



Design of an e-learning training programme for wind mills maintenance technicians enriched with interactive virtual reality simulations

Progress Report

Public Part

Project information

Project acronym: e-WindTech

Project title: Design of an e-learning training programme for wind mills maintenance technicians enriched with interactive virtual reality simulations

Project number: 134700-LLP-2007-ES-LMP

Sub-programme or KA: Leonardo da Vinci Multilateral Projects - Development of Innovation

Project website: <http://www.ewindtech.net/>

Reporting period: From 01/01/2008
To 31/12/2008

Report version: V2

Date of preparation: V1: 30/01/2009 and V2: 15/04/2009

Beneficiary organisation: Fundación para la Formación en Energías Renovables (CENIFER)

Project coordinator: Joseba Aranguren

Project coordinator organisation: INICIATIVAS INNOVADORAS S.A.L.

Project coordinator telephone number: +34 948 28 12 70

Project coordinator email address: jaranguren@iniciativas-innovadoras.com

This project has been funded with support from the European Commission.

This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Executive Summary

This is a report to explain the situation of the project e-WindTech “Design of an e-learning training programme for wind mills maintenance technicians enriched with interactive virtual reality simulations” in the middle of its execution, 12 out of 24 months. We mean, this report presents the content of the project and its achievement during 2008.

This report is intended for widespread. The target audience of this Interim Report of the project is general public, people who will not be familiar with the sector of wind mills maintenance. This report is a document for external communication and it will be published by the Executive Agency (EACEA).

The general aim of this project is to train wind mills maintenance technicians and for that during the project it is intended to achieve the development of a new multilingual homogeneous e-Learning course; a tool enriched with interactive Virtual Reality based exercises.

In order to achieve this general aim, the project is divided in different workpackages (WPs) with different tasks and actions that are established following a plan, a calendar and specific objectives. This workpackages are :

- WP1 - Project management and coordination
- WP2 - Knowledge gathering and design of learning content
- WP3 – Development of virtual reality simulations and adaptation of the platform
- WP4 – Implementation and evaluation of the course/programme
- WP5 – Quality and Evaluation Plan
- WP6 – Dissemination
- WP7 – Exploitation

At this stage of the project, in the middle of its execution, the WP2 and WP3 are nearly to be finished, and all the partners involved in the consortium are working also in all the transversal stages of the project which are: WP1, WP5 and WP6. The actions that have not been started yet and that will start in 2009 are: WP4 and WP7.

Some of the specific objectives/outputs that have been achieved at this development stage of the project are listed below:

- Definition and implementation of a Coordination method and development of an Intranet to assure and standardize the management and communication between the partners involved in the consortium.
- Development of three of five consortium meetings between the partners (two in Pamplona-Spain and one in Porto-Portugal)
- To gather and organize the current level of knowledge regarding wind mills maintenance in the partners countries (Spain, Germany, Greece, Portugal and Lithuania), select, classify and combine this knowledge, to design, standardize and develop the training programme. At present time the development of the main bodies of all the units of the training programme is being completed.
- Development of some simulations as practical tools as part of the final training course to be achieved.
- Development of a web of the project for the general public, that during the project will be supplied with the final results of the project.

The main outcome at the end of this project will be a new multilingual homogeneous e-Learning course -ready to be certified by different European Vocational Training Centres both public and private- enriched with interactive Virtual Reality based exercises and European developed contents to train students (in vocational training centres), technicians and unemployed technicians by using new interactive virtual reality based techniques. Furthermore, this programme will contribute to the re-training of technicians who are already working in these tasks but never have the opportunity to attend a formal course (due to the sector's fast growth this tends to be a regular situation).

It can be said that at this stage the outcomes of this project are intermediate and partial and aiming to achieve the above result at the end of the project.

All the partners have been involved during this first year of the project with more or less dedication depending on the calendar and their assigned tasks, developing each one their expertise to achieve the above specific goals of the project.

Each of the members of the consortium has a specific complementary role that will definitely contribute to achieve the main and the specific goals of the project:

Some partners are experts in renewable energy training (CENIFER - Spain) and e-learning training (BBZ - Germany); other partner is an expert in e-learning development who is to adapt the content of the course to an e-learning platform (IGD-Germany) and another is an expert in Virtual Reality Simulations who will include them as a practical lesson in the content of the course, to avoid the most risky practices (VICOMTech - Spain). Other partners contribute to the development of the course with their different points of view depending on their experience and specific country conditions. Within the oncoming months their task will be to carry out the Pilot Projects of the course and implement the course in a real way in order to test the training method & the e-learning tool and to improve it (IDEC - Greece, SPI - Portugal and SSI - Lithuania). IDEC is also the responsible of the Workpackage 6 (Dissemination). The cooperation and fluent communication is being ensured between the partners because one of them is an expert in Management and Coordination of consortiums in different European projects (INICIATIVAS INNOVADORAS - Spain).

Until now all the partners have developed part of their tasks, some more than others, but this is due to the fact that the consortium is trying to follow the original project planning and the calendar defined in the proposal.

Also wind energy sector companies and specialised education centres and experts have been involved to gather the information and the current level of knowledge and obtain the main wind mills maintenance areas needed for the sector companies to be included in a course like this.

This is an Interim report, so the final results and benefits of the project will be explained better in the Final report when the project will finish the next year.

The website of the project is: <http://www.ewindtech.net/> though many areas of this site are still under construction as they are not final results yet.

Table of Contents

- 1. PROJECT OBJECTIVES 6**
- 2. PROJECT APPROACH 7**
- 3. PROJECT OUTCOMES & RESULTS 8**
- 4. PARTNERSHIPS 11**
- 5. PLANS FOR THE FUTURE 14**
- 6. CONTRIBUTION TO EU POLICIES 15**

1. Project Objectives

The general and final aim of this project is to train wind mills maintenance technicians. For this purpose it is intended to develop a training programme and to adapt it into an e-learning platform that will be tested in different training pilot projects. This tool will provide Interactive Virtual Reality Simulations to train the most critical operations in maintenance of wind farms regarding safety, budget and relevance.

To obtain this final aim there are some partial or specific objectives that have been worked during this first year of the project by the consortium:

- To gather and organize the current level of knowledge regarding wind mills maintenance in the partners countries in different key sectors: Vocational Training Centres, Companies, Research and Development Centres, other training centres, Work Departments and Trade Unions.
- To select and standardize the knowledge based on the Qualification Catalogue Profiles and the Training Centres and Companies priorities.
- The contents of the units of the course are currently being finished
- Certain Simulations to be added to the course are currently being developed

At this stage this project has been known by some potential final users of the final results. Thus, some specific communities have been involved to obtain the previous and first objectives of the project. These are: wind energy sector companies (maintenance responsables, technicians...) and energy and education training centres and institutions.

This communities have answered different surveys of the partners trying to gather and organize the current level of knowledge regarding wind mills maintenance in the partners countries, so as to develop the best possible programme course.

After one year of the project the consortium believes that once the project is over it will achieve all the goals initially planned:

It is intended that this project will contribute to the development of competencies of young students in their formal education stage and to fit them to the companies requirements as there will be constant cooperation between the project partners and the wind sector companies.

Furthermore this programme will help to the re-training of technicians who are already working in these tasks but never have the opportunity to attend a formal course (due to the sector's fast growth this tends to be a regular situation).

Finally the project will take advantage from the utilities of the ICTs applied to enriched training environments in which all type of students and professionals could monitor their own learning process.

To sum up, we have to say that the objectives are being achieved following the original project planning defined within the proposal.

2. Project Approach

Below, the methodological / didactic approach on which the project is based is explained and the measures that will be adopted for testing the materials on target users are outlined. To create the e-learning training course the steps developed until now have been:

- **Wind mills maintenance competencies described.** This result also includes:

- ✓ State of the art in the development of Qualification Catalogues, for this professional family, in each partner's country identified.
- ✓ Sector training needs regarding wind mills maintenance identified.
- ✓ Wind mills maintenance competencies described at a partner's countries level.

- **Content developed and standardized.** This result also includes:

- ✓ Wind mills maintenance knowledge gathered.
- ✓ Content selected and classified depending on the previous items.
- ✓ Content developed and/or adapted based on the previous items.

- Actually is being developed the **eLearning Course design**. This result also includes:

- ✓ e-Learning design parameters established and agreed.
- ✓ Contents and exercises done following the previous requirements.

During the validation of competencies profiles and selection of contents and practices, work and education institutions have been involved. These organizations are potential users and advisors of the project outputs.

The project is providing also an opportunity of cooperation between social agents, companies and training entities.

If at the end of the project the main objectives are achieved, the results of this project can contribute to make the Formal Vocational Training more attractive and to make students responsible for their training process. What is more, Vocational Training Centres as well as SME's could apply new information and communication technologies in the classroom. For teachers it is also a change in the way they establish relations with the class and a way to introduce the new technologies in this subject. The product, with its face-to-face complement, can be applied to the three Vocational Learning Subsystems and it should be a very good aid in the training process of wind mills maintenance units. However this training should be completed with more knowledge and real practices.

All the results obtained in this first year of the project are partial and that is why the exploitation strategy of the final product or course has not yet been described. However, the consortium is still working on that issue.

3. Project Outcomes & Results

At this stage major achievements and results of this reporting period (half of the project – one year) are the following, divided between workpackages (WP):

WP1: PROJECT MANAGEMENT AND COORDINATION

- Project Plan (Coordination Method): Method to assure the overall understanding and unify the development of contents and outcomes.
- Meeting Agendas and Minutes of the three first coordination meetings of the five in total (two in Pamplona-Spain and one in Porto-Portugal): Contents of the meetings, attendances, description of the discussion and agreements.
- The first six-month progress report (technical and economical): report containing the activities developed during the first six months, outlined and monitoring the project progress.
- Interim Report (Technical and Financial): Report containing the activities developed during the first year (half of the project). The actual report is part of this Interim Report. It will include also the required expenses certification.
- Intranet: It is a project management on-line tool adapted to the e-WindTech project to facilitate the fluent communication between partners and to share contents in the development and draft & final versions of outcomes (<http://intranet.ewindtech.net/>)

WP2: KNOWLEDGE GATHERING AND DESIGN OF LEARNING CONTENT

- Database with organized and accessible content and knowledge: This database summarises all the tasks and work of research and gathering of information of all partner countries and Europe.
- Design of Course (planning of training contents): Description and planning of training contents of the wind mills maintenance course. Development of three of the five units of the course: (1) Wind Energy, (2) Wind Turbine Description and Components, (3) Introduction to the maintenance of a wind turbine, (4) Description of the maintenance in the components of a wind turbine and the specific tools for this maintenance and (5) Prevention work in the maintenance of wind turbines.

WP3: DEVELOPMENT OF VIRTUAL REALITY SIMULATIONS AND ADAPTATION OF THE PLATFORM

- At this moment an e-Learning platform is being adapted for the specific purpose: Adaptation of a SCORM compliant e-Learning platform to include the new on-line programme of wind mills maintenance and the virtual reality simulations, and to easy the future adaptation to possible changes of the technology or the programme.
- Implementation of Virtual Reality Simulation running on the platform: At this moment also it is being developed some simulations to include in the programme course and the simulations will be running in the adapted platform to be checked and to find possible and first errors and lacks of functionality.

WP4: IMPLEMENTATION AND EVALUATION

This workpacakge, just started last December 2008 and there are no outputs yet.

WP 5: QUALITY AND EVALUATION PLAN

- Quality Management Plan: It defines the approach taken to ensure the quality of the deliverables and highlights other management processes which influence deliverables quality, such as change and risk management.
- Ex-ante report evaluation: It refers to forward-looking assessment of the likely future effects. Its purpose is to gather information and to carry out analyses which help to ensure that the objectives will be delivered successfully.
- Interim External Evaluation Report is currently being developed.

WP 6: DISSEMINATION

- A Dissemination Plan collecting all the dissemination activities that will take place during all the project has been developed.
- A project logo has been defined
- Also there has been created a Website of the project with the contents and outputs of the project developed in all the languages of the consortium and English.



The website of the project is: <http://www.ewindtech.net/> though many areas of this site are still under construction as they are not final results yet. The website will be updated with the results and information that will be achieved during the lifelong of the project. For the moment there are different information and some fields available to go including different outputs of the project: "Home", "About e-WindTech", "e-WindTech Tool", "Knowledge Databas", "News, Press & Events", "Contacts" and "Partners Area"

WP 7: EXPLOITATION

This workpackage has been discussed in all the meetings but there are no outputs yet as this WP will be developed at the end of project.

All the partial outputs can be found in the intranet (internally) and as soon as the consortium obtains final results, they will be possible to find in the website of the project.

4. Partnerships

CENIFER (Foundation for the Training in Renewable Energies) located in Navarra, Spain, is the applicant and leader of this project. CENIFER provides professional training to technicians in order to contribute to the appropriate development of the Renewable Energy sector not only in Spain but in Europe.

But to achieve the main goal of the project, CENIFER needed to work with a European Consortium with partners with different skills and experiences.

For that reason the consortium is made up of 2 partners from Germany and 2 from Spain, as Germany and Spain are the European countries with more wind capacity installed; 1 from Portugal, 1 from Greece and 1 from Lithuania.

The profiles of the partners are different and working together provides added value to the project. Some partners are experts in renewable energy training (CENIFER - Spain) and e-learning training (BBZ - Germany); other partner is an expert in e-learning development, to adapt the content of the course to a e-learning platform (IGD-Germany) and other, is expert in Virtual Reality Simulations to include these ones as a practical lesson in the content of the course, to avoid the most risk practices (VICOMTech - Spain). Other partners contribute to the development of the course with their different points of view depending on their experience and specific country conditions. Within the oncoming months their task will be to carry out the Pilot Projects of the course and implement the course in a real way in order to test the training method & the e-learning tool and to improve it (IDEC - Greece, SPI - Portugal and SSI - Lithuania). IDEC is also the responsible of the Workpackage 6 (Dissemination). The cooperation and fluent communication is being ensured between the partners because one of them is an expert in Management and Coordination of consortiums in different European projects (INICIATIVAS INNOVADORAS - Spain).

Some contact details and data of the partners are:

Foundation for the Training in Renewable Energies (CENIFER) *Spain*

<http://www.cenifer.com>

Address: C/ Aduana s/n. 31119 - Imarcoain.(Navarra) Spain

CENIFER, the applicant organisation, was created by the Department of Education and the Department of Industry and Technology, Commerce and Work of the Government of Navarre. In 2005, six sector companies joined to the Foundation's Board (Gamesa Eólica, Acciona Energía, Ingeteam, Ecotécnia, Gas Natural Eólica y Eólica Navarra).

Navarre is one of the most active regions in Europe regarding Renewable Energies implementation. CENIFER's main aim is to provide professional training to technicians in order to contribute to the appropriate development of the Renewable Energy sector not only in Spain but in Europe. CENIFER contributes to match vocational training initiatives of the Regional Government (initial, occupational and continuing) to the sector's employment real needs. Other objectives are to organise and carry out dissemination activities as well as experimentation, innovation in training focus on renewable energies.

The tasks that CENIFER is carrying out in e-WindTech project are the following:

- Identification and adaptation of the technical knowledge, coordination of the gathering of knowledge regarding wind mills maintenance operations within the partners countries.
- To design the contents, being in charge of the action final contents after discussing with all partners.
- To validate this contents with sector's companies.
- To cooperate in the virtual reality simulation practices.
- In the next future to prepare and to run a pilot training action involving initial vocational training students and current maintenance professionals.

Innovative Initiatives (INICIATIVAS) Spain

<http://www.iniciativas-innovadoras.com>

Address: C/ Zabalgaina 3. Oficinas 4-5. 31180 - Zizur Mayor. (Navarra) Spain

INICIATIVAS, the Coordinating Organisation, is the leader of WP1 (Management and Coordination of the project). The tasks that INICIATIVAS is carrying out in the e-WindTech project are:

- General project management and coordination.
- To communicate with the partners and the Executive Agency.
- To follow up the realisation of the project supervising the work carried out within each WP and task, identifying any risk, designing a contingency and conflict management plan, and ensuring the smooth advance of the project to meet its final objectives.

Vocational Training Centre of the Craftsmen's Guild Association in Iserlohn (BBZ) Germany

www.bbz-mk.de

Address: Handwerkerstrake 2. Iserlohn D-58638. Germany

BBZ is contributing to the project with its pedagogical expertise in organisation of vocational training, in particular in organisation of e-learning with the method of blended learning.

Fraunhofer Institute for Computer Graphics (IGD) Germany

www.igd-r.fraunhofer.de

Address: Joachim-Jungius-Str. 11. 18059 Rostock. Germany

IGD is contributing to the e-Learning platform adaptation and collaborating in the methodology to adapt the contents to the e-Learning format and carrying out dissemination and exploitation activities in Germany.

Visual Communication and Interaction Technologies Centre (VICOMTech) Spain

www.vicomtech.es

Address: Parque Tecnológico de Miramón. Paseo Mikeletegi 57. 20009 - Donosita-San Sebastián. Spain

VICOMTech is the leader of WorkPackage 3 (Development of Virtual Reality Simulations and adaptation of the Platform) in the project. On the basis of its expertise on Virtual Reality, interaction and Computer Graphics, VICOMTech is developing with support of CENIFER, BBZ, IGD mainly and the rest of the partners, the Virtual Reality based exercises that will enrich and reinforce the training tool with a set of simulations containing the most relevant aspects of the maintenance of wind mills. In the rest of the work packages it is also involved to achieve the aims of the global project.

IDEC Greece

<http://www.idec.gr/>

Address : Iroon Polytechniou 96. Piraeus 18536. Greece

IDEC is the responsible of WorkPackage 6 - Dissemination in the project, always validating all the decisions with the consortium (Steering Committee). IDEC will be also involved in the oncoming future in the development of the training Pilot Project, testing and validating of the e-learning tool. Also in the rest of the work packages is involved to achieve the targets and indicators.

Portuguese Society for Innovation (SPI) Portugal

www.spi.pt

Address: Rua Julio Dinis, 242, 2º, 208. 4050-318 Porto. Portugal

In the project SPI is developing tasks in all the work packages but it will be more involved in WP4 to implement the training Pilot Project and to test the prototype of the e-learning tool with applications of Virtual Reality Simulations to educate future maintenance technicians of wind turbines in wind farms in Portugal. SPI is also developing general tasks of all the work packages.

Public Institution Strategic Self-Management Institute (SSI) Lithuania

<http://www.eksponente.lt/ssi>

Sausio 15 osios 11a-27 Kaipeda - KT 91136. Lithuania

SSI scientific abilities and experience in wind energy, creation and implementation of virtual simulators and scientific innovation activity, is giving it the possibility to participate in many stages of the project. Primary, market research of the demand for education and improvement of abilities of wind turbines maintenance staff, preparing the evaluation of the areas of the programme. Its sociological and IT skills will enable SSI to prepare and arrange a virtual poll of potential and real students and teachers.

5. Plans for the Future

The project is now in the middle of its development. In the next months it will be finishing completely the Work Packages 2 and 3; it means, that proximally it will be completing the contents of the course and their adaptation into an e-learning platform with some virtual reality simulations, videos and electronic pictures.

Also now the consortium has begun the preparations for the oncoming implementation of the pilot projects (WP4) in the different countries. Implementing the training Pilot Project will serve to test the prototype of the e-learning tool, with applications of Virtual Reality Simulations to educate future maintenance technicians of wind turbines in wind farms, in a real way to test the training method, the e-learning tool and to improve it

All the partners will also continue with the development of WP5, the on going evaluation, to fulfil with the Quality Management Plan of the project.

Furthermore, the consortium will continue with the development of WP6 (Dissemination and promoting the project): finishing the brochures, developing new ones, delivering brochures, publication of press articles in all the countries involved, presentation the project and the results in seminars or fairs, feeding of contents to the webpage (news, final products, documents...) and at the end of project development of a Final European Seminar.

For the last seven months of the project it is foreseen to carry out the WP7 (Exploitation of the project's results), by first elaborating an Exploitation Plan on which the consortium has already started to work. The main activities of the Exploitation Plan will be necessary at the end and after the project in order to reach the right and proper audience, because the sector of wind energy is changing and developing very fast. Some useful activities will be the image (Marketing) of the product; the creation of specific areas on the partners web sites for the outcomes of the project (or news on the bulletins of the partners); mailings to associations and to the education and work departments of the EU regions where wind energy is more developed; meetings with companies and teachers of the wind energy sector; participation in exhibitions and commercialisation fairs, etc. Fulfilling the detailed Exploitation Plan that will be developed in the framework of the project, the sustainability will be assured. It will be necessary also that the Platform, where the course will be adapted, was easily modifiable, because the technology of wind energy is changing very quickly.

6. Contribution to EU policies

It is explained below, how this project is contributing to key EU policies, objectives and priorities at this stage of the project. However, these explanations will be more exact and concrete in the final report at the end of the project.

Lisbon Education & Training Progress Indicators

Target: Open learning environment, population aged 24-64 participating in education and training.

At this moment in the middle of the development of the project it has not reached many students or technicians but it is expected to happen in the next months in the development of pilot projects. Thus, some of the potential beneficiaries of the proposed final tool will be the current windmill technicians working in Europe, who demand re-training and continuous education on windmill maintenance.

Target: Making learning more attractive, share of the population aged 18-24 with only lower secondary education and not in education and training.

In the close future, other potential beneficiaries of the final results of the project will be also those young people with a secondary lower level education interested in technical professions on emerging sectors, such as the renewable energies one. For the moment this beneficiaries have not yet been reached.

Lisbon Key Competences

Target: Digital competence.

Actually some partners have contracted some staff to work in the project with ICT skills and all the people involved in the project are learning new ICT skills to develop and adapt the contents of the course to an ICT platform. Also all the consortium is using the intranet as a tool to communicate and to manage the project. What is more, in the future with the final results of the project, the innovative and ICT-based environment of the project aimed tool will enable students, who will require basic digital competences, to further increase them through searching, locating, evaluating, manipulating and controlling of digital and visual information from diverse digital sources and formats.

LLP Horizontal policies

Target: Promoting equality between men and women and contributing to combating all forms of discrimination.

Actually, half of the committees that are working in the project are composed by women and always in all the actions of the project is taking into account the equality between men and women. The extremely technical content of the training does not provide many chances to include subjects in the final programme course that may confront the traditional gender roles or to promote gender equity messages. Nonetheless, the maintenance technician sector, is an extremely male gendered sector for the moment, so with the development of the final result at the end of the project, as first step, could contribute to access improvement by women to training in maintenance skills of wind turbines.

Complementarity with other policies

Target: Environment.

The proper thematic of the project on Renewable Wind Energy is focused on the European Union's Energy Policy to maintain the EU's position as a world leader in renewable energy by proposing a binding target of 20% of its overall energy mix to be sourced from renewable energy by 2020.

Also in the development of the actions of the project the consortium tries to use as less paper as possible, using to communicate between them the intranet and send all the documents via electronic files.

Target: Education and Training 2010 Work Programme.

The project will contribute to Objective n° 2 of the Work Programme, as it will be an open learning environment that will improve the attractiveness and access to training for the reasons described in previous paragraphs.

