to inform teacher about relevant information event about environmental education an as a tool of best practices exchange.

Selecting the search button the users will receive back a list of the most relevant courses matching the chosen criteria. The list will be highlighted by the name of the course, a brief abstract, its duration and type and main topic of reference.

The name of the course will be a link to access the resource. The course sheet will report the following information: image of reference, name; main subject; next curriculum topic (useful

most of all in case of topic not directly taught at school, as biodiversity); age of reference (14-16, 16-18); type of resource (audio, video, ppt, doc, animation...); duration of the proposed activity/lesson, raking of the resource from the teacher and eventual feedbacks about the validity of the course provided both by teachers and by the Envriplus team. The portal contents will be organised in a main and a secondary navigation.

We report in fig.3 a draft of the database scheme we can derive from the requirements. This is just a draft that will be improved and enriched in the development phase:

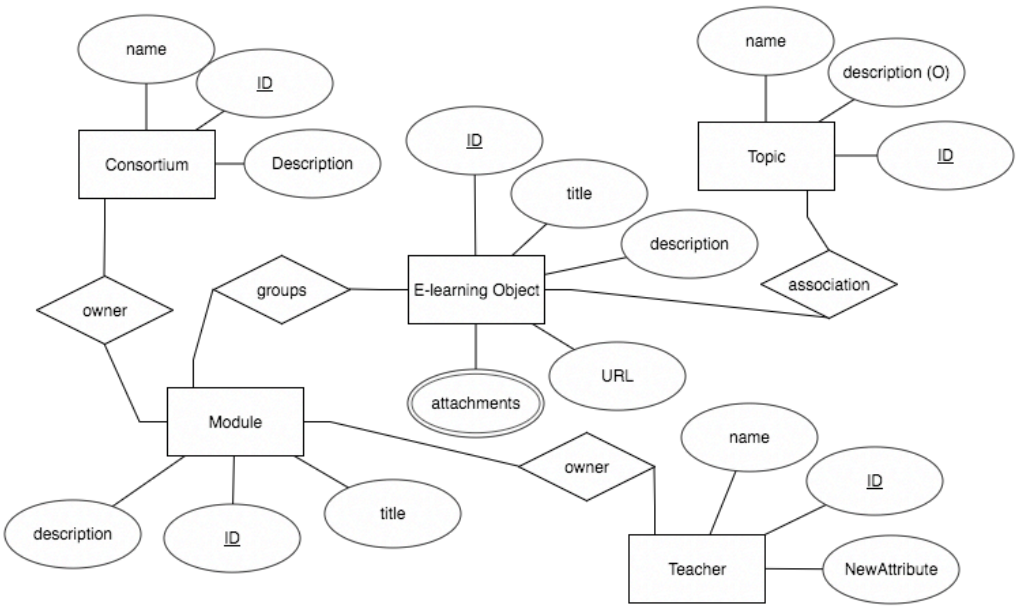


Fig. 3 - *Draft of the database scheme.*

We plan to use an open source set of tools to build the IT architecture needed to fulfil the aims. MySQL is the world's most popular open source database, with its proven performance, reliability, and ease-of-use, MySQL has become the leading database choice for web-based applications, used by high profile web properties including Facebook, Twitter, YouTube, and all the major web applications. On top of that we have to create an application layer to manage and update the learning objects. This application layer will be based on a WordPress customization for learning with the addition of a content authoring tool called H5p. This solution is totally based on open source technologies and it allows graphical customization as a normal website. This platform allows to create different types of websites. There are thousands of plugins, widgets, and themes that enable the developer to build just about any type of website, also a learning management system. The combination with H5p is a plus that the platform can offer to the users that can easily create contents for their learning management system. The customization of the WordPress for educational purposes will provide features for creating online courses, to manage any kind of lessons, to create quiz, to host videos, to develop an assessment system, to track course progress etc. The final architecture will allow us to build an Educational system that uses WordPress, with the Sensei plugin, H5p to build original learning objects and WPML for the translation of the multi-language site. To get this system to work

correctly we also need to define the server infrastructure we need to house it. Since dedicated servers are almost always expensive it's generally a good idea to start with a VPS , virtual private server, until the overload of the platform is increased so much that needs to be balanced out. We can then summarize the application technologies with a full stack that comprehends a VPS server, where an Linux based operating system resides, e.g. Ubuntu, Debian. The web server installed should be Apache being an open source web server able to compile PHP applications.

The final implementation will benefit by functionality test and validation that will be performed also in collaboration with potential users and beneficiaries.

4. Discussion

We aim to help teacher to be able to create, teach and manage (in a word "to design") their own didactic units arranging the teaching resources on the ENVRIplus issue. Starting from suggested learning paths, teacher may overcome the lack or scarcity of these issue on school textbooks and programs. The structure, service and equipment are implemented of the scientific contents of additional hosting kits (mobile apps, videos, interactive and online serious games, quizzes, lesson plan/teaching notes, video lessons, didactical video series, school labs and other classroom activities, ...) and will be suitable in the ENVRIplus learning portal. The website will be "Learning+: Sharing Environmental knowledge"(hereafter referred as to Learning+), a science information network to connect the ENVRIplus project and the secondary schools communities addressing major topics and challenges of Research Infrastructures. The Learning+ platform is a large scale initiative to promote the scientific key competences concerning a long-term sustainability plan aiming at life-long learning for all secondary level of education and also making careers in science more appealing. Learning+ will introduce educational innovations improving students' motivation and will provide materials rich of activities targeted in available training for (i) teachers favouring scientific knowledge transfer to students and for (ii) students improving skills shortages in scientific and technical topics. Thinking about the relationship with colleagues who teach the same or other subjects and the difficulties to coordinate and harmonize every teaching method with others, we will implement the ENVRIplus e-Training Platform with a blog focusing on teacher recruitment, enhancement and enrichment activities, curriculum development and infrastructure. This will be another tool to strengthen cooperation with schools, teachers' experiences and didactic units and protocols exchange.

The results obtained from the questionnaires we designed for teachers, will provide more content material for discussion and implementation of the Learning+. This structure will make a top class-learning portal, fit for the purpose it has been intended: share environmental knowledge.

CONCLUSIONS

Secondary School level education on environmental issues related to the Research Infrastructures (RIs) represent a valuable charge in Europe, especially regarding the scientific themes concerning resources and sustainability of our planet (fishery, food, energy...), biodiversity and climate change (storms and floods, landslide, ocean acidification, biodiversity reductions, ice cover reductions...), living with natural phenomena (earthquake, volcano eruption, tsunami) and associated risks (environmental contamination and pollution).

The elaboration of a long-term training plan is very important to spread best practices and tools for teachers and students on environmental issues dealt through the RIs. Task 15.5 is working to develop the ENVRIplus e-Training Platform for multimedia education of Secondary School level to increase the awareness of the Earth System complexity and Environmental challenges, for

Earth preservation and sustainability. The platform should help teachers and, consequently, students in training on RIs. Our educational facilitator of science topics within the European schools is under construction as part of the training activity for teachers and will provide materials for training, e-learning and courses targeted at teachers to help them in scientific knowledge transfer to students.

The actions undertaken for the development of Task 15.5 introduces a first proposal of a learning-portal ("Learning+: Sharing Environment knowledge") to provide educational resources as the main part of a training course for teachers. Currently in Europe there are really few websites aiming at disseminating educational resources in environmental topics, so that we are working on the realization of a more appealing and usable portal, to stimulate learning of STEM (science, technology, engineering and math) topics. A thorough analysis of what already exists in the web is in progress and the results will be conveniently inserted inside the platform. To reach the goal imputs and continuous feedback will be provide by interconnection with users, both teachers and students.

IMPACT ON PROJECT

The ENRVIplus consortium increases efforts to ensure that all communities have access to an appropriate scientific and technological tool reducing skills shortages in selected issues dealt through the RIs. This should improve motivation in learning Science, helping teachers to introduce educational innovations that encourage students to consider scientific careers.
The proposed learning-portal will provide educational resources as main part of a training course for teachers. The portal will have two main goals:

- help the teachers to easily find an educational resource on a specific environmental topic he/she wants to discuss in the classroom;

- help the Envriplus infrastructure staff to create new learning resources to fill the gap in the topics not yet covered and to easily publish the new items on the portal.

The e-Training Platform we are designing would represents an educational facilitator for teachers and students training on issues that fit the RIs main fields. The aim is also to promote RIs and to increase the awareness of the Earth System complexity and Environmental challenges.

IMPACT ON STAKEHOLDERS

Schooling, Science and Culture are strictly connected. Through the school, students may gain a global perspective on scientific issues related to their personal lives and the impacts of their actions on the environment. Increasing motivation to learn Science is important not only for the general improvement of performance at primary and secondary level and for encouraging the choice of scientific subjects at tertiary level, but also to enhance responsiveness for Earth preservation and sustainability. Moreover, maintaining high-level skills in science fields is crucial to the economy. The economic development of nations is increasingly projected in search of new green and sustainable technologies.
Secondary Science education has a key role in the ever-growing realization of the need for scientific understanding. To involve students, science education must be more attractive. The level of motivation to learn Science is an important factor of student achievement in school. Moreover, young people's interest in scientific disciplines is a strong determinant of career choice in related fields. The e-Training Platform we are designing can support this virtuous process. Scientific thought support decision-making and make citizen to be able to take an active

part in decisions that affect all our communities. A trained and informed society can be a continuous stimulus and operational support for efficient stakeholders' actions.

REFERENCES

http://eacea.ec.europa.eu/education/eurydice

APPENDICES

Appendix A - List of multimedia resources

PROPRIETARIO	PAESE	NAME	LINK	NOTE	Info proprietario	Note Gio	Appunti Gio	Age of reference	Name of the course	Brief abstract	Duration	Type	Main topic of reference	Caution	Blog
UCAR	USA	learning zone	https://scied.ucar.edu/teachers	free			corsi x insegnanti,blog, events/hiaghlighgth, giochi memory o sorting x ragazzi								
UCAR/NCAR	USA	Meted education resources	https://www.meted.ucar.edu/training_detail.php?topicSorting=5&languageSorting=1&module_sorting=skillLevel&o	login needed			lezioni								
Teacher without borders	PROGETTO GLOBALE: Afghanistan, Bangladesh, Brazil, Burundi, Cameroon, China, Ghana, Haiti, India, Kenya, Mexico, Nigeria, Pakistan, Rwanda, South Africa, Suriname, Turkey, Uganda and the United States of America.	Earthquake Education Curriculum	http://s3.amazonaws.com/inee-assets/resources/TWB-earthquake-package_small.pdf	free	Teachers Without Borders (TWB) an international non-profit organization launched in 2000, connects teachers to information and each other in order to close the education divide.	lesson conten	guida x insegnanti con 12 lezioni.		Earthquake Education Curriculum	A course packet of lessons developed for Grade Levels 6-12. The pre-assessment activity creates a means to do this. Lessons 1-6 target physical processes related to earthquakes. Lessons 7-11 focus on hazards associated with earthquakes and mitigation strategies. Lesson 12 provides a unique means for reinforcing concepts covered during previous lessons. For Celebration Day, held after completing all lessons, students' accomplishments are acknowledged. The post-assessment activity, held a few weeks after the Celebration Day, provides a means for assessing students' learning and for receiving feedback from students to improve future course curriculum.	The lessons 1, 4, 6, 7, 10 are designed for one-hour class period. The lessons 2, 5, 8 last three one-hour class periods over several days, or a three-hour lab period. The lesson 3 last two one-hour class periods over two days, or one two-hour lab period. Unlike previous lessons, Lesson 8 begins with a Tabletop Exercise and ends with Post-Exercise Discussion. Lesson 9: The tabletop exercise is expected to take about 45-60 minutes to complete. The hands-on activities are expected to take 2-3 hours total. The Tabletop Experiment follows with 3-day activities. Lesson 11 allows 2 two-hour blocks for this activity. Lesson 12 allows 3 to 4 two-hour blocks for this activity.	A teacher's guide to Earthquake Science, Hazard and Mitigation Strategy with **hands-on and interactive scientific lesson plans**	What is known about earthquakes, earthquake hazards, and hazards preparedness.	Prior to the start of lessons, it is important to assess students' knowledge of earthquakes and hazards.	
INGV	ITALIA	Earthquake how and why	http://www.edurisk.it/edition/earthquakes-how-and-why/	free											
USGS	USA	USGS Educational Resources for Secondary Grades	http://education.usgs.gov/secondary.html	free		es. https://walrus.wr.usgs.gov/elnino/									
IRIS	USA	IRIS education and public outrech	http://www.iris.edu/hq/programs/education_and_outreachit			http://www.iris.edu/hq/inclass/animation/building_resonance_the_resonant_frequency_of_different_seismic_waves	video esplicativi. seismic monitoing								
OSU	USA	OSU teaching resources	http://volcano.oregonstate.edu/teaching-resources	free		http://volcano.oregonstate.edu/volcano-games	volcano games, lessons, adventure and fun								
Cyclone Center	USA	Cyclone Center	https://www.cyclonecenter.org/	free			talk to cyclon center, risposte multiple								
TES	UK	TES	https://www.tes.com/.	a pagamento		https://www.tes.com/teaching-resources/blog/secondary	Encouraging independent study at secondary. risorse a pagamento https://www.tes.com/teaching-resource/flooding-6069627								
ISDR	PROGRAMMA NAZIONI UNITE	Stop disasters!	http://www.stopdisastergame.org/en/playgame.html	free	ISDR stands for International Strategy for Disaster Reduction The Strategy brings many organisations, universities, institutions together for a common objective: reducing the number of dead and injured by disasters triggered by natural hazards.	http://www.stopdisastergame.org/en/isdr.html	problem solving, ruolo	Aimed primarily at secondary level education, the game is delivered using flash 7 via the web to allow access to as many people around the World as possible.	Stop disasters!	This game tackles the very real issue of mitigating the impact of natural disasters around the World to save lives and reduce the financial impact that natural hazards cause when they turn into disasters. The aim of this game is simply to raise awareness of how disasters affect people every day and how often very simple measures can save many lives. There was a vast amount of information to absorb and try to distil into a 'Sim City' style game in such a way that players aren't bombarded with facts but can discover information as they try to achieve their goals. Playerthree designed and built the whole thing, including the associated website to provide support, information and score tables for the game.		videogame (disaster simulation games)	Disaster prevention awareness on a grand scale	This game requires Macromedia Flash Player 7 to run correctly.	
Smithsonian (Funder: US Department of Education)	USA	DISASTER DETECTOR	https://ssec.si.edu/disaster-detector	free	The Smithsonian Science Education Center (SSEC) works to improve the teaching and learning of science for K-12 students throughout the United States, and ultimately, throughout the world. It develops innovative new curriculum, conducts Summer Science Academies for Teachers at the Smithsonian museums and labs, and fosters science education leadership among school and community leaders.	Good Thinking! The Science of Teaching Science. Each episode is grounded in findings from peer-reviewed science and education. https://ssec.si.edu/goodthinking	1) KIT (a pagamento) per tutti i gusti, lezioni e video o parte di essi gratis: **https://ssec.si.edu/explore-our-curriculum-resources?f[0]=field_subtype%3Acurriculum** 2) EROSIONE: https://ssec.si.edu/erosion di cui sono attualmente scaricabili le lezioni 1, 4 e 8 e sarà disponibile in estate 2017. 3) https://ssec.si.edu/sites/default/files/ChemicalReactions_StudentGuide_FinalProofs.pdf, https://ssec.si.edu/explore-our-curriculum-resources. Science Starts With a Question: Chemical Reactions (Student Guide), esperimenti e molto	*Disaster Detector* is intended for use in the classroom or at home and is aligned to national science standards for middle school but great for players of all ages. The game features printable reports.	Disaster detector	In the game, players must protect the citizens of five cities by helping them prepare for natural hazards, including tornadoes, volcanic eruptions, earthquakes and hurricanes. Players learn how to analyze current and historical data using tools such as Doppler radar, anemometers, barometers, and seismometer. The player must decide what defenses will best equip the city. For example, a tornado requires equipping a home with Building Straps and Storm Shelters, while an Earthquake might call for Building Frames and even Support Centers for the city.		videogame (game details)	How to analyze and interpret data on natural disasters in order to mitigate the effects of those disasters and also forecast future catastrophic events	**Platform:** Web, iOS, Android (Free)	STEM visions Blog: https://ssec.si.edu/stemvisions-blog

Appendix B - Questionnaire for the teachers

PART I GENERAL INFORMATION

Country:	
Teaching area:	
School level and type:	
What is the duration of secondary education cycle?	
At which age do students begin their secondary education and at what age do they complete their curriculum?	
How many teaching hours per week are devoted to geosciences?	
Is there any didactic relation among the cycles (primary and secondary)?	• Low • Average, • High • Very high
Are there any subjects or topics particularly related to geosciences?	
Which academic degree is required for teaching geosciences?	• Higher education • Master's degree in a related geoscience topic • Master's degree in Education • Specialized course in Education

PART II SPECIFIC GEOSCIENCES TEACHING

In the geosciences study, what are the prevailing topics? **You can select more than one topics**	• Earth interior • Plate tectonic • Atmosphere and climatology • Seismology • Geomorphology • Hydrography • Volcanoes • Other
In the geosciences curriculum, is your own country's and/or Europe's regional aspects discussed?	• Just my country • My country and Europe • Just Europe • Europe and World
In the last two years, have been there some new approach or topic in geoscience curriculum? If the answer is yes, specify which ones.	• Yes ..... • No

Which are the most used tools or resources to teach geosciences?	• Traditional approach as books and my teaching notes • New multimedia technologies • Labs lessons and hands-on activities • External experts lessons • Outdoors experience • If other, please specify ……
Which are the most typical assessment methodologies? e.g.	• Oral presentation • Test • Quiz • Complex evaluation • If other, please specify ……
Part III what you have and what would you need to have	
Based on your experience, which are the tools available in the school to support scientific teaching?	• None • Smart-board • Online resources • Edugames • External expert lessons • Labs • If other, please specify ……
Based on your experience, which are the most useful and efficient tools or resources for teaching geosciences?	• Traditional approach as books and my teaching notes • New multimedia technologies • Labs lessons and hands-on activities • External experts lessons • Outdoors experience • If other, please specify ……
What would you need to be more effective in teaching that would really help you to improve geosciences teaching?	• Labs lessons and hands-on activities • Edu-games • External experts lessons • Outdoors experience • If other, please specify ……
Do you use a digital resource to find new educational tool for environmental topics?	Yes, I use:….. No

Appendix C- Introduction to the e-knowledge platform


ENVRI
Introducing the
knowledge platform:
(E)Learning+
Sharing environmental knowledge

FOREWORD

ENVRIplus is a Horizon 2020 project bringing together Environmental and Earth System Research Infrastructures, projects and networks together with technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research. One of the aims of this project is to disseminate knowledge on environmental topics, focussing attention on European secondary schools.
This document wants to introduce a first proposal of a learning-portal to provide educational resources to the teacher and the students.
Currently in Europe there are really few websites aiming at disseminating educational resources in environmental topics. As already highlighted in our report on educational resources we can take as a starting point of reference for our project the ESERO UK website, but we would like to realise a more appealing and usable portal, to stimulate learning of STEM topics.

THE ENVRIPLUS LEARNING PORTAL

The learning portal we have in mind will follow the look&feel of the Envriplus website and will act as a main container for all educational resources we have found in the first part of our work. The portal will be first developed in English, Italian and French and in a second stage of the project will be then translated also in Spanish and German.

The Multilanguage approach is considered as essential since the main targets of this portal are the European secondary schools and most of all their teachers.

As a first proposal we suggest to call the website **Learning+: Sharing environmental knowledge.** This name helps on one side to immediately connect the portal to the Envriplus project and on the other side to give an exact and clear message on its content.

Once the name of the portal will be approved an original logo will be then designed to represent this portal and its aim.

The portal will have two main goals:

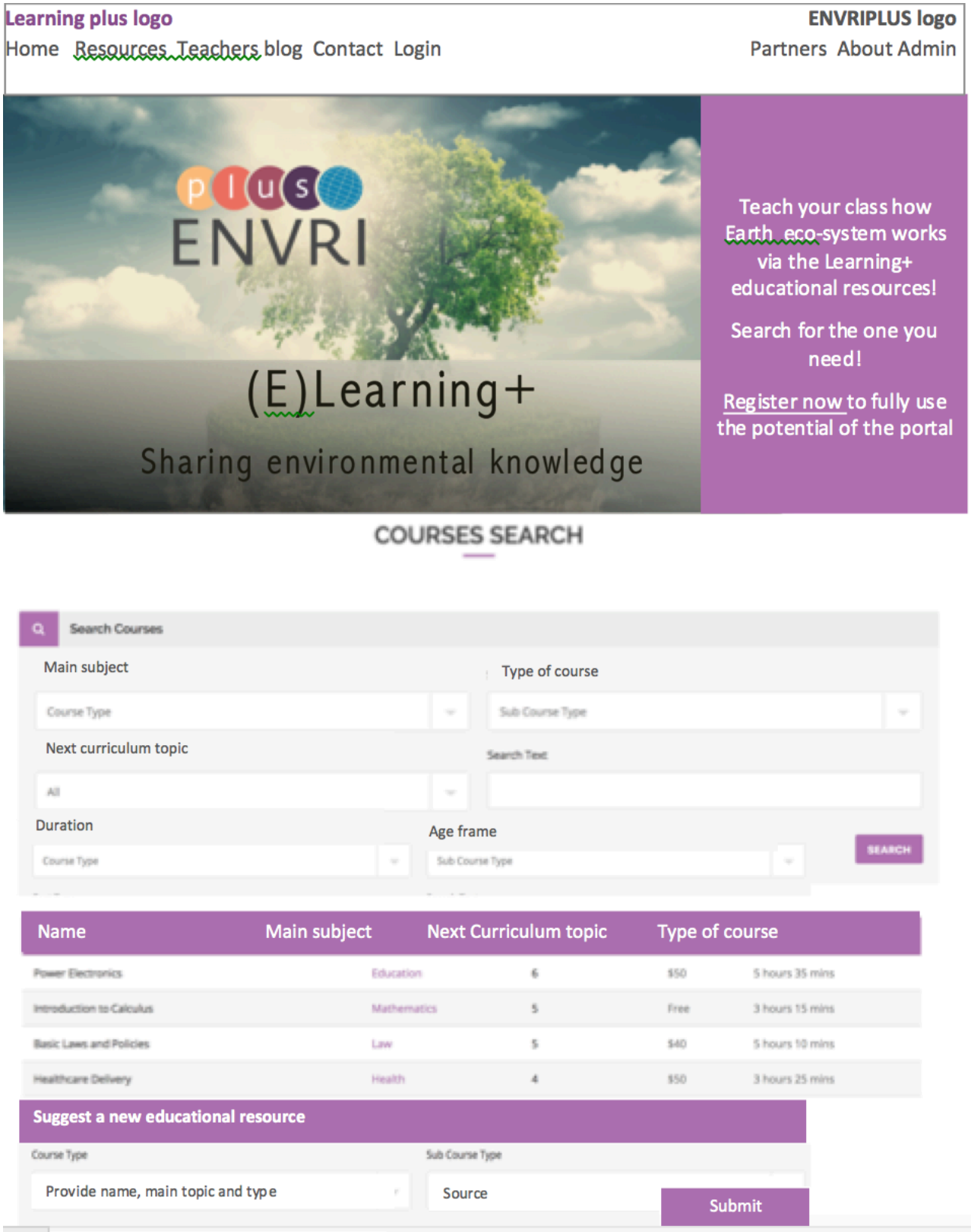
- Help the teachers to easily find an educational resource on a specific environmental topic he wants to discuss in classroom
- Help the Envriplus infrastructures people to create new learning resources to fill the gap in the topic not yet covered and to easily publish these new items on the portal

So on one side the target of the portal will be the teachers of the European secondary schools, but on the other side the Envriplus people themselves will be a main target, as they will have at their disposal a very easy tool to create and disseminate knowledge.

To satisfy these goals and provide dedicated services to both the targets we will create a private area for the Envriplus people that will be used to create content and publish new resources, while the front end of the website will be targeted just to the teacher.

The home page of the portal will provide an overview of the purpose of the website and a quick look of its content, but most of all it will allow to directly search for a specific

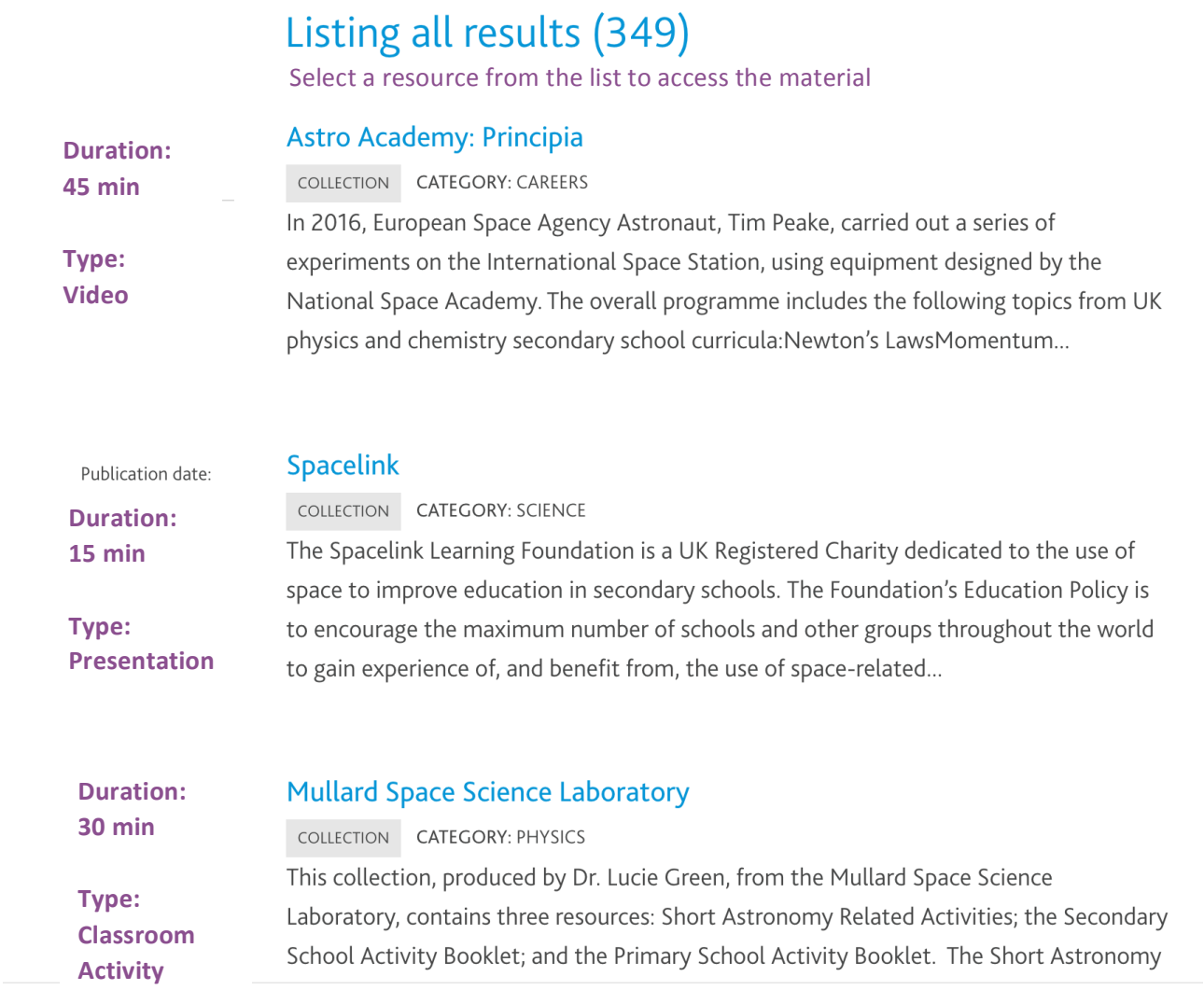
learning object, simply choosing keys from predefined categories as shown in the drafted layout below:



The home will also list the newest resources added on the portal and some example of use of the resources discussed in the blog. The blog will also be used to inform teacher about relevant information event about environmental education an as a tool of best practices exchange.

Selecting the search button the users will receive back a list of the most relevant courses matching the chosen criteria. The list will be highlighted by the name of the course, a brief abstract, its duration and type and main topic of reference.

An example of this list is provided below:



The name of the course will be a link to access the resource. The course sheet will report the following information:

Image of reference, Name; main subject; next curriculum topic (useful most of all in case of topic not directly taught at school, as biodiversity); age of reference (14-16, 16-18); type of resource (audio, video, ppt, doc, animation…); duration of the proposed activity/lesson, raking of the resource from the teacher and eventual feedbacks about the validity of the course provided both by teachers and by the Envriplus team.

The portal contents will be organised in a main and a secondary navigation.

The main navigation is composed by five content sections:

- Resources: earth sustainability, climate change, natural disasters, scientific approach.
- Teacher Blog
- Login
- About
- Partners
- Contact
- Admin

The first four categories include educational relevant data and this is why we decided to place these links below the Learning plus logo that will act, in all the website, as a link to the home page. The last three sections link will be instead placed below the Envriplus logo since they intend to provide relevant information on Envriplus. The Envriplus logo itself will be a link to the main page of the official Envriplus website. The Admin option will let the Envriplus Learning team to access the back-end of the portal to upload and create new learning objects.

A cascade menu will allow to access the secondary navigation options (available just for the resources sections), that will be instead located in the right side of the page as shown in the following layout.

Registering to the portal teachers will have the possibility to reply to the teachers blog and also to propose new educational resources via a simple form available in every page of the portal. These resources will be first evaluated by the Educational team and then, if considered interesting, uploaded on the portal with the provision of all the metadata needed to better describe this new content to the other users of the portal.

THE BACKBONE OF LEARNING PLUS: THE IT ARCHITECTURE

This first proposal described at a glance above from a communication point of view, will be now described by an IT perspective.

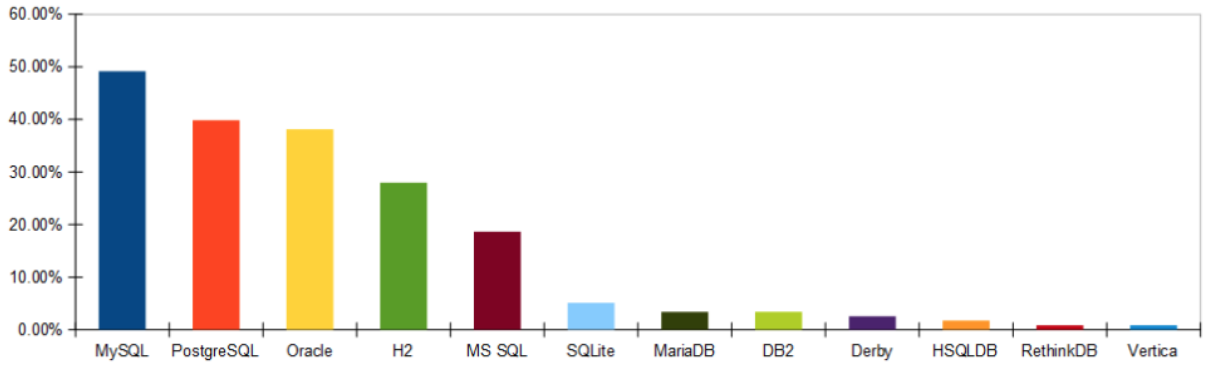
Since Envriplus is a European funded project we suggest to use an open source set of tools to build the IT architecture needed to fulfil the above described aims.

We can summarize the requirements for this system in the following table:

ID	Requirement
R1	The learning object has to be stored in a database
R2	The learning object has to be categorized
R3	The learning object has to be available for front-end user
R4	The learning object has to be searchable using the stored parameters

R5	The learning object can be updated by the user with privilege
R6	The learning object can be deleted by the user with privilege
R7	The learning object has to be linked to the consortium that has the learning materials
R8	The learning object has the specification of the language in which is provided
R9	The learning object has to be linked to the source where the user took the material
R10	The learning object specifies the target of the material (student between age of 14-16 or 17-18 or the teacher) and the curriculum topic next to it (for example earth science, biology, chemistry…)
R11	The learning object has to provide a description of the topic
R12	The data have to be available for the most used browsers
R13	The learning objects have to be manipulated with a minimal web interface, not in database
R14	The learning objects can be grouped in course modules
R 15	The learning object format can be of any of the following: video (mp4), game, quiz, ppt, web-based, doc, excel, pdf, audio (wave or mp3)

After this first analysis of the requirements we selected the tool for storing data and then the database in a list of possible open source projects. We considered the popularity as first indicator of benefits in the employment of the selected database tool. For this reason as stated in the following bar chart we selected **MYSQL** as database for the realisation of the first proposal.



MySQL is the world's most popular open source database offering all the databases features that we will indicate in the future as F0. With its proven performance, reliability, and ease-of-use, MySQL has become the leading database choice for web-based applications, used by high profile web properties including Facebook, Twitter, YouTube,

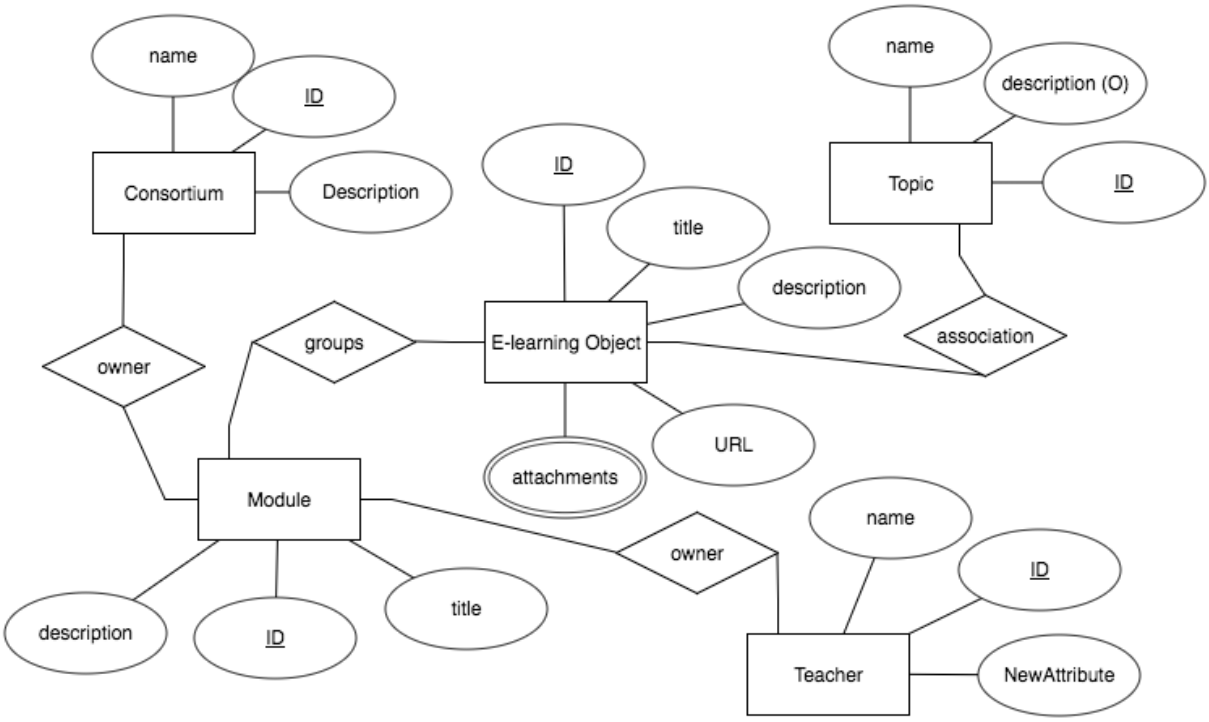
and all the major web applications. The problem of having a database without a user friendly user interface for data entry is that the database tool is not usable without a user interface, since the SQL language is a domain specific language that is suitable only for computer scientists. It comprehends a dedicated syntax that has to be learned and of course only software developers are able to interact with complex queries that have to be built to get the desired results. For this reason we added a new requirement R13, specifying that the database has to be connected to a presentation layer offering a minimal web based user interface. These interface should provide the following features:

F1	Data-grid listing with paging, sorting, searching by field and search for all with ajax (flexigrid theme) or instant javascript scripting (data-tables theme)
F2	automatic creation of inputs by field type. Till now the field types that auto-generate different inputs are: integer, string, text, date, date-time, set, enum, true_false(0 or 1), hidden, password and read-only
F3	database relation 1-1 , 1-n and n-n , automatically with just one line of code
F4	changing themes easily, so far there are two themes , data-tables and flexigrid
F5	validation form with client side validation and server side validation adding your own validation rules
F6	flexibility to choose columns and fields that you want to add to your table
F7	unset operation like unset add, edit or delete
F8	Call-backs almost everywhere to do your own customizations
F9	changing the auto generate field type, for example a text field can transform easily to date field
F10	works fine with all the modern browsers, such as: Mozilla Firefox, Google Chrome, Opera, Safari, Internet Explorer 8 or later and works fine for all the modern OS systems such as Windows, Linux, MACOS
F11	mobile compatible, works fine with the default browsers of Android , Windows and Apple mobiles
F12	multilingual functionality. Translated to 34 languages so far

The features listed in the above table have then been linked to the requirements that help to satisfy, in the last column of the table that follows:

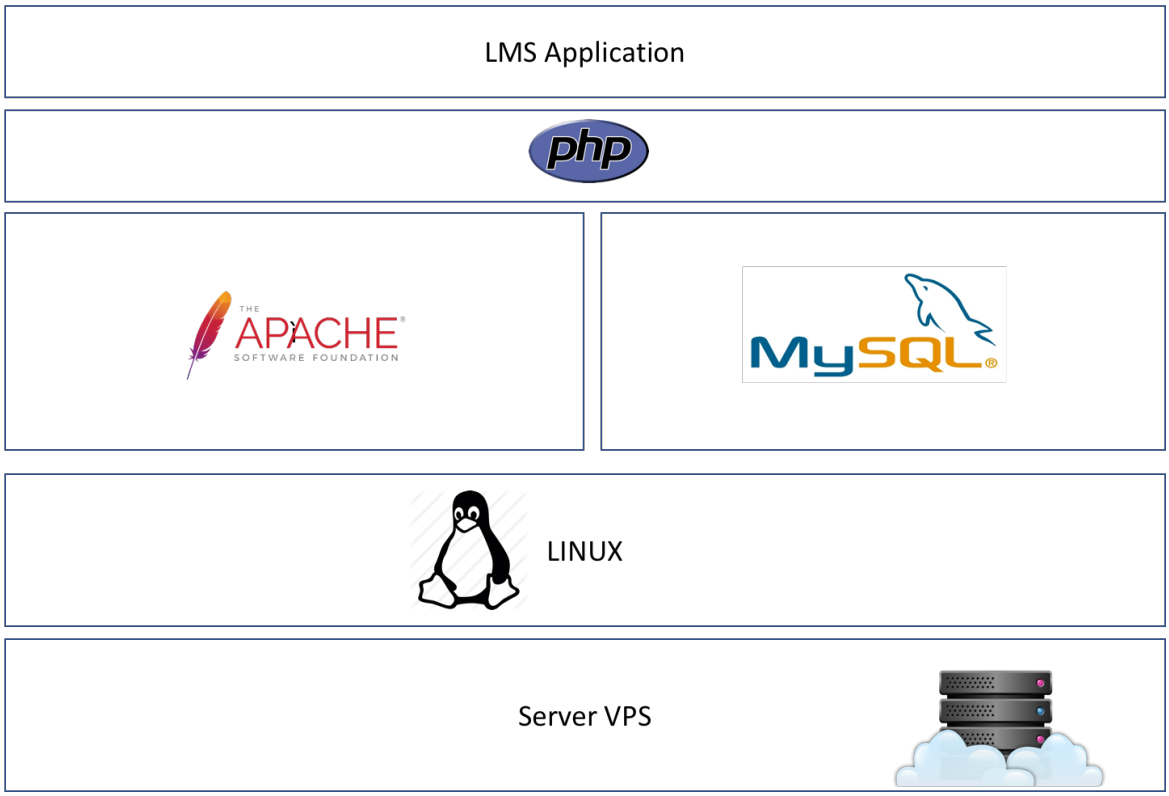
ID	Requirement	Features
R1	The learning object has to be stored in a database	F0
R2	The learning object has to be categorized	F0, F1
R3	The learning object has to be available for front-end user	F1,F2
R4	The learning object has to be searchable using the stored parameters	F1
R5	The learning object can be updated by the user with privilege	F3, F5, F6
R6	The learning object can be deleted by the user with privilege	F3,F5
R7	The learning object has to be linked to the consortium that has the learning materials	F0
R8	The learning object has the specification of the language in which is provided	F12
R9	The learning object has to be linked to the source where the user took the material	F0
R10	The learning object specifies the target of the material (student between age of 14-16 or 17-18 or the teacher) and the curriculum topic next to it (for example earth science, biology, chemistry…)	F0,F2
R11	The learning object has to provide a description of the topic	F0,F2
R12	The data have to be available for the most used browsers	F11
R13	The learning objects have to be manipulated with a minimal web interface, not in database	F1-F12
R14	The learning objects can be grouped in course modules	F0

In the following we report a draft of the database schema we can derive from the requirements elicitation. Of course this is just a draft that will be improved and enriched in the development phase:



Some of the more interesting features include bulk editing tools for user management, that usually is demanded to a single edit, and a customizable reporting function.

As stated above the database chosen to store the data should be MYSQL and on the top of it we have to create an application layer to manage and update the learning objects.



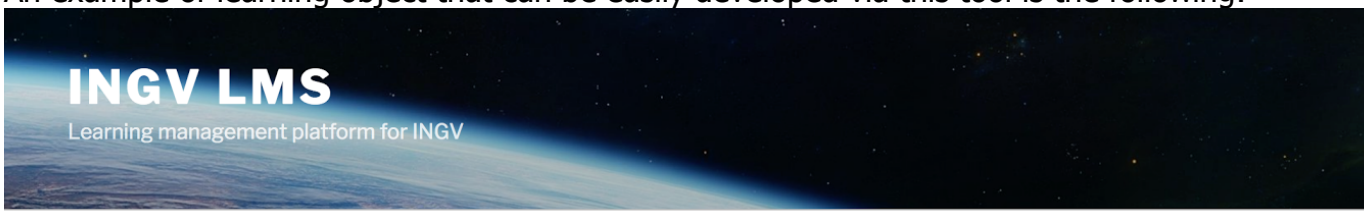
This application layer will be based on a Wordpress customization for learning with the addition of a content authoring tool called ***H5p***. This solution is totally based on open source technologies and it allows graphical customization as a normal website.

WordPress is a web publishing software that can be used to create websites or blogs. Since it was released in 2003, WordPress has become one of the most popular web publishing platforms. Today it powers more than 70 million websites. But many people don't realize that WordPress is much more just a blogging tool. It's also a highly flexible content management system (CMS) that enables to build and manage a full-featured website. Since WordPress is an 'Open Source' project, meaning that hundreds of volunteers from all around the world are constantly creating and improving the code for the WordPress software, this platform allows to create different types of websites. There are thousands of plugins, widgets, and themes that enable the developer to build just about any type of website, also a learning management system. The combination with ***H5p*** is a plus that the platform can offer to the users that can easily create contents for their learning management system.

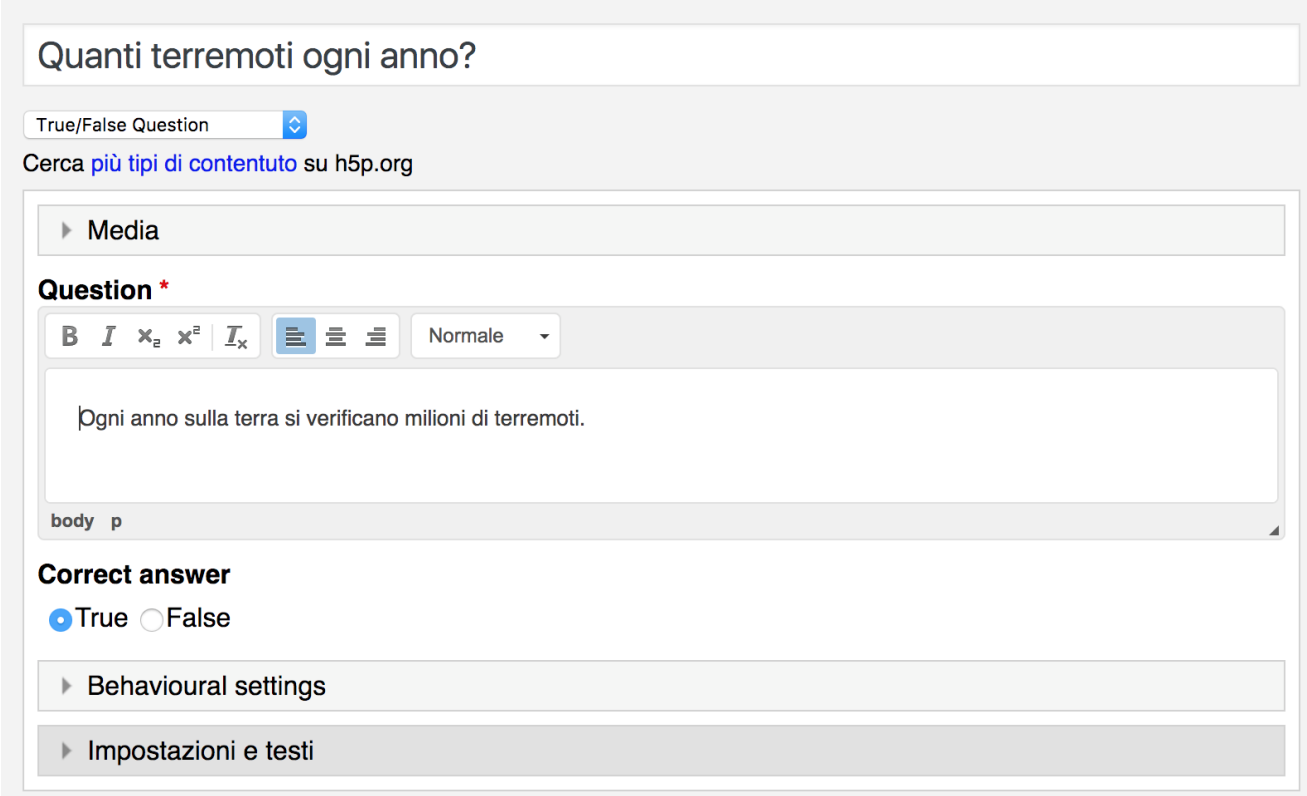
The customization of the wordpress for educational purposes will provide features for creating online courses, to manage any kind of lessons, to create quiz, to host videos, to develop an assessment system, to track course progress etc.

The feature will include the creation of online training website with satisfaction and teach to students about the domain.

An example of learning object that can be easily developed via this tool is the following:



and this is the back-end mask that allow its development:



Other kinds of learning objects that can be simply created are the following:

Accordion

Create vertically stacked expandable items

appear.in

Add a video chat to your web page

Arithmetic Quiz

Create time-based arithmetic quizzes

Chart

Quickly generate bar and pie charts

Collage

Create a collage of multiple images

Column

Column layout for H5P Content

Course Presentation

Create a presentation with interactive slides

Dialog Cards

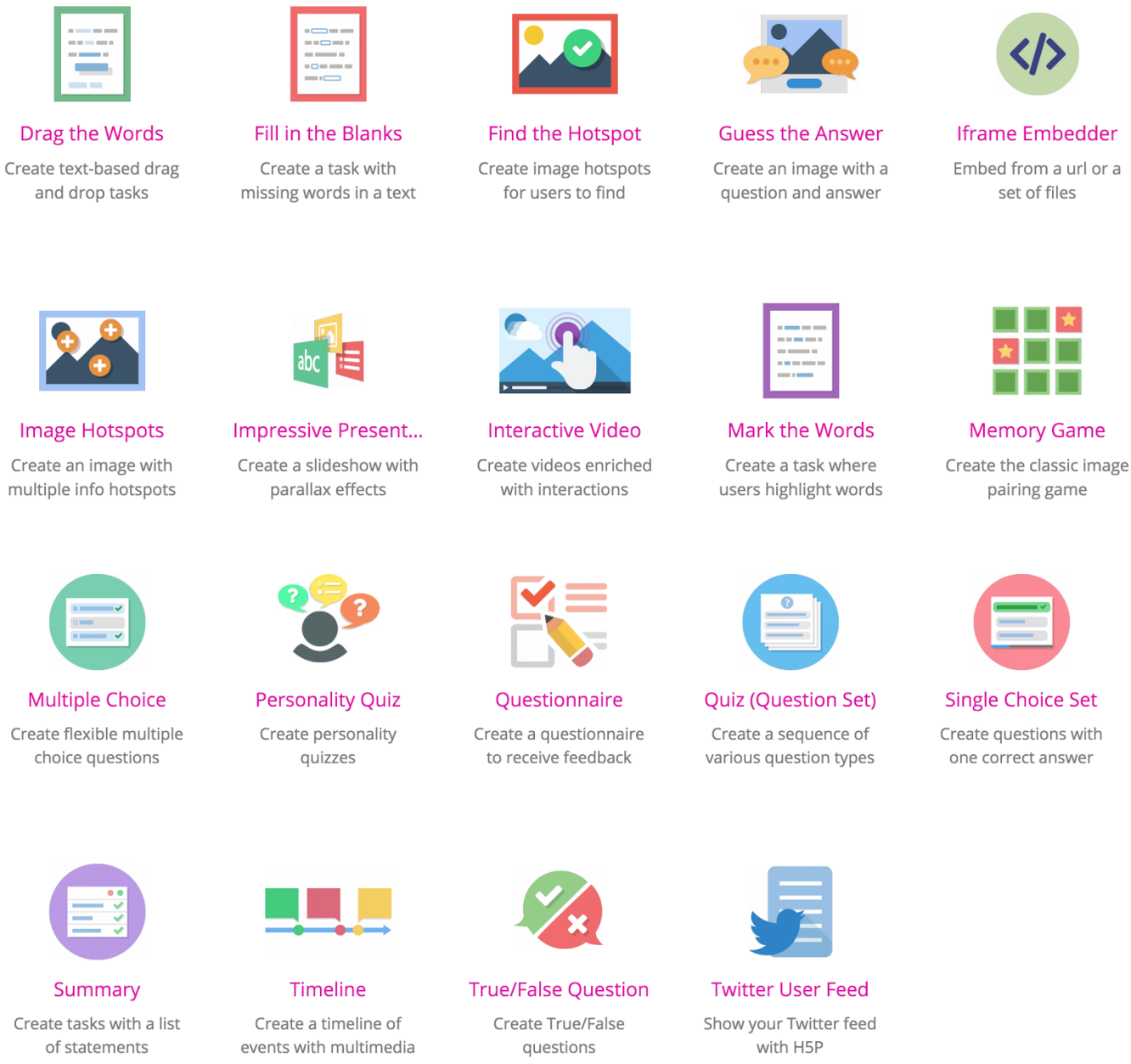
Create text-based turning cards

Documentation Tool

Create a form wizard with text export

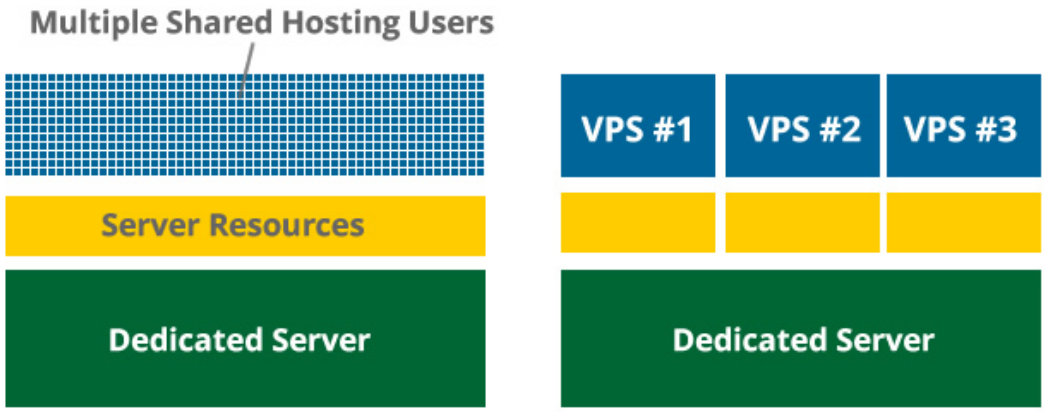
Drag and Drop

Create drag and drop tasks with images



The final architecture will allow us to build an Educational system that uses WordPress, with the Sensei plugin, ***H5p*** to build original learning objects and WPML for the translation of the multi-language site.

To get this system works correctly we need also to define the server infrastructure we need to house it.



To this aim we prefer virtualization instead of common platform based on physical server. With a VPS, virtual private server, the resources of the server are split between different websites or hosting accounts. Think of it as a home computer that has many different users, all of who use the machine in different ways. Virtual Private Servers have both high end and low end options available. However, the cost usually ranges from €25/month all the way up to €120+/month. The main pros of a VPS is that being resources virtual, the increment of overload for a platform can be easily resolved adding new virtual resources to the VPS and restart the machine from the admin area. The backup and all the features dedicated to the machine are demanded to the provider and not to the administrator of the dedicated server.

A dedicated server is a server that's literally dedicated to your own personal use. You'll have rights to all of the resources of the machine, and you'll be able to configure the hosting environment however you wish. Dedicated hosts are usually only worthwhile if you're receiving over 500,000 visitors per month and have the necessary technical staff to maintain and optimize your server.

However, since dedicated servers are almost always more expensive it's generally a good idea to start with a VPS until the overload of the platform is increased so much that needs to be balanced out. We can then summarize the application technologies with a full stack that comprehends a VPS server, where an Linux based operating system resides, e.g. Ubuntu, Debian. The web server installed should be Apache being an open source web server able to compile PHP applications.

This infrastructure will make of (E)Learning plus a top class learning portal, fit for the purpose it has been intended: **SHARE ENVIRONMENTAL KNOWLEDGE**.

Appendix D – front-end e-knowledge platform

Name resource

Permalink: http://79.137.35.238/envriplus/?dt_courses=basic-laws-and-policies Change Permalinks

Add Media Add H5P Visual Text

Paragraph

[h5p id="1"]

Pellentesque venenatis orci vel enim malesuada, eget dignissim turpis egestas. Donec a ligula ac tellus ultrices lacinia. Nullam non nisi varius, posuere leo non, scelerisque orci. Nulla mi nisl, rutrum aliquet ante sit amet, fermentum adipiscing diam. Nam non consequat quam, a auctor ipsum. Maecenas imperdiet commodo sapien, non molestie orci eleifend in. Vestibulum fringilla tellus eget magna gravida porta. Interdum et malesuada fames ac ante ipsum primis in faucibus. Proin congue nibh at leo posuere scelerisque. Aenean aliquam augue scelerisque lorem mollis lacinia. Donec vel lacinia erat. Ut sodales tellus eu lacus pretium cursus. Nulla facilisi. Suspendisse potenti.

Fusce commodo in neque vitae mollis. Sed dolor lorem, cursus et venenatis sed, sodales eu nisi. Nunc lacinia massa neque, eu tincidunt mi blandit eget. Proin eget arcu vitae velit sodales ultricies a in sem. Mauris rutrum augue id volutpat scelerisque. Fusce

Back-end

* see: Restriction Options → Posts

Require Custom Capabilities?

* see: API Scripting → Custom Capabilities

Featured Image

Click the image to edit or update

Remove featured image

Resource Category

Education

OUR POPULAR RESOURCES

Name resource Name resource Name resource Name resource

Learning Path | Age reference Learning Path | Age reference Learning Path | Age reference Learning Path | Age reference

03:15 03:15 03:15 03:15

Front-end

Name resource

Permalink: http://79.137.35.238/envriplus/?dt_courses=basic-laws-and-policies Change Permalinks

Back-end

Add Media Add H5P

Paragraph

[h5p id="1"]

Pellentesque venenatis orci vel enim malesuada, ege
nisi varius, posuere leo non, scelerisque orci. Nulla
consequat quam, a auctor ipsum. Maecenas imperd
eget magna gravida porta. Interdum et malesuada fa
scelerisque. Aenean aliquam augue scelerisque lore
cursus. Nulla facilisi. Suspendisse potenti.

Fusce commodo in neque vitae mollis. Sed dolor lor
tincidunt mi blandit eget. Proin eget arcu vitae velit
ut consectetur turpis. Fusce et lacus et nisi ullamcor
blandit iaculis. Suspendisse commodo placerat lore
Vestibulum ante ipsum primis in faucibus orci luctu
facilisis ultricies. Vivamus non ullamcorper lorem,

Suspendisse pulvinar, quam porttitor luctus tincidu
dictum, justo ut pulvinar hendrerit, metus enim ma
ultricies pretium. Duis ac tincidunt turpis. Integer s
in mattis vel, accumsan at erat. Ut et sapien sit amet
lobortis. Ut viverra est vel congue placerat. Proin et

s2Member™

Post Level Restriction?

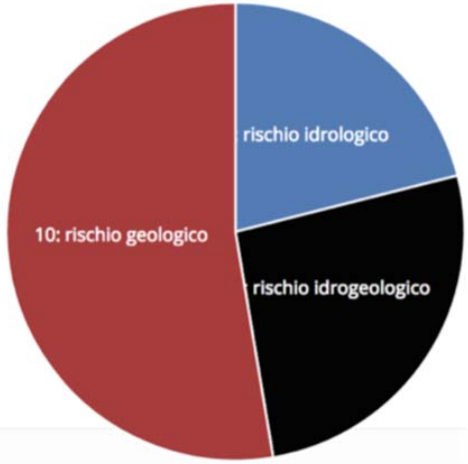
Name resource

Resource Category 5 Lessons 5 hou

Course Progress

20%

Free



Front-end

Download Embed

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Type of chart *

Pie Chart

Data elements *

Data element: rischio idrologico

Name *

rischio idrologico

Value *

4

Content-authoring

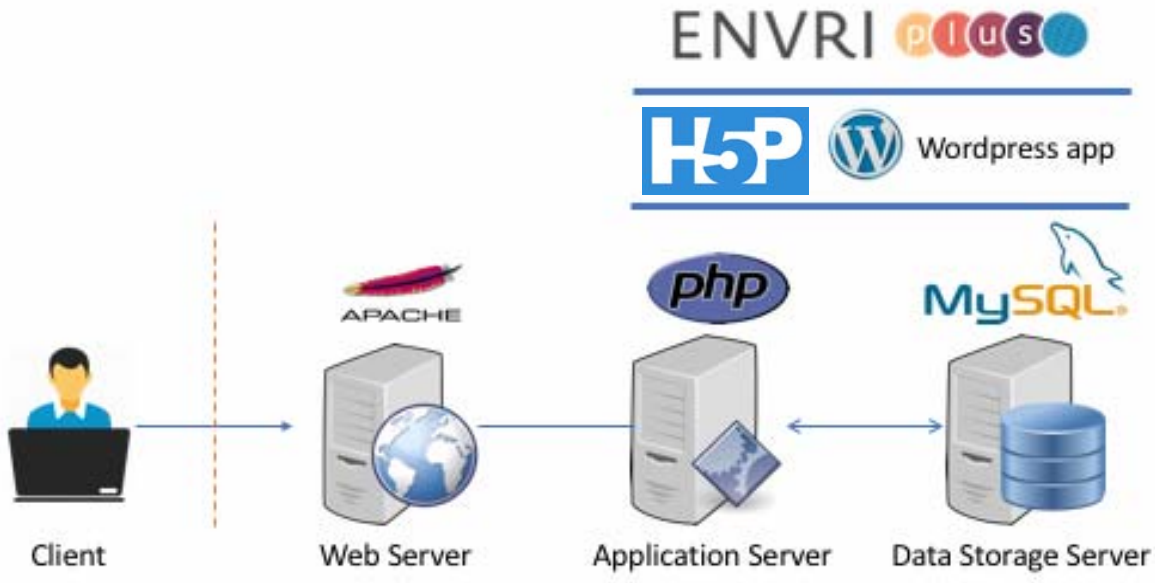
Color

Font Color

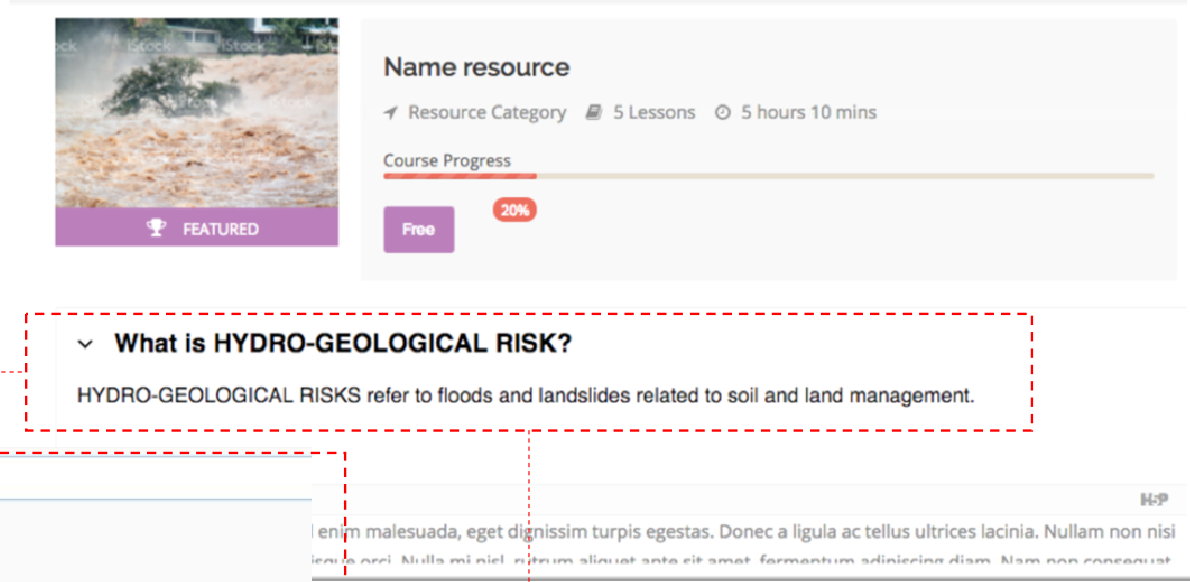
Data element: rischio idrogeologico

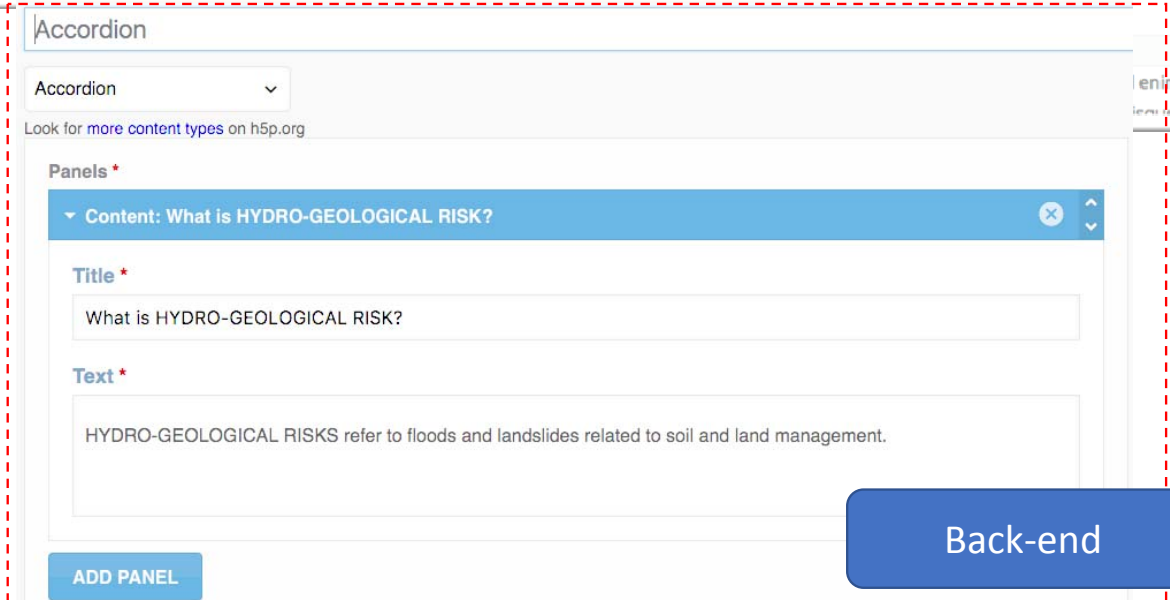
Name *

rischio idrogeologico


ENVRI plus
H5P
Wordpress app
APACHE
php
MySQL
Client
Web Server
Application Server
Data Storage Server

Front-end





Back-end

chat and talk

appear.in for Chat and Talk

Tutorial available

Look for more content types on h5p.org

Room name *

Name of the appear.in room

Let's talk about the earth

Fit to container

Make the room fit its container, will override any height and width defined with

Height *

Set Height of chat/talk room

600

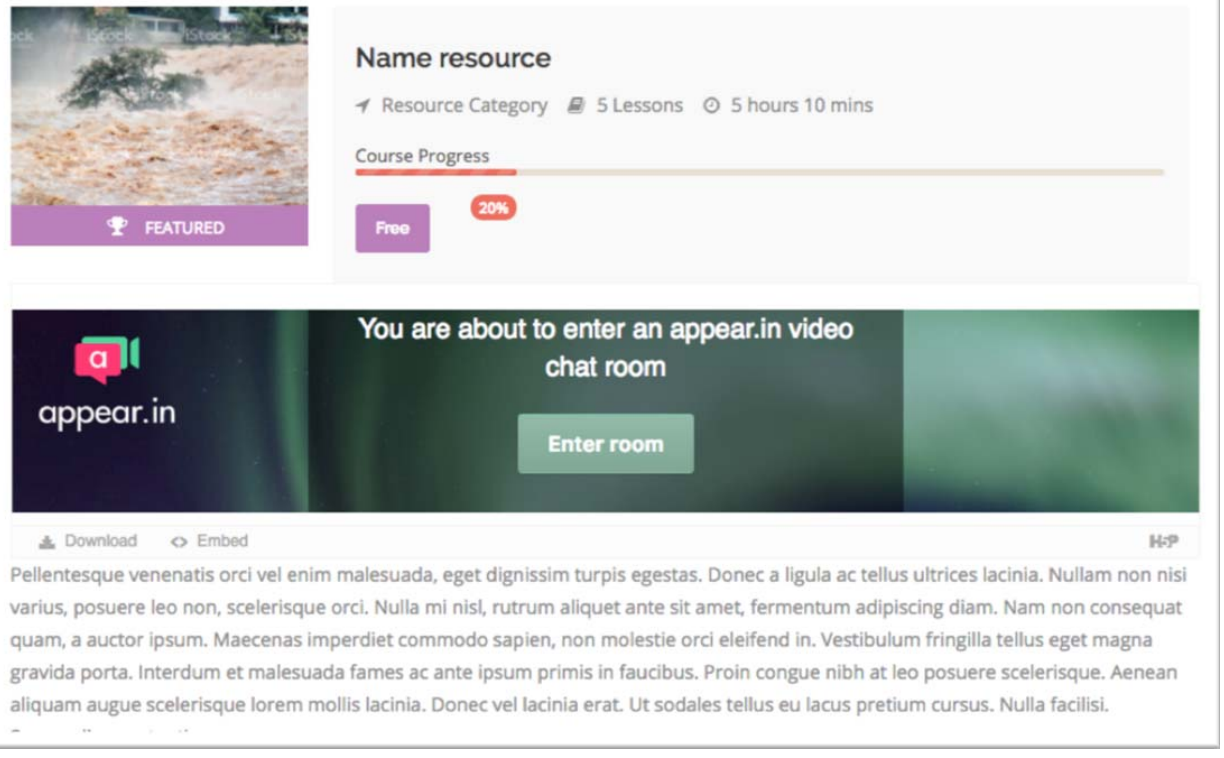
Width *

Set Width of chat/talk room

550

Back-end

Front-end



Front-end

Name resource

Resource Category 5 Lessons 5 hours 10 mins

Course Progress

20%

Free

0:00 / 1:47

Download Embed

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Audio Lesson #1

Audio Tutorial available

Look for more content types on h5p.org

Source files *

Edit copyright

Player mode *

Select the layout of the player.

Minimalistic

Fit to wrapper

Enable controls

Controls allow the user to for instance pause the audio

Enable autoplay

With autoplay the audio starts to play immediately. If autoplay is disabled the user presses a play button to start the audio.

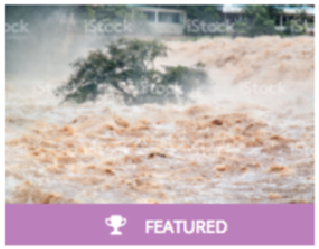
Text overrides and translations

Here you can edit settings or translate texts used in this content.

Audio content name *

Audio

Back-end



Name resource

Resource Category 5 Lessons 5 hours 10 mins

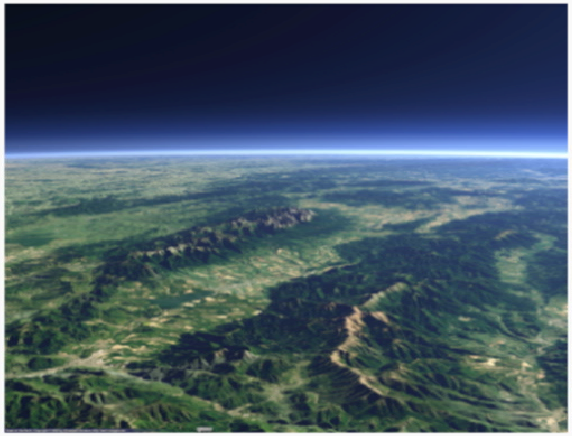
Course Progress

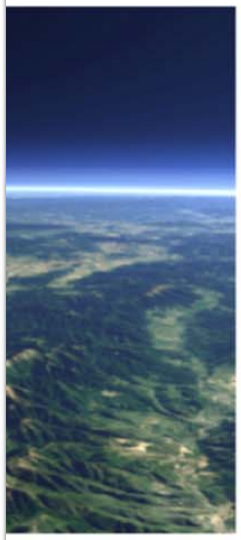
Free

20%

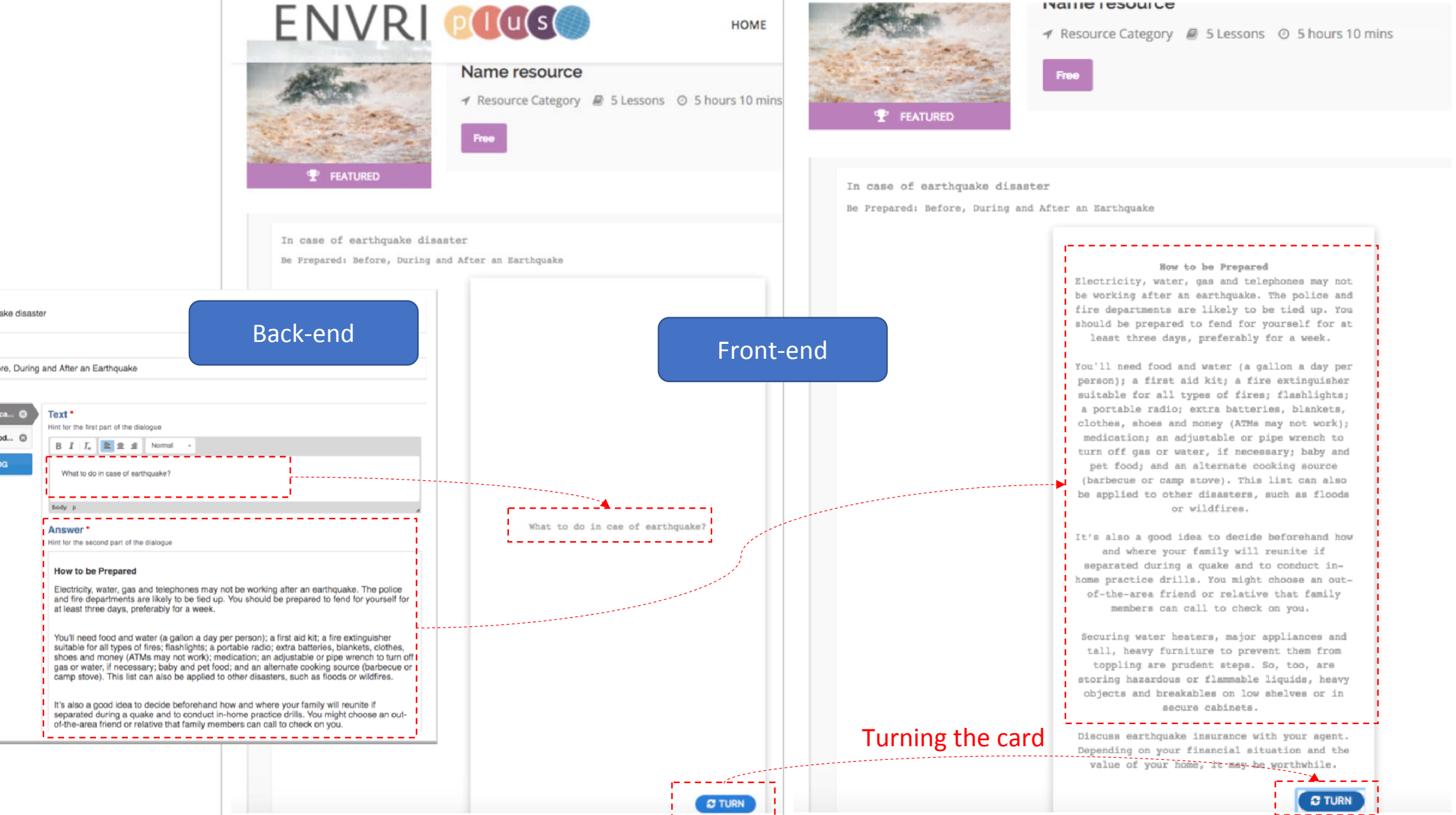
Front-end

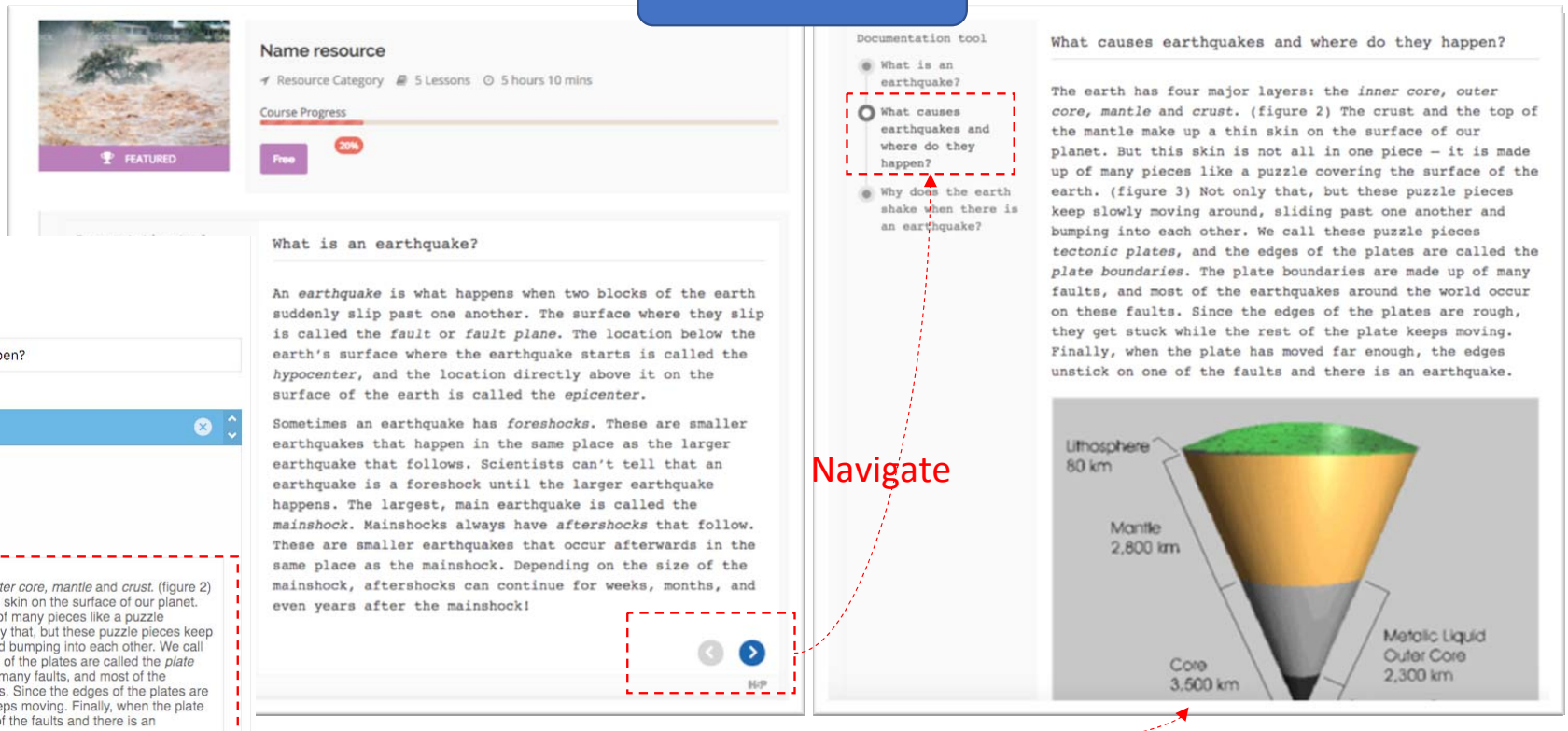
hem. You can also select an image and then use the + or - keys on your keyboard to zoom or simply hold

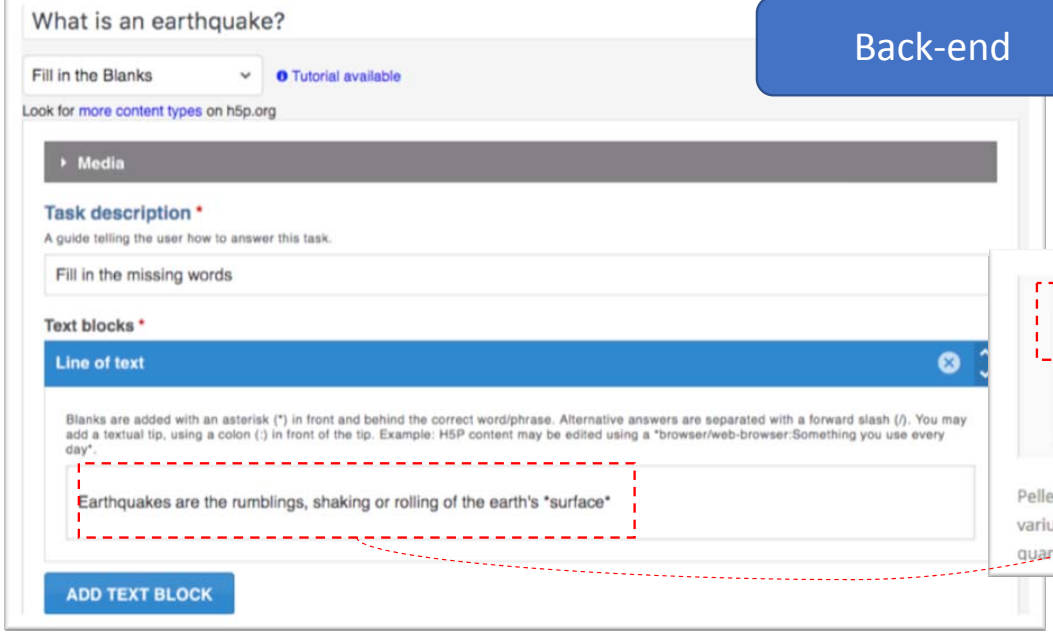




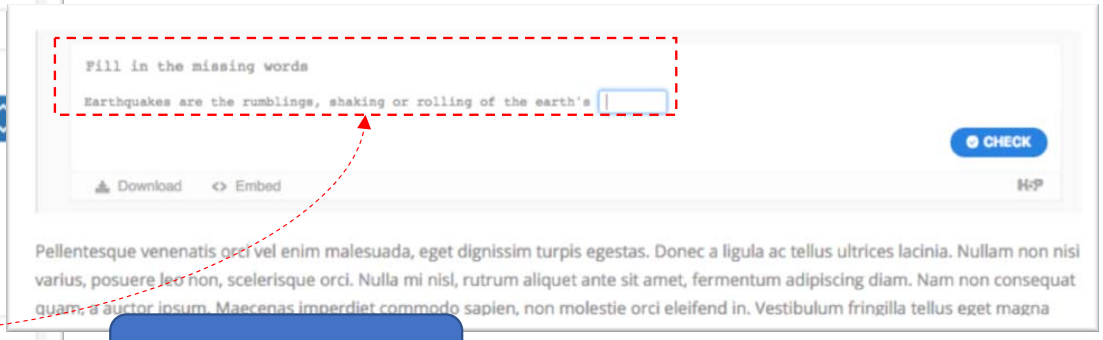
Back-end


ENVRI plus
HOME
Name resource
Resource Category
5 Lessons
5 hours 10 mins
Free
FEATURED
In case of earthquake disaster
Be Prepared: Before, During and After an Earthquake
Back-end
Front-end
Text *
Hint for the first part of the dialogue
What to do in case of earthquake?
Answer *
Hint for the second part of the dialogue
How to be Prepared
Electricity, water, gas and telephones may not be working after an earthquake. The police and fire departments are likely to be tied up. You should be prepared to fend for yourself for at least three days, preferably for a week.
You'll need food and water (a gallon a day per person); a first aid kit; a fire extinguisher suitable for all types of fires; flashlights; a portable radio; extra batteries, blankets, clothes, shoes and money (ATMs may not work); medication; an adjustable or pipe wrench to turn off gas or water, if necessary; baby and pet food; and an alternate cooking source (barbecue or camp stove). This list can also be applied to other disasters, such as floods or wildfires.
It's also a good idea to decide beforehand how and where your family will reunite if separated during a quake and to conduct in-home practice drills. You might choose an out-of-the-area friend or relative that family members can call to check on you.
What to do in cae of earthquake?
Securing water heaters, major appliances and tall, heavy furniture to prevent them from toppling are prudent steps. So, too, are storing hazardous or flammable liquids, heavy objects and breakables on low shelves or in secure cabinets.
Discuss earthquake insurance with your agent. Depending on your financial situation and the value of your home, it may be worthwhile.
Turning the card
TURN

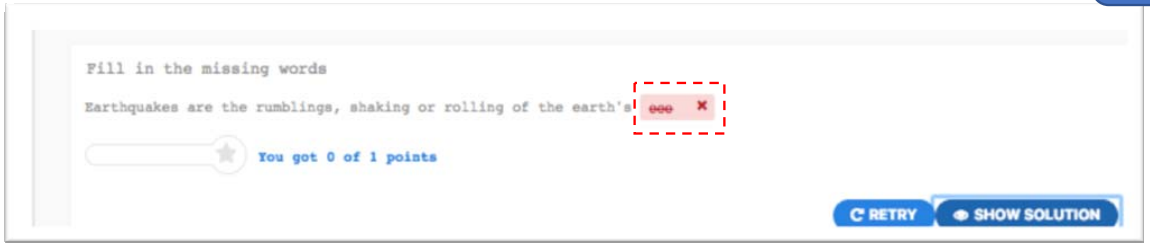

2. Standard page
3. Standard page
ADD PAGE
Standard page
Title *
Title for the page.
What causes earthquakes and where do they happen?
Elements *
Element type
Library for this page.
Text
Text *
The earth has four major layers: the inner core, outer core, mantle and crust. (figure 2) The crust and the top of the mantle make up a thin skin on the surface of our planet. But this skin is not all in one piece – it is made up of many pieces like a puzzle covering the surface of the earth. (figure 3) Not only that, but these puzzle pieces keep slowly moving around, sliding past one another and bumping into each other. We call these puzzle pieces tectonic plates, and the edges of the plates are called the plate boundaries. The plate boundaries are made up of many faults, and most of the earthquakes around the world occur on these faults. Since the edges of the plates are rough, they get stuck while the rest of the plate keeps moving. Finally, when the plate has moved far enough, the edges unstick on one of the faults and there is an earthquake.
Element type
Library for this page.
Image
Image *
Back-end
FEATURED
Name resource
Resource Category
5 Lessons
5 hours 10 mins
Course Progress
20%
Free
What is an earthquake?
An earthquake is what happens when two blocks of the earth suddenly slip past one another. The surface where they slip is called the fault or fault plane. The location below the earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter.
Sometimes an earthquake has foreshocks. These are smaller earthquakes that happen in the same place as the larger earthquake that follows. Scientists can't tell that an earthquake is a foreshock until the larger earthquake happens. The largest, main earthquake is called the mainshock. Mainshocks always have aftershocks that follow. These are smaller earthquakes that occur afterwards in the same place as the mainshock. Depending on the size of the mainshock, aftershocks can continue for weeks, months, and even years after the mainshock!
Navigate
Documentation tool
What is an earthquake?
What causes earthquakes and where do they happen?
Why does the earth shake when there is an earthquake?
What causes earthquakes and where do they happen?
The earth has four major layers: the inner core, outer core, mantle and crust. (figure 2) The crust and the top of the mantle make up a thin skin on the surface of our planet. But this skin is not all in one piece – it is made up of many pieces like a puzzle covering the surface of the earth. (figure 3) Not only that, but these puzzle pieces keep slowly moving around, sliding past one another and bumping into each other. We call these puzzle pieces tectonic plates, and the edges of the plates are called the plate boundaries. The plate boundaries are made up of many faults, and most of the earthquakes around the world occur on these faults. Since the edges of the plates are rough, they get stuck while the rest of the plate keeps moving. Finally, when the plate has moved far enough, the edges unstick on one of the faults and there is an earthquake.
Lithosphere
80 km
Mantle
2,800 km
Core
3,500 km
Metallic Liquid
Outer Core
2,300 km

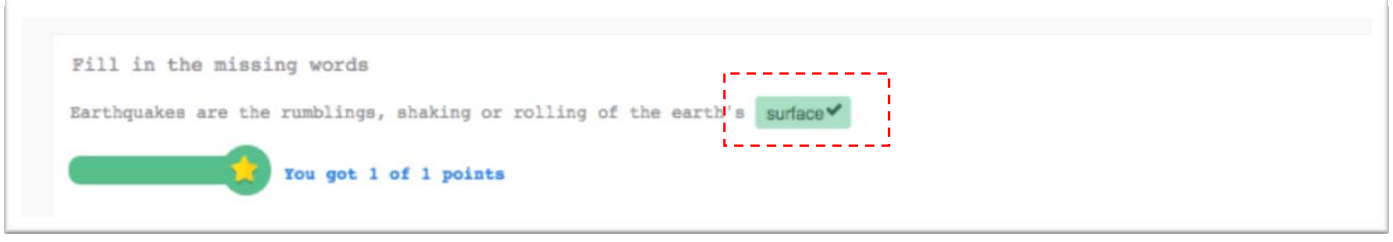


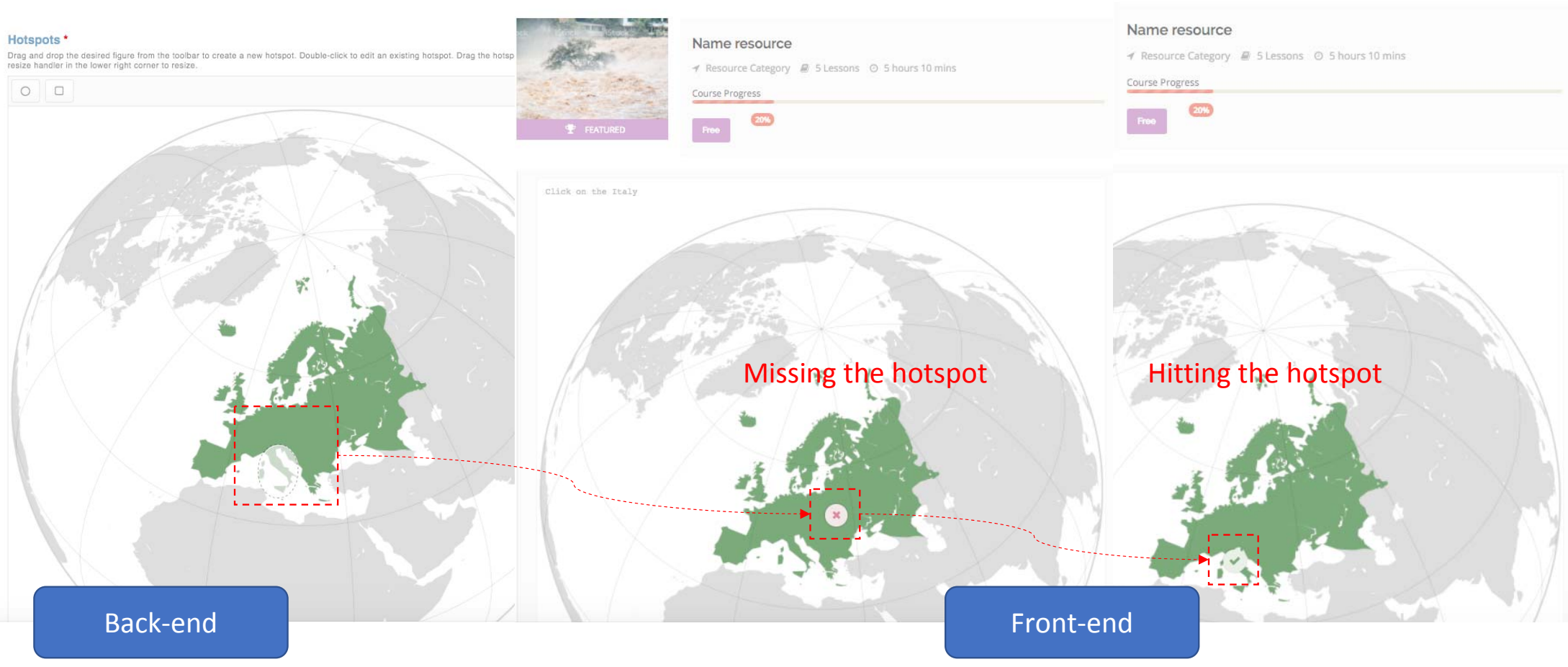
Back-end

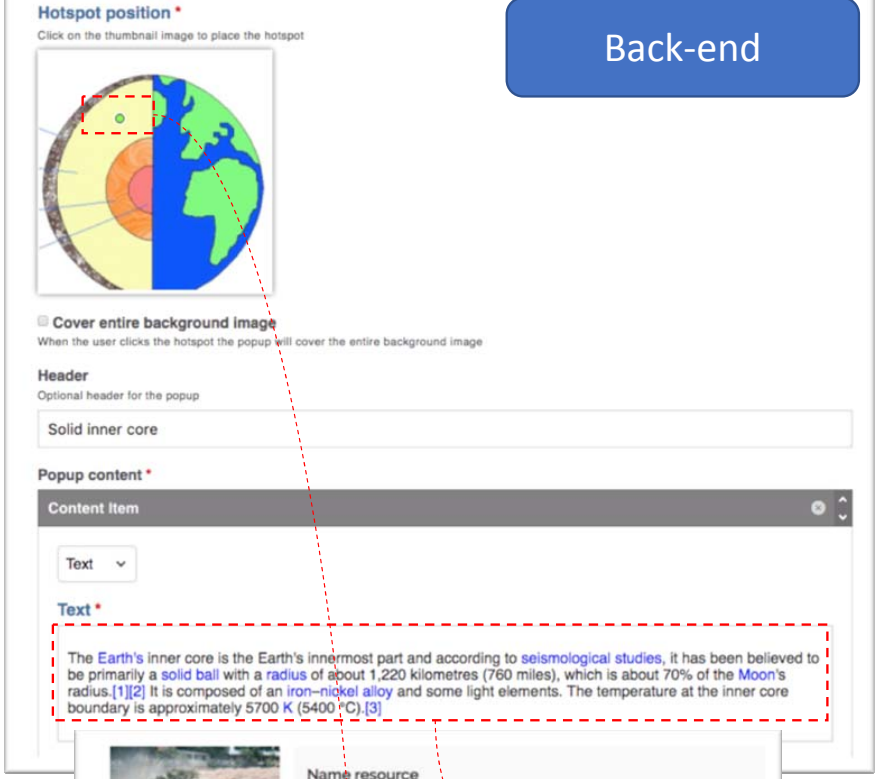


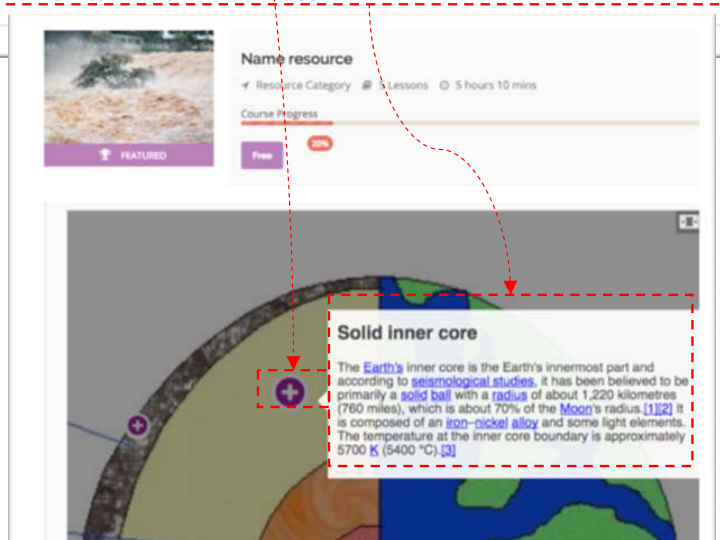
Front-end

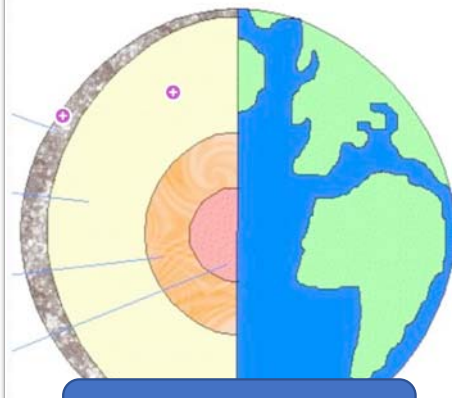


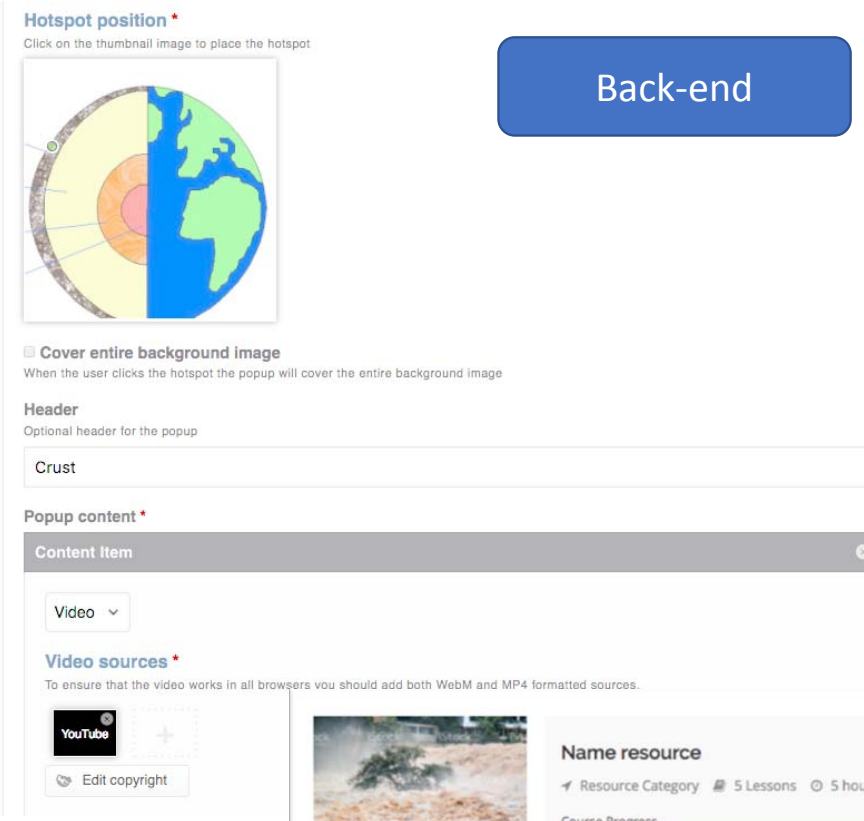


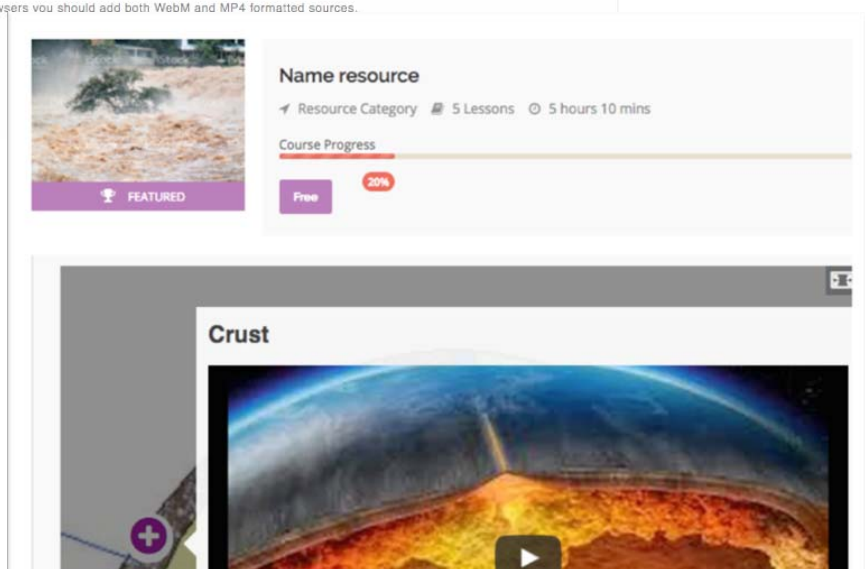

Hotspots *
Drag and drop the desired figure from the toolbar to create a new hotspot. Double-click to edit an existing hotspot. Drag the hotsp
resize handler in the lower right corner to resize.
FEATURED
Name resource
Resource Category
5 Lessons
5 hours 10 mins
Course Progress
Free
20%
Name resource
Resource Category
5 Lessons
5 hours 10 mins
Course Progress
Free
20%
Click on the Italy
Missing the hotspot
Hitting the hotspot
Back-end
Front-end


Hotspot position *
Click on the thumbnail image to place the hotspot
Back-end
Cover entire background image
When the user clicks the hotspot the popup will cover the entire background image
Header
Optional header for the popup
Solid inner core
Popup content *
Content Item
Text
Text *
The Earth's inner core is the Earth's innermost part and according to seismological studies, it has been believed to be primarily a solid ball with a radius of about 1,220 kilometres (760 miles), which is about 70% of the Moon's radius.[1][2] It is composed of an iron–nickel alloy and some light elements. The temperature at the inner core boundary is approximately 5700 K (5400 °C).[3]


Name resource
Resource Category
5 Lessons
5 hours 10 mins
Course Progress
20%
Free
FEATURED
Solid inner core
The Earth's inner core is the Earth's innermost part and according to seismological studies, it has been believed to be primarily a solid ball with a radius of about 1,220 kilometres (760 miles), which is about 70% of the Moon's radius.[1][2] It is composed of an iron–nickel alloy and some light elements. The temperature at the inner core boundary is approximately 5700 K (5400 °C).[3]




Hotspot position *
Click on the thumbnail image to place the hotspot
Back-end
Cover entire background image
When the user clicks the hotspot the popup will cover the entire background image
Header
Optional header for the popup
Crust
Popup content *
Content Item
Video
Video sources *
To ensure that the video works in all browsers you should add both WebM and MP4 formatted sources.
YouTube
Edit copyright


Name resource
Resource Category
5 Lessons
5 hours 10 mins
Course Progress
20%
Free
FEATURED
Crust

Back-end

Start date *
YYYY,MM,DD (Minimum YYYY required)
2010,03,03

End date
YYYY,MM,DD (Minimum YYYY required)
2010,03,03

Headline *
Headline for the date entry
3.0

Body text
Body for the date entry

Tags
Enter Tags (categories)

▸ Asset

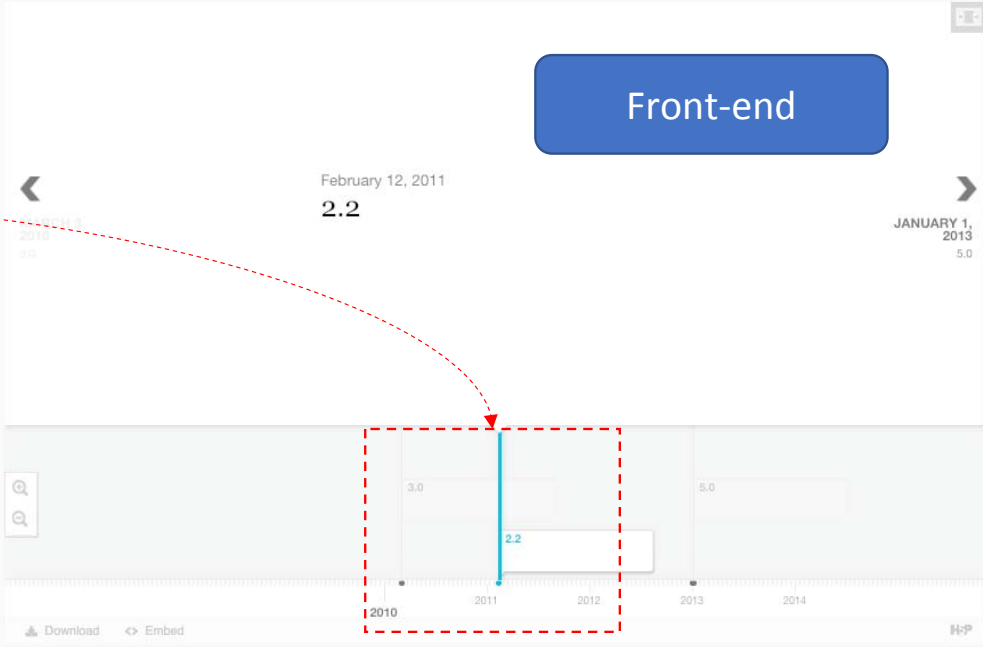
Date: 2011,02,12

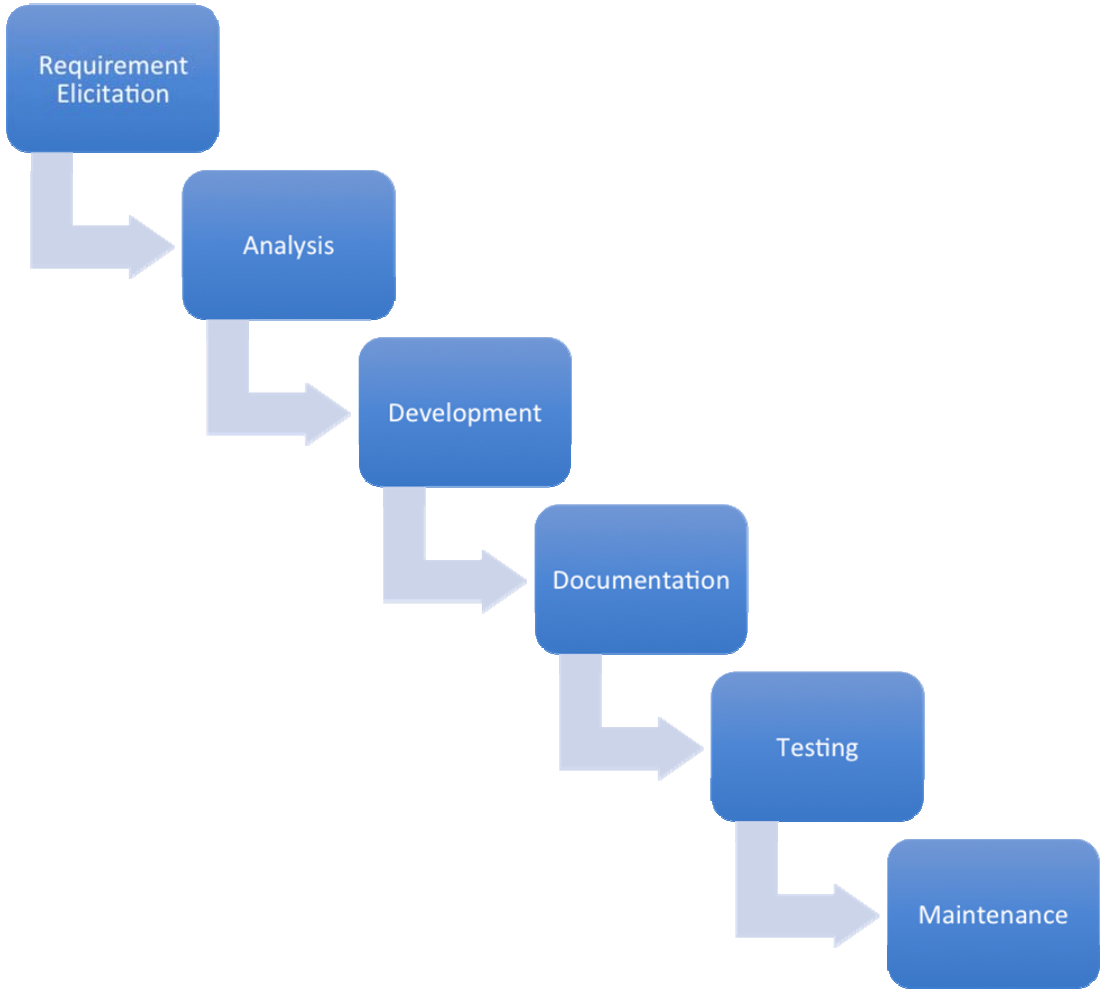
Start date *
YYYY,MM,DD (Minimum YYYY required)
2011,02,12

End date
YYYY,MM,DD (Minimum YYYY required)
2011,02,12

Headline *
Headline for the date entry

Front-end




Requirement Elicitation
Analysis
Development
Documentation
Testing
Maintenance

Appendix E – back-end e-knowledge platform

LEARNING+

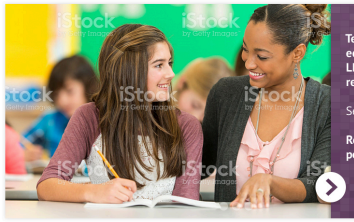
SHARING ENVIRONMENTAL KNOWLEDGE

The lay-out of the portal

ENVRI PLUS

LEARNING+ SHARING ENVIRONMENTAL KNOWLEDGE

LEARNING PATHS | RESOURCES | TEACHER CORNER | ABOUT | CONTACT | Login | Register



Teach your class how earth eco-system works via the LEARNING+ educational resources!

Search for the one you need!

Register now to fully use the potential of the portal

REGISTER

DISCOVER OUR LEARNING PATHS

Earth Sustainability
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Climate change
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Natural disasters
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Scientific approach
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

SEARCH YOUR RESOURCE HERE...

Learning paths

Type of media

Next curriculim topic

Duration

Age frame

SEARCH

GIVE A LOOK TO THE LATEST RESOURCES UPDATED

RESOURCE NAME	MAIN LEARNING PATH	NEXT CURRICULUM TOPIC	TYPE OF MEDIA
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	

OUR POPULAR RESOURCES

Name resource

Learning Path | Age reference

03:15 ★★★

Name resource

Learning Path | Age reference

03:15 ★★★

Name resource

Learning Path | Age reference

03:15 ★★★

Name resource

Learning Path | Age reference

03:15 ★★★

LATEST POSTS

28 Jan

POST name

Main subject | Type of media | comments

Teacher name

28 Jan

POST name

Main subject | Type of media | comments

Teacher name

25 Jan

POST name

Main subject | Type of media | comments

Teacher name

28 Jan

POST name

Main subject | Type of media | comments

Teacher name

ENVRI plus

LEARNING+
SHARING ENVIRONMENTAL KNOWLEDGE

LEARNING PATHS
- Earth sustainability
- Climate change
- Natural disasters
- Scientific approach

RESOURCES
- Search
- Directory
- Suggest new resource

TEACHER CORNER

ABOUT
- Partner

CONTACT

Login | Register

Teach your class how earth eco-system works via the LEARNING+ educational resources!

Search for the one you need!

Register now to fully use the potential of the portal

REGISTER

DISCOVER OUR LEARNING PATHS

Earth Sustainability
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Climate change
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Natural disasters
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Scientific approach
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

SEARCH YOUR RESOURCE HERE...

ENVRI PLUS

LEARNING+
SHARING ENVIRONMENTAL KNOWLEDGE

LEARNING PATHS | RESOURCES | TEACHER CORNER | ABOUT

CONTACT | Login | Register

DISCOVER OUR LEARNING PATHS

Earth Sustainability
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Climate change
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Natural disasters
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Scientific approach
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

SEARCH YOUR RESOURCE HERE...

Learning paths

Type of media

Next curriculim topic

Duration

Age frame

SEARCH

GIVE A LOOK TO THE LATEST RESOURCES UPDATED

RESOURCE NAME	MAIN LEARNING PATH	NEXT CURRICULUM TOPIC	TYPE OF MEDIA
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	
Lorem ipsum dolor sit amet		Lorem ipsum dolor sit amet	

OUR POPULAR RESOURCES

Name resource
Learning Path | Age reference
03:15 ★★★

Name resource
Learning Path | Age reference
03:15 ★★★

Name resource
Learning Path | Age reference
03:15 ★★★

Name resource
Learning Path | Age reference
03:15 ★★★

LATEST POSTS

28 Jan
POST name
Main subject | Type of media | comments
Teacher name

28 Jan
POST name
Main subject | Type of media | comments
Teacher name

25 Jan
POST name
Main subject | Type of media | comments
Teacher name

28 Jan
POST name
Main subject | Type of media | comments
Teacher name

LISTING ALL RESULTS (349)

SEARCH YOUR COURSE HERE...

Main subject: EARTH SUSTAINABILITY

Type of media

Next curriculum topic

Duration

Age frame: 15-17

RESET

Select a resource from the list to access the material

Name resource 1

Main subject | 03:15 | Age 15-17

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie

Type:

Name resource 2

Main subject | 03:15 | Age 15-17

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Type:

Name resource 3

Main subject | 03:15 | Age 15-17

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Type:

Name resource 4

Main subject | 03:15 | Age 15-17

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Type:

Name resource 5

Main subject | 03:15 | Age 15-17

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Type:

Name resource 6

Main subject | 03:15 | Age 15-17

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Type:

TYPE OF MEDIA

Audio	4
Video	1
Presentation	7
PDF	4
Word	10
Website	3

RAITING

1 Star	4
2 Star	1
3 Star	7
4 Star	4
5 Star	10

POSTS

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UNDERSTANDING SUSTAINABLE LIVING

UNDERSTANDING SUSTAINABLE LIVING

Earth sustainability 03:15 Age 15-17

Type:

DOWNLOAD

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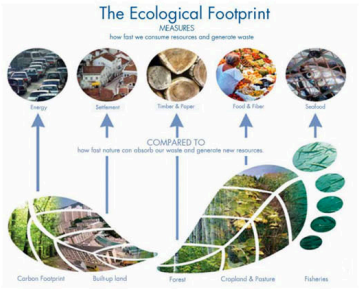

COMMENTS (1)

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COMMENT

4.18

(268 votes, average: 4.18 out 5) 268 ratings

1 Star	4
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This resources owns to the Earth sustainability Learning path

RESOURCE 1 — 50 mins — Age 15-17

2 RESOURCE 2 — 50 mins — Age 15-17

RESOURCE 3 — 50 mins — Age 15-17

RESOURCE 4 — 50 mins — Age 15-17

RESOURCE 5 — 50 mins — Age 15-17

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DIRECTORY (12.354)

Select a resource from the list to access the material

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RAITING

1 Star 4
2 Star 1
3 Star 7
4 Star 4
5 Star 10

POSTS

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TEACHERS CORNER

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POST name

Main subject | Type of media | commets

Teacher name

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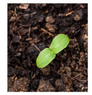

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