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Modular e-course with Virtual Coach tool support

Final Report Public Part

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Project information

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Executive Summary

This report presents the approach, results and achievements of the COACH BOT project "Modular E-course with Virtual Coach tool support". The overall aim of the project is to address the lack of adult distance learning programmes in Europe by designing and testing an innovative e-learning methodology for adult education that combines Conversational Agent Technology (chat-bot) with an ad hoc designed modular e-learning path. The COACH BOT project and e-course address European home health care professionals (nurses, physiotherapists, social workers, doctors etc.). The COACH BOT methodology allows this target group to customize their own personalized training paths based on their specific training needs, allowing them to successfully manage a training course amid their personal and professional life. The "Virtual Coach" supports learners "individually" during the modular e-course who acts as a teacher, coach and tutor by providing in-depth information, assessment, case studies and technical support at any time of day. The project tested the methodology on the target group of home healthcare professionals from different European countries and with different educational and professional backgrounds and specific training needs. The modular e-course permits trainees to customize their learning experience by choosing course contents that are most relevant for their job depending on their profile, thus addressing an array of diverse professions within the healthcare sector.

The project partnership comprises 6 European countries: Italy, Denmark, Romania, Slovenia, United Kingdom and Switzerland. The multi-actor partnership consists of 7 organizations: Interuniversity consortium, public healthcare institution, multimedia consulting, NGO, nursing school, vocational training institutions in the health and social sector and a non-profit enterprise. All the skills required to achieve the project objectives were assured thanks the multi-actor consortium providing technological, methodological, educational, social and healthcare, communication and management expertise. In order to guarantee the project impact and sustainability, the COACH BOT approach was developed to gather continuous feedback and interaction between partners and the target group. Specific actions were implemented to reach home healthcare professionals and involve them in the overall project's development. In particular, a need analysis on the European context of home healthcare assistance was conducted in each partner country and in Croatia. The research phase consisted of desk research on the comparative study of European literature, case studies and best practices concerning existing training programmes to update home healthcare service skills. Two healthcare professionals were interviewed in each partner country, in order to collect more in-depth information on the target group and their training needs. The subsequent report (available on the project website) contains the need analysis results identifying the target groups' training needs that were used to develop the e-course contents. The evaluation strategy, described in the project Quality and Evaluation Plan, covered all aspects of 'process' and 'content/product' of the project. The evaluation process incorporates both qualitative and quantitative aspects of the project in order to effectively monitor and evaluate both processes (e.g. project management) and products (e.g. training contents and methodology). In order to successfully promote the project, a comprehensive Dissemination Plan was produced and implemented to strategically involve all partners in dissemination and exploitation activities throughout the project. Dissemination materials such as multilingual brochures, posters and e-newsletters were distributed among the target group and stakeholders over the project life cycle. In order to constantly promote the project, the COACH BOT website was created featuring a multilingual public area and a private area. (www.coachbot.eu).The project is also published on the ADAM portal (Advanced Data Archive and Management System), featuring the project's results and products (http://www.adam-europe.eu/adam).

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1. Project Objectives

The overall aim of the COACH BOT project is to address the lack of adult distance learning programmes in Europe by designing and testing an innovative e-learning methodology for adult education that combines Conversational Agent Technology (chat-bot) with a modular learning path designed ad hoc. The pilot e-course addresses a target group of home healthcare professionals.

The healthcare sector is a complex system that demands extensive resources and consists of a set of integrated services and inter-collaborative health teams. Home healthcare professionals come from different educational and professional backgrounds, and thus have different gaps and training needs. The e-course modules, as well as the possibility to concentrate more on some rather than other aspects (legal, communication, etc.) depending on the profile, is well suited to this target group, which is not homogenous. The COACH BOT methodology can help solve these problems by providing home healthcare professionals with the opportunity to renew and improve their skills by using a flexible learning approach.

The project's innovative aspect consists of the development of a collaborative e-learning environment featuring a "chat-bot" or "Virtual Coach" who interacts with users through a human-like interface. The "Virtual Coach" acts as a teacher, coach and tutor, who supports learners "individually" during the modular e-course by providing in-depth information, assessment, case studies, technical and methodological support. The COACH BOT e-course is based on a personalised approach allowing home healthcare professionals, with the help of the "Virtual Coach", to customize their own training path and benefit from a suitable training path that is relevant to their profession and based on their own specific needs, knowledge and skill requirements.

In order to test the effectiveness of the "Virtual Coach", the e-course was experimented by 2 different groups of users in each partner country (Italy, Denmark, UK, Romania, Slovenia and Switzerland): an experimental group (with the help of "Virtual Coach") and a control group (without "Virtual Coach"). This choice provided a fundamental added value by allowing the comparison between the two groups of participants and providing meaningful data for analysing the core role of the Virtual Coach (an expectation questionnaire and a satisfaction questionnaire were submitted to both groups before and after the testing of the e-course and on the base of these results it has been produced the Evaluation of COACHBOT methodology).

In order to guarantee that the project responds to target users' needs, the continuous and active involvement of home healthcare professionals (nurses, physiotherapist, social and care workers, doctors, homecare assistances) within the project activities was foreseen as follows:

- *Training need analysis* of the healthcare professionals work context and training needs in different European countries;
- *Two National Exploitation Seminars* organized in each partner country before and after the delivery of the e-learning course to involve users in the COACH BOT e-course and to spread project results;
- *Testing of Virtual Coach* before the e-course experimentation phase (at least 3 home healthcare professionals involved in each partner country);
- *Experimentation of COACH BOT e-course* in each partner country
- *Evaluation of COACH BOT methodology* through the submission of an expectations questionnaire before the e-course delivery, and a customer satisfaction questionnaire after the e-course ending;

- Arrangements of *focus groups* by involving home healthcare professional from the control and experimental groups in each partner country after the delivery of the e-course, in order to gather qualitative and in-depth data on pilot application usability and transferability;
- *Dissemination activities*: circulation of project website, brochures, posters, e-newsletters and organization of the final project international conference.

Home healthcare professionals benefited by their direct participation to the project activities as they attended a course that they have contributed in creating. The COACH BOT e-learning course was customized according to their real training needs and work experience. Moreover, they were able to experiment a knowledge sharing experience during which they will discuss with colleagues of the other countries involved in the project, for the circulation and comparison of information through an effective use of ICT.

The potential short term impact of the project upon the target user group includes the following:

- facilitate the e-learning experience (in order to avoid difficulty and potentially reduce drop out) and maintaining individual motivation in ongoing updating of skills, particularly relevant for home healthcare professionals, thanks to the “Virtual Coach” main functionalities;
- promote an in depth knowledge on healthcare professionals work context at European level, through the interaction and exchange of experiences with colleagues from different European countries;
- enhance competences in the fields covered by the e-course: medical issues, psychological issues, national/EU health legislation and social and ethical aspect linked to the home healthcare work;
- narrow specific gaps perceived by each user by creating a customised training path focusing on specific topics (medical, psychological, legislation or communication skills);
- respond to adults training needs and characteristics.

The potential long term impact of the project upon the target user group includes the following:

- provide a more flexible and accessible training opportunities whereby individuals undertake self-directed learning;
- provide training opportunities for healthcare professionals allowing a cost reduction with the training delivering increase;
- support the installation and use of new IT tools for providing in-service training within healthcare institutions;
- promote individual development/sense of achievement and consequently the improvement of work performances;
- promote the improvement of specific skills of healthcare professionals ensuring compliance.

2. Project Approach

Management strategy

The project Consortium relied on an integrated management process based on coherence, sharing of results and horizontal supportive communication. The project management has been developed as a cohesive system driven by effective communication and sharing of competences among partners (favouring internal contributions), with a strong capability to collect and analyse external inputs. The Decision-making process was based on consensus.

The organisational structure of the project foresaw different roles and functions according to the specific needs and features of each project activity. FOR.COM (IT), as the prime contractor of the project, was responsible for the entire management of the project and led the Steering Committee composed of one representative from each partner organization.

Operative project management

In order to guarantee a high quality of the project outputs, specific partnership staff has been assigned to carry out the different activities according to their professional skills and expertise. For this purpose, at the beginning of project specific work teams have been identified:

- *Needs analysis and didactic Team*: researchers and trainers in charge of the development of COACH BOT curriculum and the pilot course contents;
- *Technological Team*: technicians and e-learning experts in charge of the designing and development of the COACH BOT platform and Virtual Coach, its integration, and the drawing up of the technological reports;
- *Experimentation Team*: key actors of healthcare sector, project managers in charge of the management and monitoring of the experimental and control e-courses;
- *Quality and Evaluation Team (QET)*: project managers and quality experts in charge of the definition of the quality indicators, the assessment of the COACH BOT methodology efficacy and the evaluation of the pilot application usability and transferability (follow up).
- *Dissemination and exploitation Team*: technicians and communication experts in charge of the design and set up of the dissemination and exploitation activities.

FOR.COM. developed a Project Management Handbook that explains the planned work of the project and includes: detailed work plan, time planning, risks which could affect the success of the project, working methodology and monitoring tools, means of communication among partners and management strategy.

A key tool created and used for the project circulation of information is the project website, which includes a Private Area for partners which contains the tools, templates, guidelines, reports and deliverables of the project, and is organized in 5 sections: file repository, recorded meetings, learning objects tools, calendar and gallery. In particular, within the file repository section a folder has been created for each different phase of the project: Management, Need Analysis and Design of COACH BOT Methodology, Technological Design, Production, Experimentation, Quality and Evaluation Process, Exploitation and Dissemination.

Organization and holding up of plenary and virtual meetings

Special attention has been devoted to the organization of plenary and virtual meetings, as they are important moments in which partners discuss the status of the project activities and also plan the future ones.

The Meeting Agenda and the pertinent documents, have been sent out to all partners in advance, so as to allow them to be able to organize the useful documents and to suggest changes, integrations and comments. During the meetings, all documents and materials related to the Agenda are handed out to all partners and organized in a meeting folder. All partners fill out a questionnaire for the evaluation of the meeting. Furthermore, following the meetings, detailed Minutes, focusing on the topics discussed, results reached and deadlines, are sent to all partners involved.

Monitoring and reporting activity

All partners were actively involved in the ongoing monitoring procedure with respect to deadlines and the project goals. The following are the main monitoring tools created by FOR.COM. (IT) in close cooperation with all partners: project time-sheet template, quarterly cost certification template, meeting minutes template, conference report template and mid-term results report template.

Evaluation strategy

The Quality and Evaluation Team (QET) was composed of partner staff and an external quality expert (devoted to the carrying out the external evaluation process and to contribute to the project's outputs evaluation). The project evaluation strategy and process is based on the assumption that it should cover all representative aspects of 'process' and 'content/product'. In fact, the evaluation process deals with both qualitative and quantitative aspects of the project and it is devoted to monitor and evaluate both process (e.g. project management) and products (e.g. training contents and methodology). The project evaluation process was described in detail in the Quality and Evaluation Plan, and includes the following main steps:

- *Evaluation of project outputs*: is related to the respect of quality criteria during project activities. To assess the quality of project outputs and the grade of achievement of the project results, an evaluation grid has been designed to be submitted to all partners for each outputs carried out. The evaluation of project outputs was carried out regularly throughout the whole project duration.
- *External evaluation*: Since the project management is a critical activity that influences the success of all project activities and the project mid-term and final results achievements, the evaluation process includes an external evaluation, as a specific task for evaluating and monitoring the project management activity. For this purpose, FOR.COM. selected an External Quality Expert who was involved in the external evaluation process and that contributed at the identification of the evaluation strategy, critical issues and risks related to management process and the working out of the properly corrective actions. The following specific tools have been designed in order to collect the management evaluation data, assess the quality management activity and analyse the critical issues: evaluation grid, meeting minutes and meeting questionnaire. The external evaluation was carried out regularly during the whole project duration and its results were analysed in the Mid-term Evaluation Report and in the External Evaluation Report.
- *Evaluation of COACH BOT methodology*: aims at evaluating the pilot application efficacy and effectiveness. Specifically, two questionnaires have been designed and submitted to both control and experimentation learners groups (an expectations questionnaire – at the beginning of the course – and a customer satisfaction questionnaire – after the e-course) and the evaluation results have been analysed in the COACH BOT Methodology Evaluation Report.
- *Follow up*: the project follow up aims at evaluating the pilot application further development and transferability through the arrangement of focus groups among

learners. Focus groups were arranged in each country among experimental and control group users and the results were analysed in the Focus Group Report.

Dissemination and Exploitation strategy

The project partnership agreed on a specific and structured strategy for dissemination and exploitation activities, with the aim of making the progress of the COACH BOT project accessible to the most extensive audience possible. The dissemination strategy was designed to obtain major project results and increase project visibility among the target group and stakeholders, in terms of promoting the project objectives, mid-term results and the state of the art of the project. The project Dissemination Plan details the multiple dissemination strategies addressing different types of target groups through the use of diverse tools:

- *Paper strategy:* multilingual brochures and posters were produced to illustrate the project's objectives and activities. Since these tools provide instant information and are easy to distribute, they are mainly target local, regional and national healthcare authorities, associations providing healthcare services and potential course participants in order to promote their participation to the e-course. Meanwhile, papers and articles containing more technical language address the community of researchers and engineers interested in the application of ICT in the field of education. Some papers and articles have been written by the partners and published in national and international magazines.
- *Internet strategy*: aimed at promoting the project through the official multilingual project website, the production of the COACH BOT multilingual e-learning platform demo and quarterly e-newsletters promoting the project to local stakeholders.
- *Event strategy*: aimed at promoting partner participation in key thematic national and international events and the COACH BOT final international conference in Aarhus (Denmark) to present the project results and share information and best practices in the field. The partnership has participated in different national and international conferences to present the COACH BOT project, through the submission of detailed papers and articles. Two National Exploitation Seminars were held in each partner countries to reach and involve target groups.
- In order to guarantee the project impact and sustainability, the COACH BOT approach was developed to gather continuous feedback and interaction between partners and the target group. The partnership created a COACH BOT database of contacts (including mail and e-mail addresses of about 150 contacts for each country involved) consisting of local, regional and national healthcare authorities, associations providing healthcare services, home healthcare professionals, secondary schools of health care sector, vocational training agencies and universities of applied science etc. The project's brochure and the e-newsletters were mailed to them. All the contacts, in each country involved, received invitations to all events organized by the partners within the COACH BOT project and the new e-newsletters.

3. Project Outcomes & Results

During the whole duration of the project, the partnership achieved the following main outcomes and results:

Management

- *Project Management Handbook*: represents the planned project activities, as well as a detailed work plan, timed planning, risks which could influence the proceeding of the project, working methodology and monitoring tools, means of communication among partners and management strategy. It is available in the project website private area.
- *Report about mid-term results*: includes activities realized during each phase of the project by each partner and the results and products achieved. It is available in the project website private area.
- 1st Annual workshop with EACEA Agency, Brussels, 15 December 2008.

Kick off Meeting:

- Project Kick off Meeting, hosted by FOR.COM. (IT), Rome, 20-21November 2008.
- Bilateral Kick off Meeting between FOR.COM. and SOSUAarhus (DK), Rome, 22 December 2008.

*Project Interim Plenary Meetings***:**

- Plenary Interim Meeting, Bucharest, 14-15 May 2009, hosted by Romanian Society for Lifelong Learning (RO).
- Plenary interim meeting, Ljubljana, 14-15 January 2010 hosted by Secondary School of Nursing Ljubljana (SI)

*Project Interim Virtual Meetings***:**

- Project Interim Virtual Meeting, 14 January 2009.
- Project Interim Virtual Meeting, 26 October 2009.
- Project Interim Virtual Meeting, 4 October 2010.

All the meetings documents are available in the project website public area.

Furthermore, FOR.COM. drew up the *Project final report* with contributions of all the partners. It summarises all results achieved and products carried out and the results of the COACH BOT e-course experimentation carried out in all partner countries as well as the final conclusions about the COACH BOT methodology and tool efficacy. The project final report is available on the project website public area.

Need analysis. The European context of home healthcare assistance

- *Training Needs Report:* this report contains the main results of the training needs analysis of home healthcare professionals carried out in all project partner's countries and a general overview of the EU context. It also includes the research carried out in Switzerland and in Croatia (thanks to the Swiss partner contacts in this country) and the results of the interviews carried out in each partner's country to some representatives of the healthcare sector or/and of the VET system. Thanks to the interviews it was possible to define in detail the characteristics of the home healthcare professionals in the different countries. Furthermore, the partners have had the opportunity to actively involve the project target group since the project beginning and

also to guarantee the creation of a course addressing the target group's specific training needs. Home healthcare professionals did not participate as mere users but also as active members providing pivotal information for the design of both course methodology and contents. The Training needs report also clarifies the link between the research conducted on the healthcare professionals' in EU and the fifteen course modules (training program) developed during the project, and more precisely how the course contents based on the comparative research results were developed into Learning Objects and tools on the COACH BOT e-learning platform with virtual assistant. The report is available in the project website public area.

- *COACH BOT curriculum*: the description of the course topics and contents. The curriculum represents the starting point and the basilar tool for the further definition of the specific e-course syllabus. The document is available in the COACH BOT website public area.

Design of COACH BOT methodology

- *E-course Syllabus*: one syllabus for each module has been prepared. The syllabi are divided into topics and include the e-course objectives, description of contents, didactic materials foreseen and expected support services for the course delivery phase (i.e. chat, video chat, videoconferencing, forum, online tutoring Session). The document is available in the project website private area.
- *Instructional Design Handbook*: describes the COACH BOT methodology and has been designed based on Pedagogical Agents technology. Pedagogical Agents are autonomous software systems, realized with AI-Artificial Intelligence, methods that can operate in the training environment as tutors or facilitators who adaptively assist users in performing training tasks. The COACH BOT virtual assistant acts as different roles within the e-learning platform: tutor, teacher, technical assistant, and mentor. The innovative methodology also includes the designing of a "personalized" learning path presented and supported by the virtual assistant, for each student according to his/her own profession, experiences and work needs. The document is available in the project website public area.

COACH BOT technological design

- *COACH BOT platform architecture report*: it presents the features, requirements and the different sections of the e-learning platform which will host the course.
- *Virtual Coach technology report*: it describes the features of the COACH BOT conversational agent and details the technical requirements ensuring the effectiveness of the tool.
- *COACH-BOT technological report*: it includes the Technological Architecture of the entire tool; the platform hosting the course and Virtual Coach. It explains how to integrate the conversational agent technology into the e-course platform structure providing the technical instructions to effectively merge the two technologies.

The three reports, developed by the technical team, are available in the project website private area.

Production of the COACH BOT training path and Virtual Assistant

- *COACH BOT e-learning platform*: on the basis of the COACH BOT Architecture report it was developed the COACH BOT e-course platform to be integrated with the Virtual Coach and able to provide the modular e-learning course. Two versions of the platform have been developed: one "experimental" platform includes the Virtual Coach integrate with the LMS system, while the "control" platform does not include the Virtual Coach. The E-Learning platform is based on the open source LMS Claroline that allows teachers to create and administer course websites through a WEB browser. This LMS is worldwide used and the vast community guarantees to

solve any problems the platform administrators or users might have. The project's technological team selected the LMS Claroline, among other possibilities e.g. Moodle, for its very clean and comprehensible source code, allowing developers to easily implement new modules to create highly personalized learning paths and embed the virtual agent into the LMS. In particular the Technical team implemented source code modifications on the original open source E-Learning platform used in the project to provide highly customized learning paths (those modifications have affected the quiz and module areas of the platform) and the development from scratch of a summarizing table which tracks the learning progress of the participant.

- *Virtual Assistant*: the main result of the COACH BOT project has been the development of the Virtual Assistant called "Clara" who becomes a mentor, a coach, a teacher, a didactic or technical tutor depending on the student's type of learning activity, and all of this embedded in an open source and SCORM compliant learning management system. On the basis of the Virtual Coach technology report and the Technological report it was developed the Virtual Coach's conversational engine and then it was integrated in the "experimental" COACH BOT e-learning platform. The conversational agent engine was developed using the AIML programming language (Artificial Intelligence Mark-up language) to give communicative skills, in natural language, to the Virtual Assistant. Several linguistic patterns have been developed in AIML to make the virtual assistant capable to understand and reply correctly. In particular, this kind of technology has been used in three semantic areas of the Virtual Assistant: a guidance interview for starting a friendly conversation between the student and the virtual assistant and for defining a professional profile of the trainee; an help desk to provide users with extensive help concerning LMS functionalities and tools and some "Suggestions" to help the user concerning specific course topics. The Virtual Coach was integrated in the E-learning platform thanks to the open source software Program which parses AIML linguistic patterns in PHP/MySQL, the technology behind the E-Learning platform Claroline, and makes the messages generated by the Virtual Assistant visible in the E-learning platform. Moreover, the technical team developed an automatic and customized messaging system, delivered by the Virtual Assistant. The Message content depends on the user's learning progress, on his or her performance to quizzes and on the area of the E-Learning platform the trainee is visiting to. The project technical team developed the Virtual Assistant graphical interface or Avatar to make more user friendly the Virtual Coach called "Clara". The Avatar is dynamic i.e. reacts with facial expressions to user's actions e.g. after a quiz completion. Adobe Flash has been used for implementing the avatar because of the high qualities' vector graphic, very easy to animate with the point to point technique of interpolation.

The integration of the COACH BOT e-learning platform with the Virtual Coach (with all its functionalities) required a close cooperation between project's researchers/teachers and technicians, who worked in parallel. Specifically, technicians' tasks included the development of the conversational agent engine, Virtual Coach software and the design and development of the Virtual Coach graphic interface that allowed the Virtual Coach to interact with users. Teachers had to provide technicians with course contents for allowing them to 'fill' the conversational agent engine. For this reason, as soon as the different Learning Objects were produced, they were sent and shared with the technicians. In order to allow mutual understanding and therefore integrated activities between researchers and technicians, various meetings have been held both in presence and in virtual modality. The course was based on an e-learning methodology that allowed each learner to build a personalized learning path. The 'Guidance interview' defines the professional profile and consequently a learning path that fit better the student while the 'start up quiz' checks the student's previous knowledge and indicates which course contents are mandatory or optional depending on the score carried out.

Production of the modular e-course contents (LOs, Learning Objects)

- *Guidelines to develop Learning Objects*: COACH BOT teachers have been provided with specific guidelines for the realization of suitable Learning Objects (e.g. audio lessons, start-up/final quizzes, lecture notes, slides and case studies).The purpose of the document is to guarantee the production and realization of homogeneous contents, in order to facilitate participants' course attendance. The document is available in the COACH BOT website private area.
- *COACH BOT e-course "Enhancing the European home healthcare professionals' competencies"*: the partners in charge of the production of the contents were Romanian Society for Lifelong Learning (RO), Secondary School of Nursing Ljubljana (SI), Norton Radstok College (UK) and Seed Association (CH). FOR.COM. coordinated the overall production of the LOs. On the base of the project Training needs report and the Curriculum and Syllabus, the partners developed 15 Training Modules (each module included 2/3 topics) referred on 4 main subjects of the Home Healthcare Assistance (Medical, Psychological issues, National/EU health laws and Social/ethical aspects). To each partner involved in this activity were assigned a number of Module to be produced. In particular the LOs produced for each topic were the following: start up and final quizzes, Audio Lessons, Lecture Notes and Slides. Furthermore, Seed Association produced 3 case studies by utilizing the Machinimas techniques. A Machinima is the use of real-time three-dimensional (3-D) graphics rendering engines to generate computer animation. In particular, Linden lab's Second Life has been used to create these highly engaging 3-D animations. The partnership decided to release the COACH BOT course contents under a Creative Commons License. This means that the 15 Modules and Learning Objects (audio lessons, lecture notes, slides, quizzes, and case studies) developed within the COACH BOT project are free to use and to adapt (open source) and have been published on the project website (public area) under a Creative Commons License.

Experimentation

- *Experimental Plan*: containing the experimental strategy and principles, guidelines for setting up the two training sessions (control group session and experimentation group session), indications to monitor the e-courses, as well as guidelines to carry out the selection phase, including the main features and requirements of both the control and experimental group participants. The plan is available in the COACH BOT website private area.
- *Testing of the COACH BOT e-course "Enhancing the European home healthcare professionals' competences":* each partner country autonomously managed the national promotion of the e-course though different ways (organization of the first national exploitation seminars, sending of informative emails to potential participants, publishing the information on their organization website and on websites of organizations linked to the target group, publication of press releases, etc.). The e-course was delivered in all partner countries involving a total of 165 participants (home healthcare professionals). The total course duration was 6 months, from March to August 2010. The participants were divided in two groups, experimental and control that attended the e-course on two different e-learning platforms. All learners participated in the e-course (with the same Learning Objects) but only the experimental group benefited from the Virtual Coach - Clara's assistance on the experimental e-learning platform. This choice provided a fundamental added value by allowing the comparison between the two groups of participants and providing meaningful data for analysing the core role of the Virtual Coach (an expectation questionnaire and a satisfaction questionnaire were submitted to both groups before and after the testing of the e-course and on the base of these results it has been produced the Evaluation of COACHBOT methodology). These activities are

described in detail in the COACH BOT Experimentation Report available on the project website, public area.

Quality and evaluation process

- *Quality and Evaluation Plan*: was drafted by FOR.COM. (IT) and SREP (RO) in collaboration with an external evaluator in order to illustrate the overall quality evaluation strategy and tools to be used during the project. The tools includes the project Meeting Evaluation Questionnaire (to be filled up by partners after each project plenary meeting), the "Evaluation of project outputs/products" and "Evaluation of project management activities" grids, to be filled in periodically by all the partners.
- *Mid-term Evaluation report:* was drafted in collaboration with the external evaluator in order to ensure effective management and overall evaluation of the project. It includes the evaluation of the first year of project activities, and analyze data collected through the meeting evaluation questionnaires and evaluation grids (filled in periodically by all the project partners) for project management and project outputs/products. Furthermore, this report includes a list of "suggestions" to correct and improve the different project results. On the base of these suggestions, the management strategy and all the project outcomes resulted improved and updated at the end of the project.
- *Project outcomes Evaluation report*: it was drafted at the end of the project to analyze the results of the evaluation of the main project outcomes.
- *COACH BOT Evaluation methodology report:* the evaluation and validation of the methodology have been fully elaborated in this report aimed at evaluating the pilot application efficacy (through the analysis and the comparison between the results of the Expectation and the Customer Satisfaction questionnaire submitted to the participants before and after the experimentation of the e-course, and the comparison between the control group and the experimental group results) and in the *Follow up report* aimed at evaluating the pilot application usability and transferability (through the analysis of the results of the focus groups organized in each partner country involving the e-course participants). The reports are both available on the project website public area.
- *External Evaluation report:* it was drafted by the external evaluator at the end of the project and it describes the project critical path evaluation and results. Thus, it includes the project main risks and corrective actions previously identified as well as the solutions that have been put in practice during the project lifecycle. The report is available on the project website public area.

Dissemination and exploitation activities

- *Dissemination Plan*: contains the executive planning, the definition of the different dissemination strategies (i.e. Paper, Internet and Event) and the different tools to be delivered in the framework of each strategy, according to specific target group. The document is available on the project website public area.
- *Database of contacts*: contains 888 contacts of the target groups and stakeholders; local and national health authorities, home healthcare professionals, vocational training agencies, universities of applied sciences, secondary schools for the health sector and other actors interested to the project. The database is available in the project website private area.
- *National exploitation seminars:* were arranged in each partner country in different dates according to the Country specific context of the national healthcare sector and to the COACH BOT e-course testing phase delay. In particular, the first National exploitation seminars were arranged from September 2009 to April 2010 in all partner

countries. The second national exploitation seminars were held from August to October 2010. The seminars were addressed to the target groups and stakeholders to promote the project results and encourage further utilization of pilot application. All the National exploitation seminar reports are available on the public area of the project website.

- *COACH BOT website*: features all the results of project activities. In order to ensure a user friendly organization of materials and information, the website is structured in two main parts: Public and Private Area. The Public Area provides access to all the project information and the main tangible outputs within different sections: Project (objectives, target group, methodology and technology), Course (description, course online), Products and Results, Partners, News, Contacts, Poll for Home Healthcare Professionals, Virtual Coach Trial and e-learning platform demo. The Private Area addresses to the partnership and collects and shares tools and contents related to the project management. The project website address is www.coachbot.eu .
- *COACH BOT multilingual brochures and posters*: these materials have been published in different languages illustrating the project's objectives and activities. They also target potential users in order to promote the e-course, and are distributed at all meetings and conferences to present the project. Brochure and posters have been distributed at local, national and international level in each partner country and are available on the project website public area.
- *COACH BOT e-Newsletters:* six e-Newsletter have been written in English and delivered among beneficiaries and stakeholders, using the COACH BOT database. The newsletter is part of the informative material concerning the project state of the art and the current achieved results. Each newsletter is available on the project website public area.
- *COACH BOT e-learning platform demo*: the demo aims to present the e-learning platform various functionalities and to explain how the learners can benefit from the e-course. It has been recorded in all partner languages (English, Danish, Italian, Slovenian, Romanian). The partnership produced and handed out 150 extra CD copies of the demo (in addition to the 300 foresee in the proposal). 150 copies of e-learning demo, together with 150 project brochures in English, were sent to the EACEA Agency in order to promote the project during the LLP Info days 2011 foreseen the 12th and 15th of November 2010 in Brussels. The COACH BOT e-learning platform demo is available also on the project website (public area).
- *Articles on the project results*: have been published by the partners on national and international magazines, web sites and blogs. Furthermore, different *papers* have been submitted to national and international conferences. *Press releases* and *advertisement* on national magazines have been produced to inform home healthcare professionals and stakeholders about the e-course experimentation and national exploitation seminars.
- *Virtual Coach Trial*: is available on the project website to promote the pilot application testing and to gather users' feedback.
- *National and international conferences:* partners took part to several events to disseminate the project spreading promotional materials and presenting the project. The conferences were focused on both the technological/methodological aspects of the e-learning as well as the project target group and sector (healthcare). The conference reports area available on the public area of the project website.
- *Exploitation Agreement:* concerning the commercialisation of the COACH BOT Virtual Assistant and Methodology and further improvements, the exploitation agreement states some important rules about the Intellectual Property Rights and the potential commercialization of the COACH BOT pilot application (COACH BOT web platform +

virtual Assistant software). Furthermore, the partnership decided to release the COACH BOT course contents under a *Creative Commons License*. This means that the 15 Modules and Learning Objects (audio lessons, lecture notes, slides, quizzes, and case studies) developed within the COACH BOT project will be free to use and to adapt (open source) and have been published on the project website (public area) under a *Creative Commons License.*

- *Final project Conference*: the project results were exploited also during the final project Conference held in Aarhus (DK) on the 15 of October 2010. Different stakeholders were invited to the conference were the project results were presented. The detailed description of this activity is available in the report of the final conference published on the public area of the project website.

- The project is published on the ADAM project and product portal for Leonardo da Vinci program (Advanced Data Archive and Management System), featuring the project's results and products (see http://www.adam-europe.eu/adam).

4. Partnerships

The project partnership consists of 7 organizations, representing 6 countries: Italy, Denmark, Romania, Slovenia, United Kingdom and Switzerland (self-financed). The consortium was designed to reflect different perspectives and expertise. The rationale behind their role in project, evolved from the identification of partners who have extensive experience in collaboration within their own specific sectors throughout Europe. Each partner has clearly divided responsibilities within different work packages, according to the key competences they possess. The added value of the transnational dimension of the partnership is considered as follows:

- A better understanding of the training needs of Health Sector professionals at European level by analysing the situation within 6 different partner countries (Italy, Denmark, Romania, Slovenia, United Kingdom, Switzerland) plus Croatia through the Training Need Analysis. The Need Analysis, resulting from a multinational perspective based on territorial criteria allowed partnership to compare the scenarios of two non EU countries within the general EU context, and moreover to outline also the situation of home healthcare professionals in Eastern Europe.
- Develop an e-learning training course based on a transnational exchange of methodological approaches and experiences of different partners involved in the project and the ability to reach a significant number of target groups, due to the high numbers of partners and countries involved.
- Compare existing e-learning best practices relating to a special focus on tutorial systems by analysing the situation in 6 partner countries.
- Effective dissemination and exploitation strategies to present the COACH BOT project results targeting a wide audience at EU level. The partnership involved the target group throughout the project in order to promote their pro-active participation, and establish cooperation relationships with the main stakeholders whose activities are complementary to the COACH BOT project.

FOR.COM. (IT) is an Interuniversity Consortium that develops and delivers open distance learning courses applying innovative solutions and interactive tools. Due to extensive experience in EU project managing and in testing new e-learning models, FOR.COM was responsible of the overall management of the project and the development of the e-course platforms. **Aarhus Social and Health Care College (DK)** is a public healthcare institution that also produces web based teaching programmes. They coordinated the Need Analysis and the development of the COACH BOT methodology. **Gruppo Pragma (IT)** is a multimedia consulting firm specialized in corporate publishing. They were mainly in charge of the design and production of the “Virtual Coach” conversational agent technology, thanks to their key technological expertise**. SREP (RO)** is an NGO that develops teaching/learning methods in order to enhance the quality of learning processes and evaluation criteria. Based on their expertise in EU project evaluation and quality assurance, they were responsible for project quality and evaluation activities. **Secondary School of Nursing Ljubljana (SI)** is a federally recognised nursing school. It was leader of the experimentation phase of the project and coordinated the delivering of both the sessions of the e-course (experimental and control group) that involved all partners’ countries. **Norton Radstock College (UK)** is a centre for vocational training, also specialized in care sector. Thanks to their relevant networks, they were responsible for coordinating the project exploitation activities. **Seed Association (CH)** is a non-profit enterprise operating in the field of education, communication, technologies and international cooperation and takes part to the project consortium as a silent partner (self-financed), participating in all the project phases.

5. Plans for the Future

The long-term targets identified with the purpose to promote the further improvement of the application and its replication are: home healthcare professionals (nurses, physiotherapists, social and care workers, etc.), local and national healthcare authorities, associations providing health care services, universities of applied science, secondary schools and training agencies which provide healthcare sector courses.

An *Exploitation Agreement* has been drafted and agreed by all the partners. It describes the process that the consortium is setting up in order to formalise the modalities and the conditions that will govern the commercial exploitation of the project results. The Exploitation agreement states some important rules about the Intellectual property rights and the potential commercialization of the project pilot application (COACH BOT web platform + virtual Assistant software). The partnership decided to release the COACH BOT course contents under a *Creative Commons License*. This means that the 15 Modules and Learning Objects (audio lessons, lecture notes, slides, quizzes, and case studies) developed within the COACH BOT project will be free to use and to adapt (open source) and have been published on the project website (public area) under a *Creative Commons License.*

The strategy to be followed after the end of the project to continue reaching long term targets is the following:

- In order to guarantee the project impact and sustainability it has been adopted a specific strategy aimed to gather a continuous feedback and interaction between partners and target groups. During the project, each partner involved representatives of the long term target group to promote the further improvement of the COACH BOT project application and its potential replication. The Partnership will continue to involve key actors through future exploitation meetings/project presentations in national and international conferences, publishing articles and information about the project in thematically related magazines, portals and delivering project dissemination materials. The project website and the project results will be continuously promoted after the project through the partners networks and among health professionals and stakeholders. A virtual Coach trial will continue to be available on project website in order to allow stakeholders to test the pilot application and to gathers users feedback.

- The ADAM portal (http://www.adam-europe.eu/adam/homepageView.htm) containing the main project results, will be updated with the public part of this Final Report in order to guarantee a continuous promotion of the project.

The real innovation of the COACH BOT project is the embedding of a pedagogical agent in an open source and SCORM compliant learning management system. The virtual agent becomes a mentor, a coach, a teacher, a didactic or technical tutor depending on the student's type of learning activity. This project provides the premises to provide the distance learning community with a multiple purpose pedagogical agent that is easy to integrate in any open source LMS like Moodle, ILIAS, Dokeos, Atutor, etc. The main long term strategy could be to further implement the system to make the virtual assistant completely independent of the learning management where is integrated in as a standard web service. In that sense the strategy would be to go beyond the prototypal phase and to make the system ready to use for any educational institutions. Moreover the system should be sector independent i.e. not only suitable for training in the health care sector but also available for other fields. In order to fulfil this objective, further developments in the virtual assistant's knowledge base should be implemented.

6. Contribution to EU policies

The COACH BOT project addresses the issue of e-learning constraints in terms of the lack of online assistance available to solve learners' needs and provide them with constant feedback and encouragement. Learners in web-based settings often tend to feel isolated which may lead to a loss of motivation. Feeling that someone, like a virtual tutor, is present to provide support may reduce feelings of isolation by giving learners a sense of "online presence". Often enough, researches in this field do not offer a theoretical basis for this "presence" or examine the preconditions for and effects of this "presence" in learning benefits and factors such as acceptance or satisfaction. The COACH BOT project also addresses adults learners' need to find a training solution that will fit into their busy schedule amid their work and personal life.

The selection of the target group of home healthcare professionals derives from **EU and national (IT, DK, RO, SI, UK) policies which underline the role of social health care** (EU Health Programme 2008/13), and highlights the characteristic of this sector and healthcare professionals, who require a broad skill base and consequently more training opportunities. There are many indicators that show the lack of training needs felt as an acute problem in the health care system: skills shortages at all levels, lack of IT infrastructure, recruitment increase, reorganisation, duplication of effort. An IT based learning methodology like COACH BOT can help to solve these problems incorporating a new multidisciplinary approach based on an e-learning system able to interface in a human-like way with students and to customize the learning process to learners' specific needs.

Lisbon Education and Training Progress Indicators

The COACH BOT project addresses the Lisbon Education and Training Indicator LIS-F22, "*Making Learning more Attractive*". The main result of the project was the development of an e-Learning platform hosting a Virtual Coach able to offer active interaction with participants. Since the interaction with the Virtual Coach was carried out in a human-like way, the system is easily accessible both for elderly and for low ICT-literate people. The platform promotes collaborative learning environment and a more attractive interaction able to stimulate and to preserve a high level of motivation. The e-course, accessible at any time without limits of space, is particularly attractive for healthcare professionals who do a shift work and do not have extra time to enrol in training courses with extensive classroom time, providing a suitable solution that allows trainees to successfully manage a training course amid their personal and professional life. Furthermore, home healthcare professionals come from different educational and professional backgrounds and thus have different experience and training needs. The modular e-course permits trainees to customize their learning experience by choosing course contents that are most relevant for their job depending on their profile, thus addressing an array of diverse professions within the healthcare sector. The COACH BOT methodology offers a flexible learning approach allowing participants to customize their own personalized training paths based on their specific time, availability and training needs.

Lisbon Key Competences

The project also addresses the Lisbon Key Competence KC4, "*Digital Competence*" by experimenting a pilot training course based on the COACH BOT methodology (virtual coach) and an e-learning platform that is used in a synergic way: the platform was used according to the project's didactic objective to maximize ICT benefits and e-course users developed digital competences as an indirect benefit of the course.

LLP Horizontal policies

Moreover, the LLP Horizontal Policies B, "Making provision for learners with special needs, and in particular by helping to promote their integration into mainstream education and training" is also addressed by the project. The use of a user friendly e-learning platform with

the help of COACH BOT Virtual Assistant facilitates the access for learners with special needs. The e-learning platform can help people with different kinds of mobility problems by breaking physical environment barriers in order to eradicate discrimination and social exclusion.

Complementarily with other policies

COACH BOT addresses the policy KA3, "*To support the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning*".

The project integrates a duly designed modular e-learning path according to adult professionals' training needs with a human-computer interface (chat-bot) to enhance the e-learning effectiveness. The project's innovation consists of the development of a collaborative e-learning environment featuring a "chat-bot" or "Virtual Coach" who interacts **with users through a human-like interface. The "Virtual Coach" acts as a teacher, coach and** tutor, who supports learners "individually" during the modular e-course by providing in-depth information, assessment, case studies, technical and methodological support. The COACH BOT e-course is based on a personalised approach allowing home healthcare professionals, with the help of the "Virtual Coach", to customize their own training path and benefit from a suitable training path that is relevant to their profession and based on their own specific needs, knowledge and skill requirements. The COACH BOT methodology not only provides assistance, but also offers trainees' autonomy, the ability to create a suitable learning path, find information quickly, apply what is learned to their work and the possibility to learn through different means (audio, video, text, etc.).