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CELGAS – CONVENTIONAL & E-LEARNING GAS ENGINEERING CENTRE

1. INTRODUCTION

CELGAS – an acronym for "Conventional & e-Learning Gas Engineering Centre" is a Leonardo da Vinci Vocational Training Action Programme approved by the European Commission in 2004 (code PL/04/B/F/ PP-17-4431/2004) targeting the development of postgraduate-level e-Learning courses in the domain of natural gas engineering. Its first phase was unfolded between December 2005 and December 2007. After this, the project consortium has continued the cooperation as a self-funded (commercial) postgraduate course. Furthermore, a new, Master of Science-level study programme for gas engineering in e-Learning system, will be launched.

The consortium for this programme was coordinated by a team from the AGH University of Science and Technology of Cracow, Poland, and comprised also following education institutions and research companies:

- Technical University Bergakademie Freiberg, Germany;
- Technical University of Clausthal, Germany;
- Lucian Blaga" University of Sibiu, Romania;
- Technical University of Kosice, Slovakia;
- DBI Freiberg, Germany;
- German Gas & Water Society (DWGV), Freiberg, Germany;
- Central Mining Institute, Katowice, Poland;
- Polish Association of Petroleum & Gas Industry Engineers & Technicians (SITPNiG), Poland.

In the next, self-financed stages of this project there will be involved also industrial companies from the domain, such as SNGN Romgaz S.A. from Romania.

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The programme is based on the general priorities of Leonardo da Vinci programmes:

- provide access to new skills for people at work;
- promote investment in human resources;
- provide access to new knowledge by the use of innovation technology.

The programme's general objectives are subordinated to the co-operation between the European Union and Eastern-European universities and research companies, as well as to the vocational educational area involving the domain of natural gases. For this, the programme has as general objectives:

- the promotion of lifelong, continuous education by creating an international network for continuous education;
- creating educational competencies for self-education and self-training;
- realising a flexible, open system for long distance learning between the participating countries;
- ensuring a transparency of qualifications.

The programme's main objective is to create a network capable of providing education and training to engineers from the natural gases industry, and also to encourage the understanding of the needs put forward by society, on the one hand to fight against joblessness and on the other hand in order to create possibilities for the individual's personal development. Furthermore, the technological distance between the European Union and the Eastern European countries must be reduced, starting from the educational, scientific and vocational progress.

By creating an environment for the technological transfer of information that could be used even on long distance, or, later, in an autonomous learning environment, the programme will promote the equality of access to education for persons that are disadvantaged from the social-economic or geographical factors' point of view.

The programme allows the transfer of knowledge from universities and research centres to local-level companies. The participation of specialists from various countries will allow the finding of new opportunities for the study under this initiative.

The programme's main target group consists of the segment of specialists from the field-specific companies, who thus have the opportunity to improve their knowledge without needing to be taken out of activity. The contents transmitted via ITC, plus the tutorials for PC, together with the virtual laboratories can reduce part of the total costs of education. It is estimated that the total number of students per year would be of over 170, specialists coming primarily from large and medium-sized companies from Poland, Germany, Romania and Slovakia but not only.

The programme's specific aims were, firstly, to create a European-level Centre for Conventional and E-Learning for Natural Gases Engineering, accessible via internet by all interested companies. This centre functions by ITC transmission and is based on tutorials and virtual laboratories that could be used both in a formal environment and in a private learning environment.

Diplomas granted to the graduates of CELGAS courses will be signed and endorsed by representatives of all partners involved in the programme, thus granting the graduates the benefits of an international study programme and facilitating them better employment opportunities.

2. COURSES OFFERED AS PART OF THE CELGAS PROGRAMME

The programme's main activities were divided among following work packages:

WP1: Project management;
WP2: Confirmation of needs and demand;
WP3: Preparation of the mixed-eLearning system;
- WP3.1: Natural Gas Production
- WP3.2: Underground Gas Storage and CO_2 Sequestration
- WP3.3: Transport and Distribution of Natural Gas
- WP3.4: New Technologies in Gas Utilisation, Safety and Environmental Protection
- WP3.5: Quality Management and Human Resources Management in Gas Industry

WP4: Performing experiments;
WP5: Evaluation, Corrections and Project Quality Managment;
WP6: Diffusion and Dissemination Process.

The package WP3 contains vocational educational methodology for scientific problems proposed by the regional and local gas companies. This package provided for the realising of the Web server and of multimedia interactive e-training software.

WP4 is a control package, allowing to assess the educational system in a real situation. After the programme's start, the project quality management package – WP5 – allowed the assessment and correction of the system. In the post-pilot phase, all partners will continue the co-operation in vocational fields, based on the experience gathered during the Leonardo da Vinci programme. All partners have committed to continue to build up the Long Distance Learning Vocational Centre by means of international experience exchanges, usage of the internet-based gas engineering vocational forum, etc. A new, Master of Science-level study programme for gas engineering in e-Learning system, will be launched.

Each of the modules WP 3.1 – WP 3.5 was in the responsibility of one of the main consortium partners to prepare, after which the contents was reviewed and assessed by other partners.

The design of educational modules is done so that short-duration trainings can be offered (equivalent to 40 hours of lectures, 10 tutorials and a virtual laboratory class) as part of the qualification.

The Romanian side was in charge of module WP3.5 titled "Quality Management and Human Resources Management in Gas Engineering". This module, although not offering direct gas-engineering-related knowledge, is the key point of the whole programme in that it offers the knowledge, skills and competences needed by the students to actually succeed in finding an employment or at their current of future workplaces and it has to be firmly integrated as a component of vocational education everywhere in the study programmes of Central and Eastern-European countries and not only there, due to the importance it bears for the future development of society.

The module's role is to teach students about the basic problems of ensuring the services quality in the natural gases industry. Modern educational techniques are to be used, such

as the mind map, educational psychology, creativity methods, activity and organised group management, techniques for motivating the organisation's personnel, for increasing the intellectual performances in an organised environment etc. Also, the usage of varied e-learning types and instruments, such as the experts forum, chats etc., will all contribute to an acceleration of the learning and understanding of the discussed topics.

The main goal of the module is the enhancement of the individual's work quality and the creation of a quality of life, in first place of the organisational life, of the community life and then of the individual life.

At the end of the training period, those involved in the programme will know:

- how to organise their work schedule for the continuous life-long learning;
- how to use the new techniques for searching for and transferring learning materials;
- how to use the psychological elements in learning systems;
- how to carry out the human resources management within a company;
- how to implement the elements of quality management in the company.

Among the module's operational goals we can mention:

- Presenting characteristics of personnel management and the development of human resources management.
- Organizational and professional culture.
- Analysis of employee motivation and commitment.
- Legal framework and regulation.
- Workplace analysis and design.
- Testing and selecting personnel.
- Training personnel.
- Developing managerial spirit.
- Quality management and production management.
- Analysis of employee performance.
- Wages differentiation and employee rewards.
- Planning benefits and services for employees.
- Equal treatment and work discipline.
- Safety regulations and work-place security.

The module consists of following courses:

P1: Personnel Management in the Gas Industry;
P2: Self-education and Creation of a System for the Enhancement of Personal Skills;
P3: Quality Management;
P4: Workshop and project.

The parts P1, P2 and P4 were prepared by specialists from the "Lucian Blaga" University of Sibiu, while P3 was prepared by specialists from the Central Mining Institute of Katowice, Poland

The course on "Personnel Management in the Gas Industry" comprises chapters such as Employee Motivation and Commitment, Managerial Behaviour; Labour Legislation; Labour Conflicts Management; Professional Performances Assessment; Job Description and Job Analysis; Personnel Rewarding; Professional Training and Career Development.

This course will introduce theories and strategies for human resources development, ways and means of selecting human resources that will improve economic efficiency. It aims at delivering know-how and expertise in human resources to maximize their achievement. Strategically, human resources development and planning are in target, as a strategic objective. Incremental management of work groups is in target at operational level.

The topics tackled during the course "Self-education and Creation of a System for the Enhancement of Personal Skills" aim to increase the individual's awareness with regard to the need to continue his training, both from a cognitive point of view and from the point of view of social and human relationing, of communication and negotiation capabilities, of dis-inhibation and diminishing of the negative stress.

Therefore, starting from the determination of the own weak points and needs, each individual is then capable to more seriously address the areas he considers vulnerable, thus trying to build a complete and harmonious image of the specialist and his personality.

The goals targeted by going through this course are:

1. Determining the own weak points and needs of the students, from a cognitive, attitudinal and behavioural point of view.
2. Understanding the mechanisms that form the base for the motivation of the individuals' activities.
3. Detection of the personal motivation and of the possibilities to activate it.
4. Identifying the requirements of a good interpersonal communication, also from the point of view of empathy, persuasion, capability to convince.
5. Exercising of the communication types and techniques.
6. Understanding of negotiation from the point of view of requirements, rigours, the negotiator's personality and of the official requirements for the process.
7. Learning the ways in which stress can appear, and the ways in which it can be kept under control.
8. Identifying the main possibilities and ways by which the personal and interpersonal efficiency can be achieved.
9. Familiarising with the European legislation regarding the individual work contract, rights and obligations of the employee and of the employers.

The workshop at the end of the module tackles the topic of international negotiations in the gas industry, including chapters on the body language, preparation of statements, effective listening, the art and science of negotiation and not least the ethics of negotiations. Among its objectives, the most important ones are:

– The development of team work.
– Using personal knowledge, talent, imagination and creativity to achieve team objective.
– The analysis of the characteristics of a managerial system of information, used for making quality managerial decisions.

In order to achieve a satisfactory unfolding of the programme, an important task for the Romanian team from the "Lucian Blaga" University of Sibiu is related to the management of e-learning activities, providing both the methodical assistance and the assistance with regard to the educational management of activities.

It should be mentioned that, by the nature of the proposed goals, the programme aims at introducing modern methods for teaching and learning, that would be based on the creativity methods, critical thinking and to stimulate/develop the emotional intelligence, both for the professors and for the students. Therefore, the team's involvement will be materialised in offering speciality counselling (references, trainings, case studies etc.), and in the advisorship of materials prepared for presentation during the teaching and tutorial activities, in practical applications etc. In this regard, attention will be focused on:

- the methodical modelling of the presented contents;
- realising of syntheses and conceptual maps;
- tutoring the Romanian students with regard to using/realising course materials;
- elaborating complementary and/or additional materials;
- intervention on the presented texts in order to make them interactive and to facilitate their understanding;
- management of stress or abandon states for those involved in the programme;
- creating the motivation for the actual activity.

Also, the long-distance component within the Quality Management and Human Resources Management module is related and dependent on the usage of the Internet, students being able to access it from their personal computers, in order to carry out the various activities. The teaching materials, courses, virtual laboratories, tutorials etc. are stored online as web pages, usually in .html, .pdf or .ppt format and are viewable by means of an Internet browser. The pages may contain text, images, sound and video recordings.

The Internet-based software instrument that allows this to be done in the case of the "CELGAS" programme is called Moodle [3]. Moodle is a course management system based on free, Open Source software package that has been specifically designed, using sound pedagogical principles, to help educators create effective online learning communities. It allows the creation of a web space where various types of information pertaining to the taught subjects can be uploaded and structured so that they fit the educator's vision on the best way to transmit the educational contents. The students can access the information via customised channels (after registering and obtaining their own user name and password), but they can also enter into a message exchange with the professor, so that the learning experience can be brought to its full potential.

Other means for online teaching and learning made available through moodle within the CELGAS courses are forums, chats, classical quizzes and hot-potato quizzes etc.

3. CONCLUSIONS AND PERSPECTIVES

The CELGAS programme can be considered a true success even now. The programme has managed to attract not only the support of some of the most important Central and Eastern European Universities involved in education in the domain of natural gases engineering, but also the interest of several important companies in the domain, who announced their interest in encouraging some of their employees to take the courses offered, in order to increase their professional competence.

After the course materials prepared within CELGAS have been peer-reviewed and determined to the adequate to the intended goals, the courses are right now in the phase of beta-testing by selected students from all countries involved (free of charge). In a few months, there will be started also the commercial phase of the project, with students paying a tuition fee for attending the courses.

Also, it is planned to extend the existing consortium's scope in order to launch also master-of-science-level courses in natural gases engineering, based on the same principles and means as the current postgraduate-level courses.

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[3] *** – Moodle – a free, open source course management system for online learning, http://www.moodle.org