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Creating Open and Distance Learning Environments for Developing Human Resources in Iasi Technical University

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Summary

Romania's Manufacturing Industry Is Unhealthy And In Crisis. Nevertheless, Because Of Its Economic Significance, It needs to be maintained. The role of engineering education in the revitalization of industry is described. Strategic training programs which will be developed and offered by Iasi Technical "Gh. Asachi" University will assist the relaunchment of the Romanian industry. Technology transfer through human resource development by using Open and Distance Learning Environments is presented.

Introduction

In recent years, there are many reports and reviews conducted in Romania which have examined the manufacturing industry. The following conclusions have been agreed:

- Romania needs to maintain a manufacturing industry;
 - Romania's manufacturing industry is unhealthy and in crisis.
- To survive, Romanian manufacturing must:
- become more innovative and more effectively adapt its production to local and international markets;
 - control quality in its manufacturing goods; -apply effective and appropriate technology;
 - adopt a management style which is responsive to technological change, economic realities and human relations;
 - educate the community to accept manufacturing as an area vital to the well-being of the whole population;
 - accelerate the successful introduction of computer related systems into firms and plants.

Iasi Technical "Gh. Asachi" University

History and Traditions

At the basis of the development of education (including engineering education) in the formerly Romanian countries (Wallachia, Moldavia, and Transilvania) up to the foundation of the national unitary state, Romania, stood not only the permanent socio-cultural and economic relationships between these countries, but also the durable contacts with famous European cultural centers.

At the beginning of the 19th century, in 1813, was created a class of cadastral engineers (lessons were taught in Romanian language) inside the "Prince Michael" Academy of Iasi. This is considered the start of engineering education in Romania. An important contribution in this event has had Gh. Asachi, later appointed professor of engineering sciences. Within the University of Iasi (founded in 1860 as the first Romanian University), between 1910 and 1913 was set up the School of Technical Applications (having sections in: electricity and industrial chemistry). "Gh. Asachi" Polytechnic School of Iasi was established in 1937.

After the 2nd World War in 1948 following the Reform of the Educational System, the Polytechnic Institute "Gh. Asachi" of Iasi was created, having four faculties: Industrial Chemistry, Electrotechnics, Mechanics, and Constructions.

After December 1989, in 1993 the Iasi Technical "Gh Asachi" University was created having ten faculties: 1)automatic control & computer sciences; 2)industrial chemistry; 3)constructions & architecture; 4)electronics and telecommunications; 5)electrical engineering; 6)hydrotechnics; 7)mechanical engineering; 8)science and engineering of materials; 9)machine building technology; 10)textile & leather technology.

Mission and Aspirations

The necessity to develop a creative and productive technical workforce equipped with the knowledge and skill to generate technological breakthroughs is the basis of the Iasi Technical "Gh. Asachi" University's commitment to Open and Distance Learning (ODL). The objective of the ITU (Iasi Technical University) is to deliver:

- short courses and research seminars;
- advanced, degree, and certificate programs;
- technology transfer programs and customized offerings into the worksites of engineers, scientists, and technical managers through the Iasi (Regional) Center for Open and Distance Continuing Engineering Education (ICODCEE).

Through ICODCEE, technology based corporations and SMEs (Small and Medium Enterprises) address the issues of sustaining competitive advantage and job productivity, while providing technical professionals with opportunities to extend their education without interrupting their careers.

Technology Transfer Through Human Resource Development

Central and East European (C&E-E) Context

Objective for a regional initiative in Distance Educations are as follows:

- to assist countries in the transformations to market economies and democracy by accelerating human resource development;
- to contribute to the closer integrations of C&E-E countries with Western Europe;
- to increase opportunities and access to education and training throughout the C&E-E region, especially in remote areas;
- to coordinate and make effective use of scarce expertise and other resource on a wide scale;
- to speed up the development of high quality, cost effective distance education systems;
- to promote interaction and mutual support for the development of distance education between institutions and countries in the C&E-E region and Western Europe.

New Role of the University in Process of Transition to a Market Economy

The reasons for which ITU is involved in continuing education network have to do with:

- the challenge of lifelong learning;
- the research network which is created;
- the pedagogical approach used.

In the process of transition to a market economy, it has become clear that university has not only a task of basic and advanced education and research, but that it must take up responsibility for upgrading the scientific knowledge of its graduates.

The new Romanian law of universities must mention explicitly the task of continuing education. The task lies with the universities to take on their own responsibility to define their strategy of research, basic education, continuing education and scientific services towards the society.

Technology Transfer

Technology is the set of engineering and managerial knowledge necessary to design and develop products for manufacture. It incorporates the skills to operate the machinery and equipment in manufacturing plants and to market the finished products in a commercial arena that is continuously changing in consumer and industrial sophistication .

Technological change is the progressive and innovative advancement of this society's knowledge regarding the industrial arts; the improvement of current products and production processes, the introduction of new products and manufacturing methods and synergistic development of new techniques in: marketing, distribution, management, and organization. Technology is transferred through people and the effective communication of information is the essence of the transfer process (ability to understand, learn and apply information). Within the near and medium term it is essential that knowledge of the new technology be imparted to the labour market through the university curriculum. Local firms are then in a position to adopt and to adapt the current available technology.

Universities provide the fundamental knowledge to understand and utilize new technologies. They train and develop the necessary manpower to facilitate the absorption of technology. Over time, the fostering of a environment for innovation and Research & Development will bring forth new products and techniques that can form the core of locally generated proprietary technology.

Market forces dictate the nature and educational level of workers demanded by industry type with economic sequences on the patterns of earnings and income distribution. The educated workers are a high component of this aggregate. The university, as agent of public policy, must ensure education and training programs are continually update to meet the requirements of industry through mutual consultation.

Today, even more importantly engineering education must relate the role of engineering to that to that of entrepreneurship and show what part engineers can play in technical innovation. By the invention process is meant the process whereby the technical feasibility idea is worked out and embodied in physical form; in contrast entrepreneurship is the process whereby an invention becomes developed into a desirable form and a viable market is established for it.

Opportunities for Continuing Engineering Education

Continuing Engineering Education (CEE)

The international competitiveness of a nation is not only dictated by the competitiveness of the individual firms, but by the infrastructure and social programs that exists. To survive in the world of business, especially where international forces rule, a business must be highly productive, efficient, well managed, and use the best technology. The competitive price pressures require the lowest cost, and wasteful practices will only force a company out of business. CEE is simply an efficient

way of combining experiences of others into a packaged program that allows an individual to learn in a week what may have taken others many years to learn.

CEE is a part of human development, another element in the same scheme comprising primary, secondary, and higher education; and technology transfer. The mission of CEE is to assure that all employees are at the forefront of their specialty and continue to broad their specialty and skills.

CEE objectives are:

- to bring all scientists/ engineers to state of the art knowledge in the areas relative to their specialty;
- to introduce technical employees to the relevant foundation technologies of the corporation;
- to require that all technical employees have a continuing educational plan to maintain competency and growth;
- to assist managers in recognizing that maintaining their onboard investment in technical personnel is essential to the accomplishment of the corporate objective and in working with technical employees to establish objectives and plan to meet them;
- to provide additional in house educational opportunities

New Opportunities for CEE

Most new opportunities for engineering education arise from the different types of student now seeking entrance to an education in engineering. Developments in communications technology and the techniques for using these devices in the delivery of education models for the provision of initial training, graduate education and continuing professional education; and some of their course materials could be readily adopted and adapted for use in Romania.

The new cohort of engineering students is an interesting mixture: professional groups in the private sector; civil servants (central & local government, agencies); teachers; social workers; people who need training for a new profession; people connected with the agricultural sector; unemployed people; engineers wanting to upgrade their qualifications in management of technological enterprises but are unable or unwilling to put university time table constraints ahead of their workplace commitments; qualified engineers wanting credit short courses refreshers or updates as a part of a program of continuing professional education.

These new and growing audiences for Engineering Education (EE) have common elements to meet their needs:

- the programs need to be tailored to individual needs (time, place, pace and style of learning) and take account of specific deficiencies in prior learning (much more attention to instructional design)
- a more open and cooperative approach to the management and administration of CEE programs, with greater recognition of previous education and relevant experience (more flexible policies on credit transfer; course brokering between institutions; the sharing of instructional resources and joint ventures in course offerings);
- the use of new instructional and communications technologies for the delivery of instructional and learning activities and in the management of instruction.

In working to meet these important needs Romanian engineering universities open a whole range of new opportunities for themselves. In the same time they are instrumental in raising the level and quality of engineering and technological education within community.

An University-Industry CEE Program

In an university-industry based CEE program, one of the conspicuous merits is the immediate access to expert groups teaching many different disciplines. Thus, curriculum formulation and adjustment of course contents, for example, may be continually incorporated and improved even in the process of execution to provide the clients with better understanding and comprehensive instructions. Vividness in research-minded attitudes and creative and liberal thinking may help students to re-orient themselves to a phase of transferring new knowledge.

The degree program and CEE program must complement each other in the sense that complimentary interactions and viability can be effected to enhance and promote the program quality. CEE doesn't have to be a program dealing only with the state of the art knowledge as a whole.

Much of the foundation theories and technologies relevant to the particular corporation may constitute the main flow of the education plan.

The CEE program will need to help engineers to maintain competency and growth through motivation, and to assist corporate managers in recognizing the absolute necessity of investment in CEE to train their technical personnel in order to accomplish corporate objectives. It does need, in general, to differentiate the level of the program content according to that of industry but quickly readjust to the advancement of the corporate level. Technology evolves so fast that technical education has to be incessantly updated and reformulated, by eliminating the inertial effect of the university, which sometimes is apt to be contrary.

Characteristics of Open and Distance Learning (ODL)

Open Learning is meant any form of learning that has elements of flexibility which make it significantly more accessible to potential student than the courses traditionally provided within higher educational institutions. This greater accessibility may result from many different factors including: flexibility in the content of the course; in the place of its provision; in the mode, medium or timing of its delivery; in the pace at which students may proceed through it; in the special support which is

available; or in the forms of assessment that are offered (e.g., the accreditation of prior experiential learning). The openness is achieved, in part at least, by the use of new information and communication media (Interactive and Multi-Media Educational Technologies)

Distance Learning (DL) is defined as any form of study not under the continuous or immediate supervision of tutors, but which nevertheless benefits from planning, guidance, and tuition of tutorial organization. DL has a large component of independent and autonomous learning; it is therefore heavily dependent on the didactic design of materials which must substitute for the interactivity between student and teacher in face to face instruction. The autonomous component is supported by tutoring and counselling systems which are provided at regional or local study centers and to an increasing extent by modern communication media.

The ODL material is structured in units or modules geared to specific learning outcomes. Open and Distance Education is making students more responsible for attaining their own learning objectives.

Developing Teaching and Learning Materials

A project management activities matrix for ODL projects outlines four management arrays through five project phases (analysis, design, production, implementation, evaluation and maintenance):

- (a) Planning array: to arrange the conditions and prepare plans for project activities;
- (b) Controlling array: to stimulate, monitor, intervene, criticize, and modify project activities, materials or products;
- (c) Communicating array: to deliver communications among team members and outside people;
- (d) Documentation array: to document materials or products.

The steps for developing teaching/learning materials use print as the paradigm; but the same steps may be applied to the development of enriching audio and video materials, and with some adaptation could be applied to the development of computer-based approach.

The most prevalent models of instructional systems development are those based on an engineering approach to curriculum. These models typically divide the process of developing instruction into five stages/phases (having typical goals):

- analysis: define training requirements; analyze target populations; establish performance levels;
- design: specify instructional objectives; group and sequence objectives; design instructional treatments;
- production: develop learning activities; develop test items; evaluate prototypes;
- implementation: implement learning activities; administer test items; assess student results;
- maintenance: revise course materials; revise test items; assess course effectiveness.

The Future For CEE In Romania

The restructuring of industry and of trade patterns throughout the country and the world has created tensions and difficulties for Romanian industry, particularly due to the lack of useful industrial technologies and know-how for the economic relaunchment. As a result, industry in Romania has begun to recognize that universities must be productive forces in the process of technological innovation, and thus they help to increase the value of production factors of: labour, technology and capital. The industry-university linkage accrues not only from the classical role of the university but also from nontraditional interactions which must be strengthened so that they can live together, share their unique resources, and cooperate with one another, to the benefit of both sectors.

As technology advances with its ever-decreasing life cycles, the need has increased for closer interactions and expeditious exchanges of information and knowledge among industries, universities, and professional and research institutions. This is necessary to facilitate the flow of technology from one institution or sector to another and to keep abreast of the changing technologies and market needs. CEE can serve as a bridge or agent linking those various institutions. And for it to be viable, it too has to adjust itself productively with changes of technological needs of industry.

Iasi Center For Open And Distance Continuing Engineering Education (Icodcee)

Objectives

The ICODCEE should provide the necessary resources for a wide range of activities including Research and Development of, and training for, Continuing Engineering Education, by using Open and Distance Learning (including interactive multimedia educational technologies), as a professional activity.

The ICODCEE performs its functions by working in the following directions:

- promotes new educational technologies for engineering universities in Romania;
- implements training schemes;
- creates and maintains a documentary fund in engineering education (pedagogy).

Organization Structure

The center is governed by an academic council under the leadership of a chairman.

The director of this center assume overall responsibility for the operation of the center and is advised by, and responsible to, the academic council. The industry advisory committee advise the director on matters relating to the conduct of teaching,

research, and other activities. The academic staff (a mixture of engineering and educational experts), the administration, and the technical staff (computer-aided design technique experts) are responsible to the director.

The ICODCEE is located in the Iasi Technical University and has following participant members: Iasi Technical University; Institute for Theoretical Informatics, Romanian Academy, Iasi Branch; Romanian National Institute for Creativity in Engineering and Technology; Iasi County Service for Labour and Social Assistance.

Budget

ICODCEE is funded by a grant from the PHARE Program and national contributions (Ministry of Education, Government of Romania).

Conclusion

The aim of this study and project document is to give some general information regarding the operation of the ICODCEE, its objective and structure. It is also hope that the proposal will convince the Romanian Ministry of Education as well as the National Romanian Accreditation 11 Board for Higher Education.

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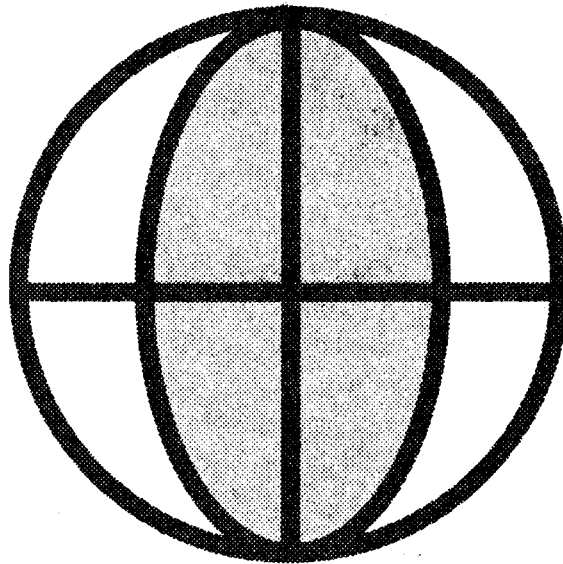
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