



INNOVATIVE EDUCATIONAL INTEGRATION OF URBAN
PLANNING BASED ON BIM-GIS TECHNOLOGIES AND
FOCUSED ON CIRCULAR ECONOMY CHALLENGES

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TASK 01/A4. COMPILATION OF TRAINING MATERIALS RELATED TO LCA AND BIM-GIS APPLICATIONS

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REPORT ON COMPILATION OF TRAINING MATERIALS RELATED TO LCA AND BIM- GIS APPLICATIONS

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Universitatea
Transilvania
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ROMANIA
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Centro Tecnológico
del mármol, piedra y materiales



Warsaw University
of Technology



Consortium members: Universitatea Transilvania din Braşov (UTBV), Asociația Romania Green Building Council (RoGBC), Universidad de Sevilla (USE), Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM), Politechnika Warszawska (WUT), Datacomp sp. z o.o. (Datacomp).



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0. Introduction

Ongoing compilation of training material related LCA and BIM/GIS applications from another Erasmus+ project was carried out. As it has carried out in previous tasks, the IO1 will compile, elaborate and update information, regulations and training materials in the OECP during and beyond the end of the project related to capital issues of the project.

This task has been raised as a technologic watch of the project about latest advanced on BIM technologies, as well as materials and energy efficiency: regulations, training materials (tutorials, guides, new materials and construction methods, LCA upgrading), new educational software, etc.



1. Building Information Modelling (BIM)

Standardized Vocational Education and Training for BIM in EU

Erasmus+: 2015-1-LU01-KA202-001353

"Building Information Modelling is rapidly changing the way construction projects are procured, designed, built and managed all along the life-cycle of a facility. New skills are required, and the project tackles an urgent need to 1) develop a transparent and harmonized competence matrix for BIM actors across Europe, 2) standardize BIM missions and processes at EU scale, taking into account the international BIM developments already existing and 3) classify and harmonize BIM training curriculum and certification schemes.

BIM4VET project proposal firstly aims at developing a European competence matrix for BIM actors and a BIM qualification maturity assessment method that will assess BIM actors collective and individual competences. Then, a decision-support system will be developed to allow BIM actors to find adapted training offer in the context of their needs, and of their lack of collective and individual competences, when working on a particular project.

The project is carried out by three institutions already active in BIM research and training. Moreover, an expert panel will be setup in order to cover most of the viewpoints related to this topic, at international level. This expert panel will be used for project results validation and for dissemination channel purpose. The methodology that will be used relies on the application of DELPHI approach to make experts consensually converge on both the BIM expertise and the maturity assessment topics. The IT-based decision-making system will rely on an expert system and will be implemented using a tangible tabletop device, enabling collaborative work and assessment of competences.

The impact of the project is primary the definition of a European BIM actor competence matrix, and the improvement of BIM training for construction practitioners needs, through the training centres already involved in BIM. The important implication of BuildingSmart is a guarantee for delivering this short/middle term impact. At longer term the project and its possible follow-up actions will contribute to enhance BIM actors' mobility in Europe and to the digital transition of the whole sector.



HBPM goes BIM

Erasmus+: 2016 2016-1-DE02-KA102-002951

After more than nine successful years of being the receiving institution for students, apprentices, masters and engineers from European countries, Biberach Educational Centre with its carpenter training centre and the centre of excellence for timber construction and finishing intends to offer the opportunity to its own staff and course participants in taking part in a mobility project with the project HBPM goes BIM.

This mobility project is aimed to participants of the courses „Certified Foreman in Building Construction “(according the advanced education of the building industry) as well as for its own training staff. The master carpenters of our educational centre act as training master in the inter-company vocational education in the carpenter trade and as lecturer in the further and advanced education. Some are already experienced in teaching European mobility groups in English language. The objective is that the participants learn about the new digital construction planning method BIM (Building Information Modelling) in a two weeks project with our Irish partner DIT (Dublin Institute of Technology) we have already worked with successfully for several years, and the participants will gain an overview about construction and structure in Ireland.

Together with Irish students and apprentices the Irish digital planning of a timber construction is implemented in a practical project. A further aim is that our teaching staff gains additional insight and comprehension about the Irish educational system and to intensify the international concept in our educational centre. 24 course participants and 9 training masters will travel to our partner’s institution DIT to Ireland in several flows. Course participants who target a leading position in a trade company with their advanced education, will transfer the European idea into the very traditionally orientated companies.

The companies will profit by the social, intercultural and language skills and will open their minds to look for urgently needed staff and it will make it much easier to gain skilled tradesmen or offer apprenticeships for applicants with a migration background. With the achieved knowledge about BIM and the type of construction in Ireland the project participants will have an advance in knowledge that benefits directly the companies.



The teaching staff will be able to use their new gained knowledge in their own further and advanced education as well as implementing this knowledge for foreign course participants. In the long run the digital construction enables to build quick valuable and cost efficient residential property / living area and timber constructions are predestinated for this. The participation in mobility projects will make the courses of our educational centre more attractive and expand the international advance towards other providers. Additionally, we are able to offer valuable knowhow to further international course participants (network concepts, sustainability of the measures).

Applicable Representation of City Centres with Heritage Importance

Erasmus+: 2015-1-UK01-KA202-013806

Applicable Representation of City Centres with Heritage Importance (APPROACH) has emerged from a multisector cooperation containing heritage, architectural and cultural organisations, municipality with architectural and media enterprises and a VET institution with media classes. The main objective of this transnational consortium is to assemble an online learning platform as an open educational resource, targeting firstly architectural, art historian and urban analyst students and parallelly media and web designer students in VET and on other levels. The main output of the programme is a 4-piece collection of interactive 3d city maps showing the centres of Edinburgh, Granada, Budapest and Lublin as non-formal educational tools. The creation of the animated models is based on a scientifically carried-out historical and urbanistic research collecting all available source materials, like old maps, perspectives and archive texts to be able to rebuild and represent the selected time periods of the cities - from their foundation to modern times. This approach gives the possibility to freely explore the urban environment in both space and time, collecting knowledge about the monuments and urban textile through interaction with the models. The multilingual content of the city maps will make them act as 3d visual dictionaries and can also function as content and language integrated learning resources. As a result of the transnationally carried-out research a comprehensive study is also assembled by the research institutions showing the outstanding materials collected together about the analysed cities and summarising the steps of the product-oriented co-operation with the architectural and media enterprises. Its main purpose is to promote the project ideas among VET institutions and relevant stakeholders and this way to contribute to the creation of further educational contents similar to the products of this project. To help the same initiative a



series of video tutorials and text descriptions is also assembled teaching about the creation of 3 dimensional interactive contents. The production of this online material is connected with a training programme also, in which blended mobility of VET students takes place combining virtual involvement with short-term physical mobilities. As a part of the training the media and web designer students are involved in learning, testing and this way into the creation of the final resource. The chapters of the material are to teach useful technics and methods about 3d modelling, composing animations and programming interactive functions in co-operation with for profit firms. In this way the training leads to the recognition of the latest trends of CAD, BIM and game development technologies, providing knowledge and competences with remarkable labour market relevance. With different techniques and target groups, all the outputs of the project provide working models and pathways for the easily intellegible visualisation of urban environment and monuments as well as for the integration of digital competences to the development of further educational resources.

Common Learning Outcomes for European Managers in Construction, part IV.

Erasmus+: 2015-1-PL01-KA202-016454

This Project is related to the EU Dir 89/48/EWG on regulated professions in respect of recognition, promotion and certification of qualifications by international association and organization - from construction. The main task of the project is to improve Directive's ideas, which will lead to creation of proper EU system of comparison, certification and mutual recognition of managerial qualifications in construction. Profile of construction managers' education, responsible for cooperation in the field of construction in the EU, developed differently in different countries. Project is the continuation of the finished LdV CLOEMC I (PL/06/B/F/PP/174014, set of 7 created manuals. That project created first 7 books for Construction Managers' Library. CLOEMC I manuals are commercially published on PL market, in respond to demand from construction engineers. Second set of next 6 manuals was written in the CLOEMC II project (finished in December 2011 - project No: 2009-1-PL1-LEO05-05016). Third set of 6 new manuals was written in the CLOEMC III project (finished in February 2014 - project No: 2011-1-PL1-LEO05-19888).

This Project foreseen creation of six new manuals for Construction Managers Library: Revitalisation and refurbishment in Construction; Building Information Modeling - BIM; Optimisation of Construction Processes; Diversity Management



in Construction; Structural Mechanics for Construction Managers; Corporate Social Responsibility in Construction.

Appearance on the European market of Construction Manager Library, containing full compendium of managerial knowledge in construction will promote a social dialogue, concerning adjustment of education profile for the needs of labour market.

In order to decrease unemployment and increase level of managerial knowledge in construction, there is a need to educate people having qualifications and competence to run a business, which will in the end increase employment.

Therefore, after project's completion it is planned to improve postgraduate complementary courses in management, which will allow certification and assure recognition of competence according to agreed European policy concerning promotion of transparency of qualification (EuroPass), in the form of title EurBE (European Building Expert).

Partners in the project (universities: WUT, DARM and RU) got experience in preparation of didactic materials for different types of courses, as well as informal learning. Professional associations (AEEBC, PSMB and CIOB) got experience in recognition of qualifications in construction and certification of managers, including EurBE card. One of the partners, AWBUD is a construction company which add industrial flavor to the project.

Project will start with preparation of website and first dissemination materials. Then content related contents of each manual will be created and tested with use of multiplier events E1-E5. After improvements of content related contents first draft of text will be prepared and tested with multiplier events E6-E10. Results of the testing will be taken under consideration and final texts in English will be prepared (and proofread). Then manuals will be translated to Polish, Icelandic and German, printed and burned on CD or DVD and uploaded to internet as open source. Project will be summarized by final international conference - multiplier event E11 in Warsaw.

The project will contribute to the following changes in national vocational training and practices, as added value:

- Full base of didactical modules and manuals will be created, allowing to recognize qualifications and will lead to managerial education in construction,
- Creation of manuals will promote social dialogue, concerning a need of adjusting education system to the needs of European labour market in construction,



- Project will create a possibility and opportunity to launch postgraduate complementary courses for construction managers, in order to certify and recognize their qualification,
- The project will ensure construction managers recognition of their qualifications by international network of professional association such as CIOB, PSMB, AEEBC - gathering European organizations of managers in construction.
- Uniformisation of the construction managers education in EU,
- Facilitation of construction engineers' mobility by recognition of their education in across EU,
- Better quality management of present construction investment projects (especially EU funded infrastructure projects),
- Better absorption of EU funds in Partners countries,
- Decreasing the cost of the projects, better possibility of savings in the projects (especially nowadays, during present financial crisis),
- Increasing the status of managers in construction.
- via creation of e-learning mode of courses on the base of the manuals project will facilitate access to the education for disabled persons as well as for busy engineers from construction industry.

BIM4PLACEMENT European key competences in building and construction

Erasmus+: 2016-1-IT01-KA202-005399

Building Information Modelling (BIM) can be defined as a process involving the generation and management of digital representations of physical and functional characteristics of places. BIM software's are used to plan, design, construct, operate and maintain many kinds of buildings and infrastructures. In Europe BIM is becoming more and more studied in VET schools, VET courses and university courses and applied in companies. It is becoming a new specialization with a high rate of employability. In Italy this methodology is not yet sufficiently known and spread, while in other EU countries, especially in northern Europe, BIM is already very well know and used: Finland is one of the earliest adopters of BIM, and it has been for years at the forefront of Building Information Modelling; in other northern european countries like Norway BIM research and development goes back to more than twenty years



ago, and nowadays it's one of the leading Countries using BIM with one of the European highest implementation of BIM among architects and installations. Considering the lack of homogeneous tools validated at European level for training in BIM, this project has the aim of building a bridge between Northern Europe and Southern Europe: Italy will have the opportunity to learn from the European best experiences paving the way to other Southern Europe Countries, while Finland and Norway will have the opportunity to enlarge their international BIM-related network of institution and companies and update their knowledge from mutual exchange of best practices and innovation of training tools. Excellence in the area of BIM is possible at the moment only through transnational cooperation, standing the big difference of knowledge, awareness, entrepreneurial attitudes and implementation rates among EU Countries. The project GENERAL AIM therefore is to deepen knowledge about Building Information Modelling (BIM) as a skills' development training subject for employability goals, upgrading existing training tools and professional qualifications and creating a network to promote work-based learning with special attention to apprenticeship project is a capacity building project in the area of VET promoting cooperation and partnership among 6 different organizations (VET provider, Regional Authority, 2 universities, private company, EU association). Countries involved are Italy, Finland and Norway, while one partner is active all over Europe. From local to European level the tackling of problems connected to social issues like youth unemployment and need of re-training for people expelled from the job market needs a common approach and a desired common impact by EU interventions through national partners like in the E+ programmes. The motivation of BIM partners to participate in the project is strongly connected to the observation of local needs and the acknowledgement about the necessity to try to cover the gap between skills' qualifications levels and the requirements from job market. SPECIFIC OBJECTIVES:- Upgrade and innovate existing training tools and training programs about BIM- Increase the synergic use of up-to-date technologies, in an integrated way, with team work approach and personal development - Improve the effectiveness of teaching and learning of vocational contents on BIM- Increase the cooperation among educational institutions and enterprises in EU for better employability NEEDS to be addressed:- lack of attractiveness of existing training tools based on playful didactic- lack of homogeneous tools validated at European level for training in BIM- lack of "mixed" network among educationals+companies- lack of BIM-related professional qualification in ER Region (Italy).INTELLECTUAL OUTPUTS envisaged:1. Comparative research "BIM as driver for employment" (publication)2. New/renewed professional qualification in building and construction sector for Emilia Romagna Region 3. New/updated training



programs about BIM for students, unemployed, employed in building sector⁴. New serious game about BIM addressed to beginners from various environments⁵. BIM network composed by educational institutions and companies interested in work-based learning, particularly in apprenticeship. TRAINING ACTIVITIES envisaged: Two intensive training courses addressed to project partners to exchange best practices about training in BIM and BIM implementation. One training of trainers for each Country addressed to local trainers/trainers/instructors in the area of building and construction and aimed to update their knowledge about training methodologies for training BIM, including the new BIM game. RESULTS AND IMPACTS envisaged: impacts are expected at regional, national and European level. The impact will rely on application and diffusion of the deliverables produced by the project. The dissemination drivers will be the consortium partners themselves and companies and educational institution members of the BIM network.

Energy Links and Integration Tools for Efficiency

Erasmus+: 2016-1-FR01-KA202-024026

Context/background of project.

The ambitious Energy and Climate targets for 2020 demand an increasing effort from the building industry to reduce greenhouse gas emissions, increase the share of renewable energies and improve the energy efficiency of buildings using innovative technologies. In the EU Directive on public procurements released in February 2014, the European Commission recommends the adoption of BIM, Building Information Modeling, for its energy and environmental transition policy. BIM is the process and practice of virtual design and construction throughout its life cycle. It is a platform to share knowledge and communicate between project participants. In some of the ELITE project partners' country BIM has already become compulsory (UK and France), while in Italy, Estonia, Portugal the issue is still under discussion and specific working groups are working on this issue. In this context, where the different national building regulations are more and more innovative and demanding, the professionals in charge of the realization of buildings are not well informed or trained and they lack interdisciplinary skills. They should be trained in order to promote their 'energy literacy', including integrated design, management practices and good operational digital skills which are necessary to face the digital transition which is spreading in the construction sector. The objectives of our ELITE project are: - to close the gaps between industry needs and professionals and future professionals' skills, defining an



innovative training course which will foster employability of the trained people, - to support the development of innovative and systemic professional approaches in the field of energy efficiency in the building sector, based on the use of BIM, which will enhance building enterprises competitiveness. The participants will be the ELITE partners, representing 5 EU countries, France, Italy, Scotland (UK), Estonia and Portugal. Their heterogeneity will ensure the multilateral approach to the project. Each partner will involve local stakeholders, representing both the construction trade and the education sector. The beneficiaries of the training offer will be construction professionals and future construction professionals (level 3 and 4 of the EQF). The innovative, open on-line tools will ensure the sustainability of ELITE activities within and beyond the partnership on a long-term basis. The local national stakeholders and the silent partners identified in the preparatory phase will guarantee the take up of ELITE outputs by a wide audience fostering the impact of the project. The activities planned by the ELITE partners are the following:

- design of an innovative the Didactic Suite based on the use of BIM to tackle energy efficiency in the building sector- implementation of an Open Interactive platform.
- design of augmented reality projects which will be available on the on-line platform and suitable to all levels and education sectors.
- pilot test of the training material.

The methodology aimed at addressing the ELITE objectives will follow three main phases:

1. Preparation: Work plan development; definition of procedures for risk, quality and impact evaluation, budget control and time management.
2. Implementation: implementation of the activities as determined in preparation stage, development of intellectual outputs and organisation of multiplier events.
3. Follow-up: impact evaluation procedures, follow-up survey of multiplier events, sustainability actions.

The results expected are the following:

- A new training offer: a didactic suite which will be addressed to learners in a C-VET perspective and will promote work-place learning.
- An open interactive platform which will enhance the permeability between formal and non-formal learning, participatory education governance and work



methods and will spread the utilisation of open training methods through promoting the use of innovative ICT tools.

- Augmented reality projects which will allow learners to work in an intuitive way using a non-formal learning tool and its utilisation be spread for educators and learners at all levels.

The expected impact is the improvement of the competitiveness of SMEs of the construction sector and the improvement of the employability of the professionals and future professionals on a European scale. Training providers will also benefit from the uptake of the ELITE approach, improving the quality and efficiency of their VET courses, making VET a more attractive learning option and ensuring link to the labour market requirements. In the long term, ELITE project, promoting the improvement of the energy efficiency of the building stock and the upskilling of the building workforce, will represent a strong driver for job creation which is highly important particularly in a period of poor economic growth and high unemployment.

Plateforme collaborative de formation au BIM (Building Information Modeling).

Erasmus+: 2016-1-FR01-KA202-024266

The new working methods focused on BIM (Building Information Modeling and / or Management) require radical changes in all the practices of all stakeholders of an architectural project, and collaborative involvement of all stakeholders to make the best in each business the benefit of this new methodology. It is also a philosophy, a way of working and a tool to enrich and maintain throughout the building life cycle. Like all actors are called to work together, it makes sense to train together and to offer a tool where they can test in common process and negotiate the best turn of BIM.

Developed by a team of 8 European partners, the project aims to share this culture and its impact on all stakeholders of the building, providing them with a learning platform (LMS = Learning Management System), under as a hybrid former (blended learning) where mix-face and distance modalities. For participants (1000 people referred), the impact is clearly the concretization of a desire to contribute to the recent revolution in professional practices in the field of construction, revolution embodied by BIM. For training organizations, universities or professional, the creation of the LMS will be an important innovation in a rapidly changing technology. The needs in training



and collaborative and innovative angle chosen by the BIM GAME make a tool expected by many industry players. The expected impact is economic (saving time, reducing costs), environmental and societal. This device is designed to be handled by the BIM trainers, with all the possibilities offered by the LMS. Each trainer will be responsible for the organization of learning, modulating content, scenarios and assigning roles to each trainee. Groups targeted training correspond to future players of a construction project: architect, engineer, contractor, driver operation, construction economist, public or private client, head of industrial, operator, etc ... the LMS offering digital models and realistic business scenarios, will focus on the effective collaboration between teams and will propose the nearest working model possible to the actual conditions. An evaluation system based on feedback from user experiences will be implemented: trainers, trainees, professionals, etc... This is to develop qualitative studies based on a compilation of data from observations and field interviews (Beta - tests). The European project will enable a broad assessment of the platform given the different practices. For these reasons, the involvement of developers, partners, cutting the project in phases and the work schedule will be paramount. There can be found:

1. At the center, various new construction projects or renovations with different numerical models. These projects present a great diversity of buildings typologies, constructive types, quality achievements, and will include several types of models (architectural, structural ...). Some projects may register in specific issues, leading a specific use of these models, linked with constraint or outsourced software.
2. Defined roles with different level of responsibilities which involve the whole building trade, directly or indirectly.
3. More or less constrained scenarios depending on the skill level of trainees who are involved in this process. Scenarios for each type of actors (customized avatars) but also a type of process related to a particular project.
4. A communication system via a collaborative platform. This platform will provide the operational interface for exchanges between the players; in order to reach the final conclusion of the scenario depending on the operational level of the players and the type of project.
5. An assessment system of the collaborative process will allow the analysis of the abilities to participate and understand the issues of any roles in the chosen BIM process. This tool can be used as part of a classical face training



or at a distance training. Modules of external training in the use of the tool will prepare each actor to play its role and understand the various technicalities related to the role that will be vested.

2. Geographical Information System (GIS)

Developing a learning line on GIScience in education.

Erasmus+: 2015 2015-1-BE02-KA201-012306

There is a strong need to implement spatial thinking using GIScience tools in education, for the following reasons:

- 1) Spatial thinking is integral to everyday life and many of the daily decisions we make. It is the concept of space that makes spatial thinking a distinct form of thinking. It is a basic and essential skill that can and should be learned, alongside other skills like language, mathematics and science.
- 2) The knowledge and capability to use GIScience and Geographical Information (GI) is not only essential as a basic skill, but it also offers significant job opportunities. However, now there is a clear mismatch between workforce demand and supply. The GI sector is in many countries a shortage occupation sector.
- 3) One of the priorities of the European Union the last decade has been the promotion of “digital literacy.” The GIScience tools used are a perfect answer to this.

Although some materials are already available for schools, teachers do not tend to use them in their class practice. The main blocking factor is that the notion of GIScience, GI or spatial thinking is uncommon in the curriculum of almost all European countries.

If we want to overcome the chasm which at the moment prevents introducing GIScience in schools, we must introduce and institutionalize it inside the curricula of the schools. This must be done taken into account the level of difficulty connected to the age group. The main focus of the project will therefore be the development of a real learning line on GIScience in education for use in schools, enabling them to translate their curriculum into classroom GI-learning. We need to translate the competencies - taking into account age and level - into real learning objectives in a number of different subjects.

The consortium consists of seven European partners covering Belgium, the UK, Spain, Austria, Poland and Romania. The partnership consists of various types of organizations and institutions operating in the field of education, each

bringing their considerable expertise to the consortium: two universities, four secondary schools and a pan-European professional association.

We divide our approach into different stages:

- 1) first, we summarize the most important literature on learning lines and spatial thinking
- 2) we scan the curricula to identify opportunities to introduce GIScience.
- 3) We develop a test to analyse the impact of the learning lines on spatial thinking.
- 3) We create drafts of learning line translating them into real learning objectives for selected years (K7 and K10)
- 4) Pupils of different age K7 and K10 of the schools will test the materials and give their feedback and if appropriate their amendments. They will also communicate with their age group of the other schools.
- 5) The teachers and researchers rewrite the learning outcomes into a final version.
- 6) In the second and third year of the project the same work will be done for year groups K8-K11 and K9-K12. Thus the same group of pupils will be testing the materials for three years in a row.
- 7) Finally, the final learning lines will be published.
- 8) The learning lines will be along with the essential classroom materials, thus facilitating the introduction and implementation
- 9) A publication with guidelines for suggested inclusion into the national curricula will be produced.

The main outputs at the end of the project are:

- a state-of-the-art publication on implementing correctly spatial thinking with GIScience tools in education through methods of a learning line
- learning lines on spatial thinking
- all needed material (lesson plans, software, data ...) to implement spatial thinking immediately in the classroom.

These results will remain freely available to all groups of stakeholders from different education sectors (e.g. teachers, teacher trainers,



educators, academics) helping them to implement the learning line on spatial thinking with GIScience tools into their classroom.

Geoheritage and climate change opening the secrets of home.

Erasmus+:2015 2015-1-FI01-KA201-009038

Climate changes have both social and economic consequences and impacts on geodiversity. The project will support high school teaching that will lead to improvements both in the perception of climate and environment changes in Europe and in the appraisal of geoheritage.

The main objectives of the project are developing basic and transversal skills using innovative methods, enhancing digital integration in learning, teaching, training and youth work at various levels and strengthening quality through mobility and cross-border cooperation. The main goal is to understand climate change as a multidimensional phenomenon and to recognise both the natural and the human induced aspects of it. The main objective is to utilize the unique geoheritage of the Geopark areas for studying the climate change. The project will reveal the local "secret" values for the students and strengthen the understanding of the geological and human history of their home region and their roots.

The participants are Vaala Municipality/Vaalan kunnan sivistyspalvelut (the coordinator), Vaala Upper Secondary School/Vaalan lukio, Humanpolis Ltd/Rokua Geopark, Verbania City/Provincia del Verbano-Cusio-Ossola, I.I.S. Lorenzo Cobiانchi/Vocational and Technical School and the University of Turin/Universita Tegli Studi di Torino. The other organizations that are involved in the project are the University of Oulu (the Department of Geography), Geological Survey of Finland/GTK, LIFEPeatland Use-project coordinated by Natural Resources Institute Finland and Parks and Wildlife of Finland/Metsähallitus, EGN and GGN.

In three years short-term exchanges (7 days) for the groups of pupils (16 students from Vaala, 22 students from Verbania, 4 teachers and professionals) are established every term.

The participants in the exchanges will be students and teachers of the project schools and professionals from the partnership organizations (Rokua Geopark, Sesia Val Grande Geopark and the University of Torino).



The purpose of the project is to enhance students' knowledge and understanding of sustainable development by studying and researching climate change in an international context and special context, such as the one offered by Geoparks. Climate change as a phenomenon is difficult for many students to understand, even if it deeply affects their everyday life.

Transnational exchanges and visits in different geomorphological and cultural environments deepen the fundamental understanding of the climate change, both in a local and global perspective. Transnational exchanges also enable to collect scientifically relevant data series and implement and practice wider range of learning and research methods. Rokua Geopark and Sesia Val Grande Geopark offer two very different but pedagogically outstanding environments to study and explore the climate change. The profit of these two areas is the unique geological and cultural heritage which create a natural laboratory for investigating long and short term climate change as well as for discussing about the effects of climate change for nature and culture.

International exchanges with the hosting of pupils in the families and the cooperation by modern technology support language learning, and strengthen language, learning and social skills. To know other cultures better also assists to understand oneself better, which is one of the key factors for socially sustainable development.

Results benefiting the students:

Learning of research methods (ia. dendrochronological methods, species identification methods, soil profile measurement, climate data analysis, digital modelling, GIS based field exercise methods, peat analysis and mire drilling, archeological methods, georesources exploitation, glaciers retreat study). Among the concepts explored in order to get new knowledge: plate tectonics and Alpine orogenesis, geological time, geomorphology, volcanism, rocks, georesources and local culture.

After the end of the EU funding, the international cooperation between schools and geoparks will continue. The approach of integrated teaching, the curriculum at school, and the educational materials will be maintained. After the project they can be used freely and we hope that we can go on with the project in the future, enlarging the number of the participating countries."



HERE Map Makers

Erasmus+: 2017-1-HR01-KA201-035413

Digital cartography is attractive field to apply modern, practical and innovative learning methods because of rapid changes in technology of cartography and GIS (Geographic information system). Digital technologies are bringing new possibilities to improve cartographic and GIS education, which have a relatively small part in schools.

Therefore, schools in this project are connected with HERE company, one of the leading companies in the world in digital cartography, which will give teachers and students the opportunity to be in touch with the latest trends in digital cartography. This project enables modern technology and methodology transfer from business sector into school educational system. Exchanging good practices, sharing ideas, skills, expertise and knowledge among partner schools will improve learning methods and pedagogical approaches based on the latest ICT tools for GIS.

The objective of this project is to strengthen capacities of schools in teaching GIS in accordance with modern trends of making digital maps. Sharing practices and experiences with partner schools and acquiring new competences from the private sector by using the newest technologies will result in increased level of digital competences of teachers and students. The main target groups, 14 teachers and 70 students, will benefit from this innovative approach in their classes because the project will bring them new possibilities to learn with modern ICT tools, innovative contents and methods.

Through the project, teachers will be educated to use the latest technologies in the field of GIS. They will transfer knowledge of using HERE software tools for gathering, visualizing and analyzing spatial data and processes to their students, by using methods, contents and activities where student is an active subject of the learning process. In the summer camp students will have tasks to detect specific changes in real world and update changes on map, using HERE Map Creator. Study visits to other countries will be organized because of different approaches in learning GIS and sharing good practices among schools. The result of the project will be digital maps of local area, including tourist or cultural content.

By using latest technology in GIS, educational process in the schools will be modernized through implementation of innovative ways of teaching, and key modern competences of teachers and students will be ensured. Comparing and analyzing practices in other European schools, will give schools possibilities of getting new ideas and good practices to their own school.



Besides improving IT competences and expertise in GIS, both teachers and students will cooperate and communicate with schools abroad and thus improve their foreign language skills, develop team work competences and social skills. Development of exact skills and know-how will assure students the competitiveness, initiative, independence, responsibility and development of critical thinking. Implementation of innovative practice on international level will have an important impact on development promoting and modernization of schools.

Open educational resources platform for Geomatics applications to social and environmental issues.

Erasmus+:2017 2017-1-PT01-KA203-035799

GEONATURA is a project under Strategic Partnership at Higher Educational Institutions for providing an eclectic and multidisciplinary formation by teaching & training activities on applied Geomatics for science & technology on engineering & management aspects. Background of university partners will be matched to benefit different audience levels considering the chosen main themes; sustainable development and environment, smart cities, climate change, renewable energy sources, social and socio environmental issues, sustainable agriculture, farming and forestry, land administration and built environment. Associate partners with background on GIS software and needs for geospatial work on all types of data are to be gathered on the initiative in all countries of partners (Portugal, UK- Scotland, Netherlands and Italy). Special focus prioritizing Azores territory is to be performed.

The objective is the development of a common innovative educational package by university staffs to HEI students and qualified users on applied Geomatics specifically driven to subjects related to social, socio environmental and socioeconomic issues present on natural and built environment. This involves technology & science tools, for engineering & management applications. Purpose is to enlarge knowledge of young adults on these fields aiming to help them on achieving smart job opportunities in market while contributing to their social inclusion. Also their growing global citizenship by absorbing philosophy of sustainable development is to be provided. Certification of approved students is contemplated giving referral to these participants for job opportunities in market while motivating them for sustainable self-learning by several OER e-learning platform enlarging the net citizens community in Geomatics and related matters.



About 430 HEI graduate students candidates will be involved, from which 160 are directly selected by partnered universities. Actually 40 per partners distributed in 4 seasonal rounds (Spring and Autumn of 2018 and 2019). They will be motivated for Geomatics application to societal values to acquire specific professional expertise to access job opportunities in market. A special remark and control is made for insertion of 20% participants evidencing needs for social inclusion.

Sequential activities are contemplated distributed on three stages; stages 1A and 1B) Introductory preparation on fundamentals of Geomatics and GIS, as well as its current applications and framework, for beginners and selection; stage 2) blended learning mobility connected to multiplier events; stage 3) remote on line intensive training for consolidation of apprenticeship followed by initial assistance to certificated participants after examination and approval. These three stages will be repeated four times (Rounds 1 to 4) in Spring / Autumn 2018 and 2019 respectively.

Methodology is referred to innovative high tech e-learning packages using MOOCs and GIS software, web site, OER platform, MIRIADA X, connection to social networks, applicable in desk tops, notebooks, tablets or smart phones. The methodology will insert modules on a proper way with innovative applications on IoT, data mining and on line animation of geo-spatial data for several and Geomatics features. The priority is to gather experiences on applicable subjects connected to sustainability issues aiming to widen an eclectic academic perception on natural resources engineering & management with environmental compliance through information and know-how exchange among partner universities exhibiting different but complementary expertise.

Impacts on 4 groups of HEI students on each country (Portugal, Netherlands, Scotland - UK, and Italy) with proficiency on applied Geomatics able to achieve the labor market with their new professional capabilities. Connection to several Internet network resources and tools is envisaged to enlarge overall self learning on GIS applications to societal issues under sustainable basis. Immediate enlargement of this net community by enlarging the number of users in the customized OER e-learning platform which will remain freely available for all in cloud-based terms.

This is a reference to support for common initiatives in GIS community promoting EU initiatives for the establishment of thematic networks approaching academia to government and corporations.



Expected benefits are; a) the enlargement of beneficiaries to 3.700 in 5 years to form a lucid and skilled community dealing with Geomatics in real problems of society becoming active in projects, research, or community and government action programs, b) the matching of this community to 10 or more e-learning or scientific platforms to improve their awareness and capabilities on cross-crossing matters to deal with real problems involving inventory, diagnosis, solutions, planning, executive actions, feed-back, and improvement.

Sustainable Management of Cultural Landscapes (SUMCULA).

Erasmus+: 2017 2017-1-SE01-KA203-034570

Problem scope

Cultural landscapes can be understood in many perspectives such as The agricultural landscape, The industrial landscape, The urban cityscape, The coastal maritime landscape, ...and even more denominations are possible for example Foodscape, Soundscape, etc. What they share is the material and intangible consequences of man's interaction with the landscape in a broad variety of different areas and contents. The issues motivating this strategic partnership build on the experiences and competences of the partners and rests in a number of issues such as:

- how to organize the numerous stakeholders in landscape questions into a sustainable governance structures;
- how to develop models for identifying, describing and interpreting material and intangible properties of the landscape;
- how to develop strategies for valuation, preservation, development; and
- how to develop local economies and sustainable tourism building on identified qualities and properties of the landscape.

The objective of this partnership is through a number of case studies approach these issues as inroads to development of courses and didactic resources to be used on master's level. The members of the partnership cover a wide range of competences:

1. University of Gothenburg, Sweden, Coordinating institution: built cultural heritage, industrial landscapes, floating heritage, iclimate change, geomorphology, bio-diversity, remote sensing and GIS



2. University of Pécs, Hungary: cultural heritage studies, regional development, strategic planning, adult education, floating heritage of rivers and lakes, viticultural landscapes, economy of regional planning, environmental law
3. University of Pannonia, Veszprém, Hungary: regional development of disadvantaged regions, sustainable agriculture, agro-economy, bio-energy production, tourism; viticulture, remote sensing & GIS
4. Lake Balaton Development Coordination Agency (LBDCA), Siófok, Hungary: regional infrastructure planning, management of nature reserves and national parks, lake-management (shallow lakes), cultural heritage of rural areas
5. European Ecocycles Society (ECyS): sustainable ecological cycles, environmental management, international networking and publishing in the journal ECOCYCLES (ISSN 2416-2140; DOI prefix 10.19040 [Cross Ref]).
6. University of Palermo (UNIPA), Palermo, Italy: general soil science and soil conservation, water resources management in arid environments, environmental protection, waste management, viticulture and conservation of viticultural landscapes, remote sensing and GIS
7. Ecole des Métiers de l'Environnement (EME), Bruz, France: environmental technologies, environmental chemistry, remediation of polluted landscapes, renewable energy technologies, flu gas cleaning, biogas production waste management
8. Mendel University (MENDELU), Brno, Czech Republic. Core competences: forestry, forest ecosystems, conservation of forest landscapes, landscape dynamics, environmental protection, environmental health and epidemiology
9. GAIA Education, Findhorn, Scotland, UK : ecovillage design and education in the design of ecological settlements, waste management and implementation of zero waste policies, environmental sociology, adult education, lifelong learning.
10. Slovak Agricultural University (SPU), Nitra, Slovakia: agriculture, food safety, bio-energy, environmental law, regional development
11. University College of Tourism and Ecology (WSTiE), Sucha Beskidzka, Poland: sustainable tourism, tourism-informatics, eco-tourism
12. Universitat Rovira i Virgili (URV), Tarragona, Catalonia, Spain: viticulture and enology, environmental science, cultural heritage



13. University of Applied Sciences (HTW), Dresden, Germany: environmental science, urban agriculture, landscape architecture

Activities to be covered: This follows the general rules for applying within Erasmus+ Key Action 2: Cooperation for Innovation and the Exchange of Good Practices, specifically focusing strategic partnership. Activities:

1. Case studies of cultural landscape management
2. Curriculum development: new master courses
3. Workshops, conferences and Intensive Programmes
4. Scientific publications regarding new methods of education
5. Establishing an international knowledge-bank through active networking

Expected outcomes:

Increased cooperation on primarily master's level among partner universities that will facilitate staff and student mobility, but also with development of didactic resources to increase the availability of courses for students throughout Europe.

Bringing the 3-D world into the classroom: a new approach to teaching, learning and communicating the science of geohazards in the terrestrial and marine environment.

Erasmus+:2017-1-UK01-KA203-036719

There is a demand for highly-skilled professionals in the environmental and geoscience sectors, who can be innovative, creative and particular skills in advanced 3D spatial analysis, multi-disciplinarity, data management and informatics, mathematical and numerical skills, fieldwork and observations skills, earth observation and image analysis. The aim of this project is to help students develop these key skills through a trans-european cooperation between 13 academic, research and industrial institutions in the UK, Greece, Italy and France. It will focus on the use and integration of terrestrial remotely piloted airborne systems (drone) imagery and submarine remotely operated vehicle data for the combined study of geohazards in terrestrial and marine environments, through a programme of data sharing, scientific and technical collaboration and ultimately curriculum development at postgraduate level to help students develop advanced skills in these areas.



The aim of the project is to develop a series of very high resolution 3D virtual reality models of geohazards observed in the onshore and offshore environment using data acquired from airborne drone and submersible platforms that can be used in classrooms to teach about onshore and offshore environments as a continuum. To facilitate this, the project aims to develop a series of toolkits to allow students to navigate these environments using virtual reality headsets, map and measure features on the ground surface and seabed to simulate real field mapping activities; and then export features they have identified for further analysis in other software such as Geographical Information Systems (GIS).

Our project will create a digital platform where terrestrial and seafloor data and virtual reality visualisation tools will be openly distributed to allow for the processing and visualisation of terrestrial and seafloor environment focused on natural hazards. The project will deliver teaching toolkits to partner the data, to develop firstly, observational and mapping skills (in the terrestrial and submarine environments) and secondly, a critical understanding of differences between geohazards in terrestrial and seafloor environments. From this, we will present a curriculum design that can form a framework for environmental and geoscience postgraduate course provision and training across Europe to tackle the skills shortage in environment and geoscience sectors.

Open tools for analysis of spatial data in life sciences.

Erasmus+: 2015-1-BE01-KA204-013222

Geographical data are increasingly available for agriculture and environment applications, as shown by the ever growing use of satellite imagery, expanding use of drones for image capture in agriculture and environment management and ubiquity of GPS technology in modern data acquisition tools. Therefore, professionals in agriculture and environment, among others, need to overcome their current limitations in extracting and exploring those important and frequently freely available resources. Professionals might also have access to large sets of spatial information through their own institutions (either public or private) without having the necessary knowledge and skills to be able to process it. To be able to address those challenges, the user does not absolutely need to be an expert in GIS or Statistics, but needs to have a sufficient background to address the problems in hand.



This projects aim at improving the skills of those professionals in that respect. It will help them to use available open source tools to extract and analyze spatial data which are relevant for their professional activity.

This project is developed by three partners : the University of Lisboa, which have a strong background on teaching courses on GIS and spatial data analysis with R software, SupAgro Montpellier, which has skills on Bayesian statistics, an experience in the creation of mooc and offer technical and logistic supports to the project (including a video studio), and the University of Liege, which has experience in the organization and management of a master degree in applied statistics and has a dedicated higher education pedagogical department (IFRES) which can provide the needed support during the construction and evaluation of the learning modules.

Year one will be dedicated to the creation of the training material. In addition to the online communication tools, the transnational meetings will be the occasion to exchange practices, meet local stakeholders and integrate their constraints into the project. During year 2, the created cursus will be tested on a panel of selected students originating from the 3 partners. The efficiency of the chosen learning techniques (MOOC, blended learning) will be monitored and analysed to fine tune the learning activities of year 3. Learning activities of year 3, corresponding to 6 ECTS of intensive courses on spatial data analysis with open tools will be held in Belgium, but transferable in partners' institutions after the project. The activities will take form of an introductory MOOC followed by blended learning activities, with a maximum of two weeks of face to face activities. During year 3, the results of the monitoring of the learning activities of the project will be proposed for a communication in a pedagogical conference, possibly one of the International Academy of Technology, Education and Development (IATED), INTED or EDULEARN.

Promotion of the project will be conducted through the creation of a website, a video teaser, a flyer and through the organisation of a local seminar in each partner's institution, and one international seminar on year 2 in Belgium.

For the target groups and stakeholders (entreprises active in life sciences needing expertise in spatial data analysis), the project will fill a gap in the training offer, permitting to acquire key competences in spatial data analysis in a organisational design especially tailored for their needs and constraints and therefore increasing competences in applied statistics for spatial data



analysis on the job market and the partial filling of the high demand for spatial data analyst workers .

Apart from the creation of the learning modules themselves, we expect creating emulation between partners of the project with other organisations active in data analysis and innovative pedagogy, and using the created contacts as well as the experience gathered during the project in order to improve the learning offer. The expected impact is a greater experience in transnational teaching, to explore the benefits and constraints of such programs. We also expect to create a worthy emulation on innovative teaching methods by exchange of our mutual experience, acquired before and during the project and use the project as a same scale laboratory of learning practices, which will be used to test the long-term feasibility of a greater scale transnational program, e.a. European Master Degree.

Towards an innovative strategy for skills development and capacity building in the space geo-information sector supporting Copernicus User Uptake EO4GEO.

Erasmus+: 591991-EPP-1-2017-1-IT-EPPKA2-SSA-B

EO4GEO is an Erasmus+ Sector Skills Alliance gathering 26 partners from 12 countries from academia, private and public sector active in the education/training and space/geospatial sectors. EO4GEO aims to help bridging the skills gap between supply and demand of education and training in the space/geospatial sector by reinforcing the existing ecosystem and fostering the uptake and integration of space/geospatial data and services in end-user applications. EO4GEO will work in an multi- and interdisciplinary way and apply innovative solutions for its education and training actions including: case based and collaborative learning scenarios; learning-while-doing in a living lab environment; on-the-job training; the co-creation of knowledge, skills and competencies; etc. EO4GEO will define a long-term and sustainable strategy to fill the gap between supply of and demand for space/geospatial education and training taking into account the current and expected technological and non-technological developments in the space/geospatial and related sectors (e.g. ICT). The strategy will be implemented by: creating and maintaining an ontology-based Body of Knowledge for the space/geospatial sector based on previous efforts; developing and integrating a dynamic collaborative platform with associated tools; designing and developing a series of curricula and a rich portfolio of training modules



directly usable in the context of Copernicus and other relevant programmes and conducting a series of training actions for a selected set of scenario's in three sub-sectors - integrated applications, smart cities and climate change to test and validate the approach. Finally, a long-term Action Plan will be developed and endorsed to roll-out and sustain the proposed solutions.

Doctoral Studies in Geoinformation Sciences (GISc).

Erasmus+: 585718-EPP-1-2017-1-HU-EPPKA2-CBHE-JP

Geospatial Science (GISc) is a new science, however, has its roots thousands of years. It integrates three traditional geosciences (firstly, geodesy as the science of precise spatial data acquisition; secondly, geography as the science of studying human and physical aspects; finally, cartography as the science of making maps. The integration of these sciences is based on the rapidly evolving computer science. The methods of GISc are widely applied in other sciences, essential in decision making for sustainable development. The wider aim of the project is to support Uzbekistan in sustainable development by GISc. The objectives envisaged with the project is to establish a missing puzzle from the Uzbek educational system after the MSc level has been completed and before the DSc is targeted. The proposal offers a programme and methods to bridge the gap. The outputs are as follows:

- an international network in GISc;
- an accredited Doctoral Programme;
- education capacity at HEIs to deal with the above mentioned problems;
- e-learning platform with a joint, co-operative knowledge pool;
- glossary of geospatial terms, containing definitions in Uzbek, helping interdisciplinary communications;
- research capacity: research labs, and a Joint Research Centre for the interdisciplinary applications in UZ;
- annual GI conferences aiming multiplier effects.

There are several challenges in UZ, where GISc may efficiently support solutions, for such issues as climate change, land degradation, heavy use of agrochemicals, diversion of huge amounts of irrigation water from the two main rivers of the region, water scarcity, the chronic lack of water treatment,



e.g. Aral Sea, or the growing threat to air quality. UZ society will benefit from innovations to enhance quality, performance and interactivity of public services, to reduce costs and resource consumption and to improve contact between citizens and government.

Constructing European identity through material and intangible heritage.

Erasmus+: 2016-1-ES01-KA219-025489

This project is focused on knowing and learning about the European industrial heritage. We will work with a broad meaning of "industrial", not only material remains, also intangible topics. The heritage knowledge will motivate our students to learn about other countries' heritage, finding common connections and shared identity symbols. We hope to develop more than a history memory; we want to discover new industrial enterprises and consider what to do with the remains of the ancient ones. The second item in our project is related to language. All the schools taking part in the project are situated in the boundaries of Europe and their mother tongues stem from different origins, so English will be our language of communication. Furthermore our students will have the opportunity to learn about many different ways to be European. The third item of our project has to do with the use of new technologies. One of the goals of our project is that students get used to working in a network, sharing knowledge and studying in a cooperative way. To achieve this, we will use 3.0 tools that will allow our students to work together, using English, communicating what they have learned, raising their skills and helping them with their idiosyncrasies. We have created an eTwinning project as the main communication tool between us. The students also get to know some tools related with GIS (Geographical Information System) and will develop an application to tablet or smartphone on industrial heritage. Our project is conceived to be multidisciplinary in order to approach new technologies applied to the project's topic, apart from learning English. Across the project our students have to learn how to communicate, plan and organize, all of them very important skills and well-valued in the work market. The participant schools are: INS Enric Borràs (coordinator) SPAIN Zespol Szkol w Nowej Slupi POLAND 4o Gymnasium Komotinis GREECE Knox Academy SCOTLAND Istituto d'Istruzioni Superiore Telesia ITALY We can ensure the cultural wealth of the project because of the diversity of partnerships: language, social environment, local landscape. All the cities involved have an heritage that worth's to be known and one of our aims is develop some skills to make it easy to attain. Social backgrounds are

also quite diverse. A diversity of backgrounds is, therefore, guaranteed. At the end of the project, we will have achieved:

*A local industrial heritage catalogue, including material remains and other forms of intangible heritage (like traditional food)

*An interactive application with the main local industrial heritage and its description.

*An educational platform to access and share the outcomes elaborated by the participants.

*A mobile app to guide the visit of the industrial heritage.

*A didactic guide to work with the resources listed above. How will we carry it out?

* Each school will individually:

- Prepare, record and share a traditional recipe

- Locate and visit their own industrial heritage.

- Take pictures and write a description.

- Make documental research.

- Elaborate the catalogue.

- Learn the software we need to develop the project.

- Translate all data in the proposed forms.

- Share their knowledge through different ways (posters, infographies, social networks). Collectively:

- Create virtual bridges of communication on two levels: students and teachers.

- Create a virtual portfolio.

- Create a web-page to access and share the outcomes elaborated.

- Create a web-page to access and share the human experiences during the project.

- Create the guide-lines of an "industrial" virtual itinerary.

- Know and compare the results of the different areas.

- Visit other partners, share experiences and plan a schedule.



New technologies will make possible the development of our project, using the resources we find on the net and GIS. We will try to use, were it possible, free software and 3.0 tools. We also expect that students that have participated in this program using English to learn and communicate will be aware of how necessary and rewarding it is to have a good level of foreign languages.

We have foreseen some tools to evaluate the evolution of the project. Evaluation will start at the beginning of the project, once the project is in process, on the basis of feedback received from students and teachers involved in the project. After every semester exchange/transnational meeting, participants will be asked to fill assessment questionnaires. Other quantitative measurements (number of students involved, numbers of meetings, people attending seminars or workshops) will complete the picture.

Once the project is finished, we will try to keep our outputs updated on a regular basis. Our intention is that the educational products that will be the result of these activities could be used in the future by other schools and even other public audiences.



3. Lyfe Cycle Assessment and Energy efficiency

Sustainability 24/7 Energy and resources.

Erasmus+: 2015-1-DK01-KA201-004336

The project is aimed at developing students' perspective and their reflection on Learning in a Global World. Students within the 16-19 age range are to reach an international level and experience by way of project work and intercultural communication, exchanges and mobilities.

We intend to address the topic of sustainability from diverse and varied angles, and how it affects the students' daily lives now and in the future. This will be achieved through the joint efforts of students and their teachers on five overall themes, related to sustainability. The five themes will start out with activities at the home school leading up to mobilities and a workshop. All workshops will consist of students' presentations and science lab work in cooperation with external local partners, e.g. universities, museums, industry and the media. The five partner countries will take responsibility for one workshops each. The 5 themes will be 'Renewable forms of energy' (IS), 'Advertising-communication campaigns' (DE), 'Biotechnology' (DK), 'Waste and recycling' (AT) and 'Saving energy' (FR).

We intend to involve a wide range of subjects, from technology and biotechnology, biology and chemistry to history, social studies and to cover many angles of the theme. The crossovers between the five schools study lines will enhance the student's motivation and involvement in their school's curriculums.

The project will focus on the students working together on research, use of data logging, practical work, lab work, Virtual Learning Environments, visits, field trips and face-to-face contact. Each theme will result in products and sharing knowledge through ICT.

The project will use the pedagogical approach of portfolio for self-evaluation and a virtual learning environment, web site and blogs.

Teachers will plan jointly and try out teaching approaches used by the partner institution. We will focus on using new digital methods of learning, e.g. virtual labs, data logging, on-line data sharing and communication.

All institutions have an overall aim to improve learning processes and achievements in science related subjects, such as technology, chemistry and



biotechnology. The National Ministries emphasise the need for better results in science related subjects and the focus on these. The schools have agreed upon the topic of sustainability, because it is something that has public and national attention in all European countries, because the European Union has committed themselves to very ambitious climate and energy targets for 2020. These targets, known as the "20-20-20" targets, set three key objectives for 2020:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

The general aim of the project is to raise awareness about the importance of adopting sustainable habits and behaviours. We aim at making our students feel more concerned about these issues and make them more eco-responsible citizens. Hereby we hope that the students realize that some problems concerning sustainability can be dealt with on a local and even personal level. Hence developing a sense of how they can convince others to act in a sustainable way.

We have also decided to address the topic of "sustainable living" by involving local primary schools in our project. The collaboration with these primary schools will aim to raise awareness in younger age groups about the issues raised as part of our project, but also to ensure an effective dissemination of the results and outcomes of our activities and production. The primary schools will take an active part in the project, both prior to and during the workshops. They will be asked to join some of the workshops' activities, enabling both age groups to learn from one another. The project will also give us the opportunity to discover social projects for young people on the upcycling of waste, and to visit institutions for handicapped people who work on the dismantling of PCs as fine motricity activities.

We grown up with eco resources.

Erasmus+:2015-1-MK01-KA201-002859

Utilization of Renewable Energy Resources (RES) and Energy Efficiency (EE) together with Environment protection (EP) are topics which are presently a worldwide trend. Unfortunately, those topics are not popular because of their



attractiveness to the students but due to real necessity of their implementation to prevent negative influence of industrial development and more and more obvious climate changing.

Many EU projects were dedicated to above mentioned topics and the most common conclusion is - There is HUGE necessity of arising of awareness for utilization of cleaner energy and to safe energy as much as possible with the most suitable target group - children from primary schools. Also, that can be noticed from many previous attempts to approach with importance of RES, EE and EP closer to mentioned target group is that there was only randomly applied projects without strategical approach which will be focused on the learning about RES, EE and EP since the youngest age.

Municipality of Kochani and Municipality of Pazardzik decided to make one innovative approach for their youngest inhabitants - students in Primary schools by developing a Strategic partnership through preparation of ""Strategy for development of education cooperation between schools from Kochani and Pazardzik"".

Also proposed project is forecasting training of teachers from 2 (two) Pilot Primary schools from Program Countries (Macedonia and Bulgaria) in development of innovative teaching methods for implementing of renewable resources, energy efficiency and environmental protection, on adequate way in accordance with students age.

Teacher's training will be supported by experts from Macedonia and Bulgarian NGO's from Kochani and Pazardzik who have a large experience in utilization of RES, EE and EP as well as great practical experience in implementation of Open Education Resources (OER) in educational purposes.

Main project objective is to create strategic partnership for school education between Kocani and Pazardzhik through preparation of Strategy for development of education and training teachers from 2 (two) primary schools from Program Countries (Macedonia and Bulgaria) in development of innovative teaching methods for renewable resources, energy efficiency and environmental protection.

The other specific objectives of the project will be: Provide teachers with practical ideas for how they can incorporate RES and EE resources into their existing lessons; Familiarize teachers with current Web 2.0 and Internet trends; Giving a space for exchange of experiences and good practices among teachers coming from different countries who work in the same field; Improving teamwork skills through the use of ICT and RES and EE resources; Sharing of best practice in teaching and learning.



Main target groups are teachers from primary schools in Kocani and Pazardzhik that are teaching students on the age from 7 to 10 years old and teachers from primary schools in Kocani and Pazardzhik that are teaching biology, chemistry, physics, mathematics for students on the age of 11th to 14th years, that will be trained for innovative teaching methods for renewable resources, energy efficiency and environmental protection. Final beneficiaries of the project will be 900 students from the two municipal project schools, existing and all future students from the primary schools in the two municipalities, municipal administration, NGO's in the field of education, national education institutions and European institutions involved in education.

Main project activities are preparation of Strategy for development of education, performing of trainings for teachers about using of Open Education Resources for Renewable resources, Energy efficiency and Environmental protection; Establishing of teachers network with using of open forum modules; Learning with OER; Using of new educational approach; Preparation of bilingual brochure and 8 (eight) guidelines - small instruction handbooks for teachers (pedagogical work material) which will be used in the teaching of students for each school level and organization of two multiplier events for dissemination of the intellectual outputs.

Sustainable COstruction in the Refurbishment.

Erasmus+: 2015-1-DE02-KA202-002312

With the directive of the European Commission 20-20-20 has to be achieved reduce of greenhouse gas emissions by 20%, increasing the share of renewable energy to 20% and an increase in energy efficiency of 20%. The Building Industry consumes about 40% of all the energy consumption in the EU. However, the biggest savings can no longer be achieved in the construction of new buildings (they are already very energy efficient), but in the renovation of existing buildings.

This results in a high demand for energy-efficient building in Europe and thus a great need for skilled labor. Our Project aims exactly this need. The Project SCORE (Sustainable COstruction in the REfurbishment) is a follow-up for the Leonardo Partnership project SCOREVET. Partners are vocational schools that provide training in the field of energy-efficient renovation of old buildings.

Innovative core of the project is the development of structurally similar teaching modules from the relevant area by each partner. These modules



(consisting of a one-week training module (hands on) and two weeks internship in the company of local networks of schools) are performed contemporaneously by all schools. Thereby this project makes possible for students, at one hand, to do a thematic module in one of the partner schools, or by any reason, stay in their own country. In this case students anyways get benefit, as they attend modules together with other foreign students.

For the preparation and evaluation of teaching modules a simple interactive website will be developed.

The partner schools have agreed to mutually recognize the acquired skills of the students and in longer perspective recognize records of abroad attended module in their national testimonies. In addition, the competencies are described using ECVET and certified with the Europass certificate.

Module that was commonly developed by five different countries should be transferable to other international school partnerships, both in content and in structure. For this purpose, a cost analysis is created. This Analysis provides a quick overview of the expected investments for the potential buyers.

Further Vocational Training in Energy Service Technicians.

Erasmus+: 2015-1-DE02-KA202-002388

The need for energy saving and for use of renewable energy is particularly high in some Baltic Sea Region countries, given the very high proportion of old buildings greatly in need of refurbishment; e.g. until 1993 99 % of the buildings built in Latvia had a very low energy efficiency.

SMEs in various sectors, especially the crafts, are therefore predestined to function as an active contributor to this process, as they carry out such works in old and in new buildings and thus, they fulfil important functions related to render assistance in direct contact with final consumers, such as information and consulting. SMEs in Germany and Scandinavia have systematically developed energy as a growth area. While SMEs in Poland, Lithuania, Latvia, Estonia, Belarus and Russia are strongly interested in this area, however, a systematic business development is almost completely lacking in these countries.

According to the ""build-up skills national reports"" for individual countries, the number of concerned professionals has to increase up to 50 % until 2020 in order to meet the EU's energy goals. In addition, SMEs in all Baltic countries



are in high demand for training on energy-related issues, particularly in Poland and in the Baltic countries.

SMEs account for 99 % of all enterprises and almost 70 % of all jobs. The existing shortage of skilled labour, which will increase in the future still strongly influenced by the demographic development, however, is increasingly becoming a major barrier to growth. The training of existing staff and the recruitment of qualified professionals is therefore the most crucial task for the promotion of SMEs in general, and in particular for the realization of the energy targets.

To secure skilled-labour supply and to increase skills in the energy sector in the Baltic Sea Region countries, the German advanced training model "Building energy consultant", issued 2012 by the German Federal Ministry of Economics and Technology, may be particularly suitable. It is not just a 1:1-adaptation that matters, but the creation of opportunities in the Baltic Sea Region states and the set-up of comparable information and advisory services for energy conservation and for alternative energy sources, to make available a holistic approach, with a complete package of legal, technical and economic content, depending on national conditions and needs.

Studies on the development of economy, population, education and labour markets will be evaluated for the energy sector. In the partner countries qualification demand analyses are to be performed. On this basis, as well as based on the German "building energy consultant", concepts for a dual training model are to be developed.

a) A compact course with to 70 - 80 hours, a survey primarily addressed to company owners that may initiate an effective entry of companies into energy conservation and the use of renewable energies.

b) A comprehensive course which consists of core and elective modules. The obligatory modules contain all relevant issues concerning the assessment of the building envelope and systems engineering, identification of potential savings, investment and profitability calculations, legal foundations and consulting expertise. Each elective module deepens the knowledge to execute building works, such as proper installation of insulation materials, installation and maintenance of renewable energies, etc. Depending on local conditions and needs, further training courses are to be combined with at least 300 hours of obligatory and optional modules. Target groups are managers and experienced professionals from the SME sector, architects and engineers.



For both courses, curricula, teaching materials, etc. will be developed. Tests and evaluations are planned in five countries in order to identify varied national conditions and to test all combinations of modules.

A "train-the-trainer"-program, targeted for lecturers of universities, chambers and other education providers, will be developed, tested and evaluated. The goal is to offer this program at universities on a permanent basis, so that teachers get qualified for the ongoing independent implementation of courses in all regions.

The project under the lead of the Baltic Sea Academy will be carried out together with six universities, chambers and training institutions from Germany, Poland, Estonia and Hungary. 67 chambers with their educational institutions as well as several educational institutions and universities from 13 countries are involved as associated partners. All project results, such as concepts, curricula, teaching materials, application notes, etc. will be published in a handbook and forwarded to the associated partners, advice will be given on the implementation. Diverse dissemination models will be implemented in various countries to achieve a sustainable demand for the courses aimed to secure supply of skilled labour and to increase skills in energy issues on a large scale.

New Energy to Rebuild European

Erasmus+: 2015-1-IT01-KA202-004681

The EU set a 20% energy savings target by 2020. Buildings are responsible for 40% of energy consumption and 36% of CO₂ emissions in the EU. While new buildings generally need less than three to five litres of heating oil per square meter per year, older buildings consume about 25 litres on average. It is also estimated that 90% of building today existing in the EU is destined to remain and the renovation is, sooner or later, inevitable. And this process could create 2 million jobs.

This represents an opportunity for European architects, as it can stimulate innovation and the economy. Thus, professionals able to offer an innovative contribution are strongly needed. The labour market will present a growing demand for qualified professionals capable of performing energy audits and design competitive and innovative strategies for energy retrofitting on existing buildings.



Matching this perspective with the shared need for greater job opportunities for architects, project NET_Learning aims at drafting a new professional profile by enriching the already recognized Energy Auditor with skills, competences and knowledge enabling Architects to become European Energy Auditors and Renovators. The project aims at creating a workforce of qualified professionals, whose skills are recognized and able to operate at European level and contribute to achieve the objectives of the Europe 2020 strategy in terms of climate change and energy efficiency, as well as increase competitiveness.

Four partners coming from Italy, the United Kingdom and the Czech Republic, all dealing with training and the promotion of a culture for sustainable architecture, will therefore cooperate to provide these opportunities to a wide number of individuals and organizations. First of all, to the community of European architects who are currently suffering the financial crisis and unemployment in a saturated market where big and renowned firms play a major role, leaving small firms and freelance architects struggling, regardless their age and experience.

Enterprises involved in the renovation of existing building will benefit from the presence of a recognized professional role with specific competences on energy efficiency improvement related to existing buildings. Because of its economic importance, these economic sectors can significantly influence the development of the overall economy and have a direct impact on the quality of life of Europeans. Finally, public national and local authorities and private/public owners of buildings which need to be renovated and reduce their energy consumption will benefit on the long term from the competences of qualified professionals who can also be involved in the programming of tenders and competitions.

To reach project objectives and these target groups, NET_Learning will implement an e-learning Platform, fostering an online basic course open to all architects coming from the participating partners regions and, based on result achieved upon its completion, 43 young architects will be selected to participate to a training activity abroad. This activity will take place in all the involved cities (Rome, Turin, London and Prague) and will focus on the analysis of selected case studies, chosen according to a detailed analysis of regulatory frameworks, technologies, methodologies and approaches today available to deal with energy efficiency and deep retrofitting of existing buildings. This analysis results will be collected in the so-called NET_Learning Handbook, a publication which will be made available and disseminated to all interested public.



The project has the ambitious objective to define a policy recommendation to tackle the issue of today fragmentation at European level of the topic related to the energy certification and auditing and provide a comprehensive overview of the current situation.

This means that the project will not end upon its closure, but is designed to become sustainable and continue on a long term.

The NET_Learning platform will remain online and will progressively supply more courses focused on specialist topics, having the Handbook as a textbook for all attendants. The platform will also become a virtual job placement space with a network of firms/enterprises offering jobs or internship opportunities, as well as an exchange space for experts and architects to compare and confront.

The problems addressed by the project are common to all project partners and this makes it really important to work at European level: many architects wish to work in a foreign European country, but mobility is seen as difficult due to practical problems and to the scarce knowledge on other national and local contexts. These are the main reasons the project NET_Learning needs to be developed at transnational level, as it will offer an opportunity to better understand foreign contexts, take part in a training activity abroad and be supported by a stable European network.

Adaptation of the LEARNING-BY-DOING Methodology for the Development of Entrepreneurial Competencies for unemployed people formed in Renewable Energy and Energy Efficiency in the sector of buildings and new constructions

Erasmus+: 2015-1-ES01-KA202-016268

The European Union (EU) is committed to boosting entrepreneurship as part of its strategy to transform its economy and build its future economic and competitive strength, no matter the sector it is. The LBD-DECR3E goals are directly related with the entrepreneurship ones defined by the European Commission:

- Promote personal skills: creativity, risk taking and responsibility
- Problem solving skills: planning capacity, decision taking and communication, cooperation, networking...



- Self-confidence and motivation to act and learn in an autonomous way.
- Innovation as a competitive asset
- Self-employment as a key for achieving smart, sustainable and inclusive growth
- Entrepreneurial skills to start up new projects or implement new ideas

Recent changes in the conception and design of teaching-learning process point the need for a greater autonomy and local decision-making power to the student, regardless of whether it belong to the education, industrial or services sector. The education model and even the form of interaction between the student and the trainer must change, and suggest new and effective alternatives to ensure an adequacy of interesting profiles.

PROJECT OBJECTIVES

LBD-DECR3E will develop an innovative training model to enhance professional skills and capacities on energy efficiency in the sector of buildings and constructions (EEB), using the “learn-by-doing” (LBD) and team academy methodology. The target group is unemployed people with previous graduation and/or professional experience in the field of R3E and EEB. It will address both:

- unemployed people with previous professional experience with the aim to provide them with higher and more specific job skills on EEB;
- unemployed but recently graduated people with the aim to make them closer to the entrepreneur world, enhancing their capacities of new business models creation in the field of EEB.

NUMBER AND PROFILE OF PARTICIPANTS

The profile of participant can be presented into 3 categories:

1. training staff and expert that will use the LBD and team academy method to be tested and adapted to EEB up-skilling during pilot sessions.
2. VET providers staff (trainers) to participate in the pilot sessions and receive training on what is and how to use the new LBD R3E-EEB methodology design in the project.
3. Trainees: unemployed people with previous graduation and/or professional experience in the field of R3E that will participate to the pilot sessions.

SHORT DESCRIPTION OF THE RESULTS AND IMPACTS



TANGIBLE RESULTS

O1: New LBD R3E-EEB Methodology for Training and Entrepreneurship opportunities

O2: New LBD R3E-EEB Trainers' Handbook

O3: New LBD R3E-EEB Training Program

GENERAL IMPACTS

- Increased offer of high-quality Vocational Training on R3E & Energy Efficiency for Buildings (EEB);
- Increased number of skilled and trained professionals in R3E & EEB field.
- Contribution to growth and employment, in the framework of a Green and Low Carbon Economy in EU.

DESIRED IMPACT AT EU LEVEL

- National Qualification bodies from the EU and the European Centre for the Development of Vocational Training (CEFEDOP) will have access to evidence-based policy recommendations for the review of the professional qualifications for R3E & EEB workers at national level.
- The method followed by LBD-R3E Training Program can also be widely transferred to other national countries and highly replicated according to local strategies.
- LBD-DECR3E project as general will also contribute to EU's Cohesion Policy, as it represents a capacity building process, transferring knowledge to other EU countries.

POTENTIAL LONGER-TERM BENEFITS

The most important end users are unemployed people who want to enter in the green job market, all over Europe. The LBD-DECR3E project should contribute to comply with the European objectives the EU 2020 Strategy on employment and labour insertion, as well as the new strategic framework for European cooperation in education and training ET 2020 (improving the quality and efficiency of education and training, enabling all citizens to develop skills and competencies for their employability, and enhancing creativity and innovation, including entrepreneurship).



Digital and environmental skills for facilities management, DEFMA.

Erasmus+: 2016 2016-1-UK01-KA202-024420

The introduction of energy efficiency measures designed to reduce resources consumption and greenhouse emissions is pulling the adoption of environmental technologies & services in the building sector. Facility managers, apart from technical & management proficiency, require a mix of digital & environmental skills to respond to the use of energy efficiency technologies systems and support carbon emission reduction practices in buildings. However, the environmental sustainability skills needs of facility managers are only partially and sporadically supported by VET programs & apprenticeships; relevant VET provision is insufficient in quality and quantity, fragmented and infrequent, not adequately addressing facility managers' needs in environmental technologies systems for sustainable building services.

OBJECTIVES

DEFMA aims to tackle this challenge by delivering a modular VET course and OERs on environmental technologies & sustainable building services to empower facility managers across the EU with modern digital and environmental knowledge, skills and competences. Project objectives are to:

- 1) Enhance the labour market relevance of VET for facility managers to address digital and environmental needs.

- 2) Introduce modern training delivery methods and innovative open access pedagogical resources, enabling learners to acquire and self-assess digital & environmental skills.

- 3) Facilitate mutual recognition of the developed learning outcomes across the EU.

The partnership comprises 6 organisations from 5 countries, from the world of VET, the Facility Management segment, energy efficiency research, as well as learning innovation experts. The South West College (SWC) leads the research in innovative technologies for the building construction sector and has strong expertise in the design of energy efficiency courses. The National School of Services (SNS) and the Vilnius Building Training Centre (VSRC) bring the expertise in the design & delivery of VET programs across a broad spectrum of Facility Management services. The Bulgarian Facility Management Association (BGFMA) has solid understanding of occupational needs and workplace realities. PROMEA is an expert in R&D and delivery of innovative ICT-based methodologies and Summit Skills, a standard setting organisation, works with the wider building sector to develop standards and qualifications.



ACTIVITIES & METHODOLOGY

- Analysis of current and future workforce training needs to develop updated and tailored to occupational needs, modern environmental technologies and services learning outcomes.
- Development of modular learning units for a comprehensive VET programme in environmental technologies and sustainable building services.
- Development of pedagogical resources and assessment tools to be offered as Open Education Resources.
- Development, testing, and delivery of a Massive Open Online Course on environmental technologies and services, promoting the adoption of innovative practices in VET.
- Involvement of key policy makers & stakeholders for the endorsement and mutual recognition of DEFMA units of learning outcomes.
- Sharing and validation of outputs with multiplier events, inviting target groups to uptake DEFMA results and to act as further disseminators.

RESULTS & IMPACT

The DEFMA project is expected to have the following results and impact:

- VET world and occupation validated learning outcomes for training provision in environmental technologies & sustainable building services for facility managers (to reach 200 VET providers).
- Formal VET learning units and VET integration guidelines (to reach 200 VET providers).
- Pedagogical resources and assessment tools for environmental technologies & services, offered as OERs (to reach 6000 learners & 200 VET providers).
- DEFMA Massive Open Online Course on environmental technologies and sustainable building services for facility managers (200 learners).
- A signed agreement on the validation, endorsement & mutual recognition of the DEFMA units of learning outcomes (60 stakeholders involved in the process).
- A sectoral recommendations paper to support decision-making and pave the way for future developments in VET policies (40 stakeholders reached).



- Two demonstration workshops and three national infodays to promote project results and validate all developed materials (impacting 440 participants).

POST-PROJECT SUSTAINABILITY

- Uptake of project materials and OERs from relevant VET providers across the EU.
- Participation of a growing number of initial and continuous VET learners in courses based on project outputs.
- Expansion of the strategic partnership towards a network of collaborating VET and sector stakeholders, including in-house training centres & large VET providers.
- Further maturing & development of national and EU VET policies targeted to the occupation influenced by DEFMA recommendations.
- Cross-border certification of skills acquired.

Eficiencia energética en la edificación. Construcción Passivhaus. ENERGETIC EFFICIENCY IN BUILDING CONSTRUCTION. PASSIVHAUS CONSTRUCTION.

Erasmus+: 2017-1-ES01-KA202-038117

Most of our lives are spent in buildings, whether at home, at work or in other activities. We use more energy in buildings than in any other activity, as it is necessary to maintain the quality of life and perform the operations and maintenance of the building. Heating, air conditioning, lighting, appliances, sound equipment, etc.

The residential and tertiary sectors, consisting essentially of dwellings and buildings, use approximately 40% of the final energy of the European Union being in the year 2005 of 437 Mtoe. And are responsible for producing high amounts of CO₂, one of the so-called "Greenhouse gases", so it is necessary to reduce energy consumption, with the consequent saving of raw materials, respect for the environment and economic savings.

Directive 2002/91 / EC, as regards energy certification, this Directive and Directive 2010/31 / EU of 19 May, on the energy performance of buildings, this European Directive seeks to improve energy efficiency of the buildings.



The upside is that the housing and building complex offers the greatest potential to save energy, which will reduce the negative impact on the environment. The potential savings have been estimated at 28% and will be achieved mainly through the reform of buildings and facilities that use energy.

Also improving daily behaviour in the consumer-building relationship. The climate change we are seeing is due to irresponsible energy consumption. In our houses and in the buildings (blocks of houses, schools, offices, etc.). There is no secret formula to save energy, but small gestures of many are the good way to make better use of resources. The efficient use of heating and hot water, lighting, appliances, etc., are concrete actions that lead to energy savings and thus to economic savings.

Also, the knowledge of new materials and construction processes, used in different EU countries, in a thriving sector such as sustainable building will allow students to acquire competences that will facilitate their insertion in the labour market as well as the improvement of their professional training. Since each country has different climatic characteristics, different regulatory regulations, different processes and materials are used to achieve the same goal of reducing energy consumption in homes. Anyway, the learning that will be acquired by students and teachers from different countries will be especially enriching since they will know materials that are not used in their countries, different construction processes, different design facilities, so that new knowledge can be applied in each one of the participating countries.

The knowledge of these materials and constructive processes will allow teachers from different countries to include new approaches in their post-project courses, that will be enriching for students who study these teachings and, therefore, improve their employability and their terminal capacities. In addition to making known to other sectors related to the sector (builders, technicians, associations, professional colleges, etc.). The fact of being in contact with teachers of other countries allows to know the different formative systems existing in those countries and to be able to draw conclusions to apply them in the own country.

The construction of buildings with the Passivhaus certificate requires a high-quality construction to minimize the energy consumption for which a high qualification of the workers is necessary. Therefore, knowledge of the right building materials and systems will allow students to work in a booming sector that requires highly trained staff, as well as to achieve optimal energy efficiency throughout the EU.



The objective Project is:

- Compare efficient housing construction systems in each country.
- Compare the systems for the use of renewable energy and natural resources in each country (water, electricity ...)
- Generate a database of constructive details.
- Increase knowledge of the materials used to improve energy efficiency.
- Improve knowledge of the construction processes to be used to improve energy efficiency.
- To train students in a profession with a future and a boom.

and above all:

- To educate society in general about the importance of energy saving, as a unique path in the sustainability of the planet.

Towards sustainable and energy efficient real estate education and training, SEER.

Erasmus+: 2017 2017-1-FI01-KA202-034760

Energy efficiency in real estate is in a turning point. Megatrends of climate change, urbanization, digitalization and the consumers changed demand have a great background influence. To respond to this and other renewable energy sources challenges, vocational further and professional education demands for more, deeper, analysis on the options of future. This requires the creation and strengthening of international networks, which enables the unification of complementary know-how.

The SEER project derives from the experiences and actual needs distinguished in the participating organisations to develop the sustainable vocational and higher education. The objectives, in turn, derives from the limits of actual comparison results and indicators of exemplary practices. They include 1) anticipating and identifying new competence and learning needs in the real estate sector that are emerging due to the energy revolution, and 2) gathering and generating best existing pedagogical models and curriculum for the education of sustainability and energy efficiency in existing buildings. Moreover, the SEER project enhances 3) developing cooperation between vocational further learning, higher education and VET in response to



challenges of lifelong learning, 4) sharing information, know-how and learning experiences at European level between the participating countries, and 5) disseminating project results to national networks around real estate and energy sectors.

Project partnership, between Kiinko Real Estate Education acting, as a coordinator, and partner organisations from German, Slovakia, Netherlands, Estonia, is based on a set of interlinked needs around the same issue. Partners have various kind of experiences about energy efficient education providing thus adequate expertise and knowledge to contribute to the project's aim. The partner organisations' profile varies from vocational further education to higher education and VET. Participants are personnel of the project partner organisations, national stakeholder networks around vocational and professional education, real estate / property companies interested in developing their personnel's knowledge about energy efficient solutions.

The main contribution of the project includes three reports: Learning needs analysis / a survey, Pedagogical models and Curriculum. A video and a conference paper/ publication will also be created. Further, three international Sustainability Enhancement Workshops will be organised. Methods, such as self-evaluation, monitoring and screening of the existing education, anticipating the future learning needs and product range are used, in relations with national energy regulations, related documents, students' and real estate organisations' feedback. The SEER project advance partner organisations to respond to the need of knowing more about the possibilities to use renewable energy and increase general awareness about them. There is a high social relevance to this.

The project results, expected during and after the project, contributes to the facilitation of European cooperation in developing real estate vocational further education towards achieving the goals of sustainability. Increased awareness goes through all levels. National educational organisations have better opportunities to stay in front of the energy efficiency trends and be proactive about what is important for property managers, real estate professionals and building occupants. More efficient use of energy, space, greater health and productivity should matter to all who want to remain competitive and increase their bottom line.

Due to Energy Efficiency Directive's target by 2020, the demand of developing sustainable real estate education will be valid for the coming years. Strengthening the transnational cooperation and widening networks pave the way for the sustainability of the project activities even after the project is finished. The strategy is to first build the transnational network and clarify



the general conditions for collaboration and make for a development that is pertinent to the issue. After that it is more straightforward to widen the network and provide a basis from which the project outcomes can be exploited by disseminating them within European networks.

Each partnering organisation is a member in various national collaborating networks, which gather regularly to the network meetings to exchange ideas and experiences, review new energy solutions on vocational and professional educational development and assess the initiative's progress. The seminars, workshops and other meetings provide forums for reaching the project objectives.

Housing Policies for Sustainable Construction.

Erasmus+: 2015-1-IT02-KA203-014974

The project Housing Policies for Sustainable Construction aims to incorporate four important characteristics in sustainable building:

- 1) Economic sustainability: ability to generate income and employment for the people's livelihood.
- 2) Social sustainability: ability to ensure human well-being (security, health, education) equally distributed by class and gender.
- 3) Environmental sustainability: the ability to maintain the quality and reproducibility of natural resources.
- 4) Institutional sustainability: ability to ensure conditions of stability, democracy, participation and justice.

Therefore, the project aims to transfer innovative practices, as regards to Sustainable Building and Green Building (ie the design of buildings environmentally optimal to minimize the overall environmental impact associated with all stages of the life cycle of project construction), in order to ensure new models of design, to build houses zero-energy, eco-towns and certificated buildings. The idea is to revive the construction industry through the upgrading of the architectural heritage and urban renewal, in line with international trends and the European regulatory framework in the area of environmental policy. There are two lines of action of the project:

- a) transforming dynamically the building sector, thus creating new market opportunities, both in terms of employment and increase the competitiveness / profitability for construction companies;



b) provide adequate training on best practices through the creation of a continuous dialogue between universities and the business world.

OBJECTIVES

- 1) The creation of strategic alliances between training institutions, chambers of commerce and other professionals working in the building;
- 2) The promotion of an interchange that combines the technical aspects of construction with the new demands of environmental impact in social sciences;
- 3) the promotion and consolidation of a network among university academic systems and business systems.

ACTIVITIES

1. Organization and coordination
2. Research and implementation
3. Creating a platform for e -learning related to sustainable construction
4. Creation of tools for learning assessment
5. Training of personnel
6. Transnational meetings
7. Implementation of the Pilot Project
8. Validation of learning skills acquired
9. Measurement and dissemination of results

Applied methodology and extent of impacts:

- Comparative research
- Assessment tools for process
- Tools for assessment of learning
- E-learning platform
- Reports

RESULTS AND IMPACT

The realization of the project will contribute to the creation of a shared protocol regarding the new and best practices on Sustainable construction, in



order to align the regulations of the partner organizations with the general rules of the European Community. In fact, this common protocol will improve the quality of life through energy saving policies and the use of eco-materials, respecting and protecting natural resources.

These actions will produce the following results:

- Improvement, development and revision of the traditional building design plans;
- Improvement of teachers in charge of vocational training in order to innovate research aimed at excellence in new design patterns related to sustainable construction;
- Provide management tools necessary for companies operating in the Construction Sustainable Social sector, in order to increase their competitiveness;
- internationalization of best practices related to sustainable construction among the partners involved in the project also focused on continuous training and the constant innovation of the labor market
- To contribute to the provision of an adequate training of human resources with low job profiles, in order to facilitate their integration into the labor market.

POTENTIAL BENEFITS in the long term

- Generally, improve the quality of life
- Dissemination of a policy based on environment respect
- Policies to improve energy efficiency to reduce costs related to energy consumption
- Increase employment
- Increase profitability of construction companies.

CENTRO DE RECURSOS ONLINE PARA EL ESTUDIO INNOVADOR DEL CICLO DE VIDA DE LOS MATERIALES DE CONSTRUCCIÓN

Erasmus+: 2016-1-ES01-KA203-025422



The awareness and environmental culture of citizens is expanding at same time that the regulations are stricter. Construction sector contributes with a 35-40% of the total of CO₂ emissions, for this, it is the moment to implant the carbon footprint calculation in buildings sector.

Calculating carbon footprint enables to value the environmental impact regarding to greenhouse gas emissions in a complete manner, from the cradle to the grave. The first step to manage and reduce CO₂ emissions is calculate it, in order to know the importance of this environmental aspect and implementing measures to improving it.

To obtain a better understanding of the impact and work on it, it is important to measure CO₂ emissions from de design and conception of the building, and according to these measures, knowing the different possibilities of reduce the footprint, doing a building more sustainable and lower-carbon. It is indispensable to make aware of the emissions from the first phases of the project for taking early actions and choosing between the different materials, transports, constructive methods, use during the life of the building, deconstruction systems, reuse, etc., and examine how to contribute to increase or decrease the emissions of the building.

Currently, there are numerous studies about the footprint calculating of materials with their Environmental Product Declaration (EPD) and Energy Efficiency (EE) during the useful life of the building, but not during the construction and deconstruction process of it.

The idea of this project is to create an Open Educational Resource (OERCO₂) where the calculations of CO₂ emissions in each phase of the building are unified so that get an overall picture about footprint from the conception of it and decide on each variable of the construction.

OBJECTIVES To contribute to overcome the situation described above, the main objectives of OERCO₂ are:

- Introduce the calculation of the CO₂ emissions at all phases of the construction processes as well as concepts related to recycling and reuse.
- Increasing the awareness about the climate change.
- Provide information about emissions of each element.
- Free access to OERCO₂ to agents involved in the construction sector (students, AEC professionals, etc.).

PRODUCTS



The main results of this project are:

- Compilation of European and national regulations of participant countries on CO2 emissions in construction sector.
- Report on CO2 emissions and EPD (Environmental Product Declaration) in industries related to construction sector, where they are measured according to a product unit or constructive element (m3, m2, ml, ud, etc.).
- Interactive tool for calculation of CO2 emissions for construction processes, where different options, materials, constructive/deconstructive methods, etc. can be chosen.
- Web page of the project and OER (Open Educational Resource) where the interactive tool will be hosted, scientific articles, updated information, calculation methodology, related products, European common curricula for a specialised course, training materials, etc.

CITIZENS FOR ENERGY TRANSITION: Educating citizens on the energy transition, improving practices and multiplying efforts.

Erasmus+: 2015-1-FR01-KA204-015349

The “Citizens 4 Energy Transition” (C4ET) project aims to encourage citizen participation in the energy transition by improving and multiplying actions being implemented to raise awareness, educate and train citizens on this issue. Even though energy is a transversal topic, crucial to sustainable development, it is generally perceived as a technical issue, making its appropriation by citizens difficult. Yet, the participation of citizens in the energy transition, notably through behavioural changes, is crucial for our societies to become sustainable and low-carbon.

The main target group for C4ET is representatives of stakeholders working on the education of citizens, especially on the energy transition or interested in doing so (CSOs, NGOs, municipalities, associations etc.). The project aims to directly reach over 5000 participants, mostly from this target group but also citizens themselves (through multiplier events, questionnaires, stakeholder identification, dissemination and communication activities). Importantly, C4ET's impacts will be further spread by the multiplier effect, via the targeted organisations working with citizens.



In order to reach its objective, the C4ET project will develop a set of innovative pedagogical materials and tools, structured according to a defined pedagogical programme of six “focus subjects” (one led by each partner), with five tools being produced under each subject. These tools will be accompanied by guidance and pedagogical tools including video tutorials and exhibition posters. A learning activity will be run to share best practice and knowledge between partner organisations, to build their capacity and inform the development of the pedagogical materials.

For the elaboration of the innovative pedagogical material and tools, the involved partners will draw inspiration from existing methods and practices and take into account current training needs among citizens, identified thanks to a State of the Art and Training Needs Analysis. This will also identify relevant stakeholders that are active or interested in the education of citizens on the energy transition, who will be targeted by dissemination activities. Quality of project implementation and outputs will be ensured by procedures, indicators, and reporting as defined in a project quality plan. Each tool will be evaluated by internal auditors and tested by citizens.

The innovative pedagogical materials and tools developed during the project will be available on the C4ET website (for the project duration and 5 years after), freely available as an open educational resource. This will also host an interactive forum for exchanges and sharing practices between stakeholders involved or interested in the education of citizens on the energy transition. Video tutorials related to each of the tools developed will be made available as well as an introductory video providing an overview of the themes covered and highlighting the links between them.

A dedicated dissemination and communication strategy will be implemented to enhance the project’s impact on the local, regional, national and European levels. This will combine multiplier events (including a poster exhibition), traditional media (leaflet, newsletters, project website etc.) and innovative/interactive tools (videos, webinars, social media and the online forum). An emphasis is put on digital media and ICT tools both for dissemination and the project outputs themselves. Specific dissemination targets will be monitored through regular project quality reporting.

The main desired impacts of the project are as follows - these will be monitored and evaluated according to associated indicators through six monthly reviews:



- Participants from partner organizations - improved skills for educating citizens on the energy transition; sharing knowledge and best practice; improved offer of pedagogical activities thanks to the tools developed.
- Target stakeholders (i.e. stakeholders contacted, event/webinar participants, recipients of communications) learning about the new pedagogical materials and tools available to broaden and enrich their training/awareness raising activities with citizens on the energy transition and raised interest for conducting such activities among stakeholders not yet active in the field
- Citizens: raised interest and enhanced participation in the energy transition.

The consortium comprises 6 European partners, led by the French non-profit organization ENERGIES 2050, representing 6 European countries (Belgium, Croatia, France, Germany, Hungary and Italy). These organizations are CSOs, a public body as well as a private company, all active in the field of educating citizens on environmental issues such as the energy transition.

Building up green

Erasmus+: 575829-EPP-1-2016-1-ES-EPPKA2-SSA

Trainers goal is to overcome skills mismatch and boost competitiveness in the construction sector. Vocational teachers hold a crucial role for the transfer of knowledge to current and future workforce at the sector. Based on existing evidence, building up VET trainers' skills in Energy Efficiency and Renewable energies is the required breakthrough to address the weak link between education and green innovation in the sector.

By creating a sustainable cooperative network, main south-European sectoral organisations and VET providers will initially start this Alliance where a broad range of Stakeholders will be gradually involved. The general aim is to jointly develop and deliver a thorough training system for VET Trainers to better perform teaching in sustainable construction with a variable set of interconnected activities, fall under:

*A new European sectoral qualification standard (Green VET Trainer at construction) following the EQF methodology- learning-outcome oriented- and underpinned with ECVET and EQUAVET principles.



-Certification of competences through “Green Tag” accreditation, awarded either by the specific BuS.Trainers learning experience or by prior learning, and MoU arrangement to promote mutual recognition in diverse EU member states.

*A collaborative platform to build community and support teachers in their continuing professional development (lifelong and life-wide learning):

-Open and innovate training course with new technologies for computers and mobile devices (App) in 5 EU languages and other services and tools for career guidance, teaching repository, mentoring sessions, etc.

The project will make a positive impact on VET providers enhancing their trainings/classes portfolio, on VET trainees and workers who will receive updated knowledge for green skills, on companies who will have better skilled workforce and on the rest of industry and public who will recognize the added value of cooperation in green curricula design and delivery.

Curricula Development of Interdisciplinary Master Courses in Energy Efficient Building Design in Nepal and Bhutan

Erasmus+: 561585-EPP-1-2015-1-SE-EPPKA2-CBHE-JP

The main goal of the project is:

- to develop a new Master programme on Energy Efficiency in Buildings.
- to support existing Master programmes with development of laboratory facilities and establishment of new courses.
- to graduate Masters in Energy Efficient Building Design who can meet the market needs of the Partner countries in order to establish sustainable energy development and efficient energy practices.
- Improving exchange of advanced knowledge regarding energy efficiency in buildings.

Intermediate goals:

- to develop appropriate laboratory components and field experiment tools based on interactive learning and teaching.
- to establish training courses for professional engineers and architects in the areas of applied energy for buildings.



- to establish scientific preparation courses for professional engineers and architects, aiming at improving or establishing research on energy efficiency in buildings.
- to promote technological and scientific co-operation between universities and companies on energy efficiency in buildings.
- to strengthen the collaboration between the participating universities from EU, Nepal and Bhutan.

Master Degree in Innovative Technologies in Energy Efficient Buildings for Russian & Armenian Universities and Stakeholders

Erasmus+: 561890-EPP-1-2015-1-IT-EPPKA2-CBHE-JP

Establishment and development of a new Master on “ENVIRONMENTAL PROTECTION AND ENERGY EFFICIENT BUILDINGS” in 3 RU and 2 AM Universities with affiliation of other 2 RU Universities, according to features and learning outcomes delivering graduates environmental and “green buildings” technological issues’ skills.

1. Curricular reform: to implement an effective curricular development oriented towards the labour market requirements; to support the employability expectations of the graduates by development of a constructive model of professional recognition of new qualification in Environmental Protection and Energy Efficient Buildings to be shared among all the involved parties. The curricula reform will be promoted, officially recognized and actually implemented in the involved Universities in different training directions, with official Master Courses implementation in 5 of them, by developing a versatile training programme, flexible and adaptive to labour market requirements; these Courses will be implemented over the project lifecycle; the 1st academic year will be completed in the framework of the 3rd project year.

2. Links university-enterprises: to develop a networking system among the PCs’ Universities and stakeholders, in order to remedy to the currently fragmented scientific background in Energy Efficiency and to the lack of distribution of knowledge, expertise, information & data.

The GREENMA Network, of which some MARUEEB partners are members, will be enlarged by stipulating a formal agreement during the final conference, also in order to raise public awareness on “Environmental Protection and EEB” and to find sources and means of mid/long-term self-financing.



The project in general terms also will spread and promote the PCs' awareness related to the EU policies referred to Environmental Engineering and Energy Efficient Buildings and to enhance the approach towards EU best practices, with specific reference to the «Environmental & Energy 20-20-20 targets»

High level rEnewaBle and energy efficiency mAster courses.

Erasmus+: 585740-EPP-1-2017-1-AT-EPPKA2-CBHE-JP

Energy Efficiency (EE) and increased used of Renewable Energies (RE) are the key elements to achieve the EU 2050 goals. The HEBA project aims to ensure that the universities in Egypt, Lebanon and Jordan can offer a high-quality education compatible with European standards that meets the market needs of the emerging knowledge-based society by strengthening EE+RE teaching. The main objective of HEBA is to reform and improve existing master programs in EE+RE on single technologies and energy systems level in building and industrial sectors and improving/establishing Centres of EE+RE Technologies in the partner countries cooperating with each other. The centres will train postgraduate (PG) and undergraduate (UG) students on EE+RE methodologies and technologies for different sectors and will contribute to guidelines for best practice for the efficient use of energy and renewable energies in a joint collaboration between EU and partner universities. The former will transfer EU best practices, experiences and methodologies according to the Bologna process to support the development and diffusion of an innovative experience in technical higher education in the partner institutions supporting the capacity and knowledge building in EE+RE Technologies. Outputs of HEBA in the partner universities will be* adapted curricula * at least 12 new or improves existing courses and lecture books/e-learning tools for PG and UG students on EE + RE* 6 1-week train-the-trainers courses for the future lecturers (min. 70) of the participating EU universities * 12 Master thesis of students from partner universities at participating EU universities * Establish/improving laboratories of “EE+RE” Technologies (EEREL center)* Contribution to guidelines for practice for EE+RE in industry and buildings HEBA will thus contribute to an increase of the local competences on EE+RE that will promote curriculum reform and leave a longer-term legacy for Egypt, Lebanon and Jordan universities.



Think Smart - Act Green.

Erasmus+: 2015-1-DE03-KA219-013585

Think Smart - Act Green“ is based on the urgency of taking action in the field of sustainability identified by the Agenda 2020. Urgent issues to be dealt with are the reduction of CO2 emissions, digital interconnectedness, the increase of energy efficiency as well as the idea „youth-on-the-move“.

We have recognised that there are regions in Europe where the issues of the Agenda 2020 are relevant and can be improved by cooperation between students, regions and countries. Sustainability in the fields of ecology, economy and social responsibility can only be granted through cooperative actions. To ensure this, awareness among the younger generations has to be created and handed over to future generations. However, awareness alone is not enough. Awareness has to lead to sustainable actions. Thus, a long-term change of and reflection on our own behaviour will be ensured in a continuous process of thinking and acting.

These goals can only be achieved on a European level by intercultural exchange. The intercultural exchange will involve:

- The creation of awareness for sustainable actions
- Social responsibility beyond one's town, region and national borders
- Taking cooperative action regarding individual problems in participating countries
- Students' experience of making a difference through common effort
- The use of English as a global language of communication, which will be practiced and improved throughout the project by all partners involved
- Increasing of students' competences in various fields (students-teach students, use of modern media, personal as well as social, topic related competences and intercultural competences)

With our team of five partners from different parts of Europe, there is a broad scale of economical, ecological and social aspects:

- Simrishamn provides a location at the Baltic sea, cooperating with the maritime centre nearby. Fishing industry and water plant are also important aspects: „smart water“.



- Thessaloniki as industrial harbour city nearby the delta of the river Axios combines urban and natural aspects: „smart river“.

In contrast to the water-related partners, the project also includes areas further inland.

- Bologna provides an urban region with sustainable living concepts, taking part in a „smart city“ fair.

- Bragança provides the aspect of sustainable tourism (Via Augusta): „smart tourism“.

- Wolfenbüttel provides the aspect of „smart consumer“, with economical and ecological factors (e.g. German energiewende).

This selection of partners promises exciting and insightful activities, which will take place through the cooperation of the different European countries. Vital exchange and learning from each other will be ensured. Among these activities are:

- learning outside school in every international meeting in form of workshops
- students-teach-students on basis of clubs
- field trips to external partners (e.g. NGO, companies, Asse, communities).
- support of students' work through experts (school internal and external)
- production and dissemination of visible results
- cooperation with schools' communities and local region
- evaluating and improving eco-footprint
- permanent use of eTwinning for documentation and exchange
- students' presentation of results of cooperation and working together (e.g. homepage, blog, open house, video documentation).
- regular mobilities between participating countries and schools with high number of students

Long term effects and use of our project are:

- sustainable and interconnected work on local, regional and European level
- student centred work, to ensure sustainable actions for future generations
- awareness of issues and possible solutions on different levels



- schools experiencing themselves as European schools with European responsibility for acting „green“
- through mobilities, a spirit of European togetherness is created
- European cooperation will be strengthened, especially for those participants currently without any bilateral partnerships (Greece, Sweden)
- the English language will be the vehicle of communication and thus be improved in the long run

The continuous and interdisciplinary work of all participants within the context of our project is a goal to be achieved over these two years and to be carried out even beyond this period. In our opinion, this will lead to a sustainable realisation of the aims mentioned above: Our project will contribute to the creation of a more ecologically, economically, socially friendly and sustainable working together of European countries: Think Smart - Act Green!

Europe 2100: A Sustainable Future for European Youth.

Erasmus+: 2015-1-NL01-KA219-008877

Our starting point is a high-impact topic: the need to make our lifestyles sustainable within the next few decades. According to IPCC by the year 2100 Europe's emissions of greenhouse gasses should be reduced to 0% in order to limit the global warming to 2 degrees. Together we, four European schools from The Netherlands, France, Italy and Lithuania, want to find a route to a sustainable future for the next generation in Europe and, by extension, elsewhere.

At the same time our school boards share the need to motivate students in order to get better (exam) results, also from excellent students, more students who choose challenging scientific studies and less absenteeism and dropouts.

By working on the topic of Climate Change we aim to enhance our education in two ways:

1. strengthening the profile of the teaching profession.
2. getting the students to learn in innovative ways.



During two years we are planning to travel to each school to learn from experts about solutions for 'Europe 2100'. We will have a constant participation of 2 teachers (the accepted minimum in international exchanges) and 10/12 students.

Each visit will have a theme related to sustainability:

1. Beverwijk, November 2015: ""Climate Change"" and ""The End of the Conventional Energy Supply"" ,
2. Desenzano, March 2016: ""Sustainable lifestyle, Sustainable Transport and Food"" ,
3. Vilnius, October 2016: ""Energy Efficiency for a Sustainable Future"" ,
4. Longwy, March 2017: ""Sustainable Waste Management"" and ""The EU Policy for a Sustainable Future"" ,
5. Texel, June 2017: ""A Carbon Free Future"" .

During the five-day Meetings students will attend the experts' lectures, go on excursions (for example in Holland to a windmill farm or in Lithuania to a pump storage power plant and closed nuclear plant). Together during the meeting they will produce their presentations for Ted Talks, to be delivered peer-to-peer when they return to their country. They will also attend English language lessons on the topic, so they acquire the specific jargon.

After each exchange teachers of different subjects from the host country will develop an interactive Learning and Teaching Module. This will be a high-quality product, deriving from the results and outcomes of the lectures and will be available on our Learning Portal and on Twin Space for teachers and students to use. In the months after each visit, the Module will have a follow up in the form of project days in each school. These projects may consist in Ted Talks, CLIL lessons or similar initiatives. In the Netherlands teachers familiar with the topics will take part using the SVOK-academy. Around 300 persons per school will benefit from these activities.

The expected impact is manifold. We aim to see long-term results on four levels:

1. Students will be more motivated for school by gaining autonomy and being able to change the future by finding solutions for the climate problem. They also enhance their cross-curricular competence, develop their language skills and European citizenship.



2. Teachers discover new teaching methods using the Learning Portal and gain high-level knowledge on the topic of sustainable development. Also, they learn to work in interdisciplinary teams, and are motivated to go abroad for their professional development.

3. Schools will be more attractive and have better results because of the strengthening of the teaching profession and increased motivation among students who will have better education, better results and fewer dropouts. Also, the schools will have created contacts with national institutions and research centres and become more international-oriented.

4. Outside our schools, we will spread the new teaching / learning methods and the sustainable solutions for 'Europe 2100' by promoting the Learning Portal. With the multiplier event on Texel (June 2017) we will disseminate our results also to people outside our local network.

The results and impact described above will be made sustainable by continuing to work together as one project team after 2017. The resources needed will be provided by the schools but we intend to apply for a new Erasmus+ project between 2017- 2019.

We expect to be able to take the following actions:

1. the Learning Portal will be promoted with the four learning Modules on ""Europe 2100: A sustainable Future for European Youth"" as teaching resources and for individual e-Learning. Each school will apply the expertise in e-Learning developed with the Learning Portal and the four Interactive Modules to new educational contexts,
2. Peer-to-peer learning will be taken in each school as a model to be extended to different educational contexts,
3. contacts with the local school network and authorities will be enforced for further initiatives and collaboration.

NZEB for Enhancing STEM skills and motivating Students.

Erasmus+: 2015-1-IT02-KA219-015139

The project ""Enhancing NZEB for STEM skills and motivating Students"" is presented by the Liceo Ruffini in partnership with six other schools from Denmark, Finland, Turkey, Bulgaria, Romania, France and the Netherlands. The strategic partnership we propose is focused on three main topics:



1. the teaching of STEM (Sciences, Technology, Engineering, Maths) by analyzing concrete problems and current challenges, such as energy efficiency in public buildings
2. the development of self-entrepreneurial skills, even in general secondary schools, where many students are interested in starting the profession at the end of university studies
3. methodological innovation through the use of ICT and learning methods on the field, on the job, cooperative learning and blended mobility

The project is based on a careful analysis of the needs and aims to meet the challenges posed by the EU both through the ET2020 objectives and through the objectives on energy and environmental concerns.

The general objectives are:

- o Implement processes of education and training using new technologies
- o reinforce the centrality of the student as part of a flexible educational process to enhance the motivation to learn, the ability to build its own training program, a sense of responsibility with respect to the future path
- o Decline the teaching of STEM disciplines on concrete and up-to-date issues
- o Deepening CLIL

The specific objectives are:

- o stimulate students' interest towards a knowledge proposed by experimenting with forms of learning on the job in real situations, more stimulating than those simulated
- o instill skills of self-orientation and train students to have confidence in themselves, demonstrate initiative, flexibility, openness to change
- o acquire skills in the use of a Content Management System and software for the control and calculation of energy loss, data processing, spreadsheets and presentations
- o Teaching students and staff of the school to behave differently and reach a more rational use of energy
- o Solicit institutions to invest in energy saving in order to free up resources that could be used in projects that enrich the knowledge of the pupils and the teachers



o Develop a collaborative learning, utilizing the expertise and knowledge of others (peers, teachers and professionals).

The project will directly involve 10 students from each partner school, of which 30% with fewer opportunities, aged between 16 and 18 years related to the courses of Applied Sciences in the activities of non-formal learning and based on field research anche on the 'application of STEM disciplines to innovative theme of NZEB. Specifically, 15 events (seminars, lectures and workshops, as well as experiences on the field and on the job) will be organized, taught by teachers at the school in collaboration with experts that are part of networks of stakeholders that NESS aims to involve. 40% of seminars will be in CLIL. 4 blended mobility are also foreseen, which will consist of 30 days of virtual mobility through TwinSpace and GoogleClass and 5 days of physical mobility in Denmark, Italy, the Netherlands and Finland. The project also includes the integration of the disciplines involved in the programs (Physics, Mathematics, Science and Technical Drawing) of some topics to be covered during the normal teaching, so as to reach students not directly involved in the activities and ensure greater impact and sustainability.

The methodologies used are:

- Inquiry-based learning
- Learning-by-doing
- Learning on the job and on the field

The training on the job requires that stakeholders inviting classes to make study visits and practical workshops to enable pupils to understand the various concrete applications of the topics they are working on, giving them an outlook for the future choice of university and work.

At the end of the activities the students will have acquired skills in STEM, basic and transversal, as self-employment, skills and digital English language.

NESS makes the involvement of stakeholders (policy makers, representative organizations, thematic networks) as a strength point; the activities of the project will be organized within the framework of EUSEW 2016 and 2017 and will produce important final products such as:

- The Decalogue ""10 Actions to Save Energy""
- The final report on the positive actions



- Data collected by the students on the energy consumption of their school buildings thus ensuring a major impact at local and European level. The project aims to produce lasting results cultural approach that both students as teachers will adopt in their relationship with the environment around them, the world of work and teaching techniques.

SAVE ENERGY SAVE THE WORLD

Erasmus+: 2016-1-PL01-KA219-026180

One of the five consistent goals of the Europe 2020 strategy is about the climate and energy. The aim is to reduce greenhouse gas emission, in comparison to 1990, by at least 20%, and if the circumstances allow, 30%; and in EU energy consumption, increasing renewable energy up to 20% and achieving energy efficiency at the rate of 20%. It is stated that, aligned to the new vision created for Europe, the transition to a low carbon and energy efficient economy will be completed by 2050; renewable energy resources instead of carbon resources will be encouraged for economic growth, and energy efficiency will be achieved.

The goal of this project is to build energy conservation consciousness in early years of life, and to draw attention to the contribution to economy of energy conservation by the target age groups and to the impact of renewable energy on clean environment. Today, with our energy need increasing every day, economic use of energy, spreading the use of clean energy and raising awareness around it will also have a positive impact on the development of environmental consciousness. When it is considered that the habits are most easily developed during childhood, consciousness around energy conservation will also easily develop in early years of life. This is why the target age group of our project is 6-11 years.

The goal of our project is to help students from the target age group develop consciousness and behaviour of using energy without wasting it, to ensure permanent learning of the subject matter, to educate parents about the issue, to explain the importance of using clean energy, to encourage using environment-friendly energy use, and to build environment consciousness.

This project is based on the idea which states that the cheapest energy is the not-wasted, saved energy. This aspect of the project takes into consideration the contribution of the project to the economy of the country; one of the aims of the project is to entrench consciousness around this aspect. The



project brings together the work from the countries of Turkey, Romania, Bulgaria, Italy, Greece and Poland. Turkey, one of our partners, has experience at the national level, whereas Romania, Italy, Bulgaria, Greece and Poland have experience with the Comenius project. Some of the project activities are drama practice, music practice, improving English language skills (because it is the common language), drawing contests, banner preparation and logo design.

During the project, students' behaviour will be observed based on the observation forms created by our partners and the results will be derived periodically for assessment, reporting and comparison. Information about the project will be given through the surveys, interviews, seminars and conferences; these activities will be carefully evaluated.

Among the project goals are investigating methodologically and observing at their place the various applications by our partners, figuring out the differences in curriculums and considering different aspects in the curriculums for adaptation to our own, using different methods and techniques - if any - while working on the subject, benefiting from our work colleagues' work experiences, and enabling students to be fully active in the learning process through arranging interesting activities.

The target group shows continuity, so even after this particular project is over, the project will allow for further work with students in that age group and their parents. Thus, because of the target group as well as the subject matter, it is a sustainable project which also allows for popularization and will have long-term benefits.

Behaviour which will be learned by the end of the project will have become a habit, so it also has the characteristic of being passed down from generation to generation. Due to this aspect of the project, the findings are valuable also for future and the project has long-term effects.

The handbook will be a source that explains the project process and experiences, important for understanding and disseminating the final results of the project after it is over.