

MECHATRONIC PLATFORMS FOR INTEGRAL EDUCATION

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Abstract: *The paper discusses how the quality of the educational process and scientific-research activity influence the economic success of a company. Education has a special economic role because the economy needs a well-trained workforce and adapt new knowledge and colossal changes in progress .In terms of sustainable development, the question of innovative learning, that can bring change through anticipation. In order to ensure the necessary skilled workforce, and skills, It is necessary to develop a system of educating and training continues to meet the needs of the labour market and of a knowledge-based economy.*

Mechatronic platforms for education ensures the conceptual approaches, operating methods and tools for achieving integrated education and development of appropriate educational technologies.

Key words: *integral education, mechatronics education, mechatronics technology*

1. Introduction

In recent decades, economic success depended increasingly over the quality of educational process and scientific research activity. Education has an economic role, particularly because the economy needs a workforce well prepared and adaptable to new and colosalelor changes in the progress of knowledge.

In the process of economic growth, the human factor is defining, through both its quantitative aspects and quality. The strategy used in the field of human capital involves the analysis and evaluation of mobility, changing labour, understood as the fundamental processes of training, adaptation and utilization of resources, now and in the future. The educational system must play a fundamental role in establishing a society different from industrial or postindustrial. In the new economic and social structure, the continuous improvement of human capital becomes a key factor in sustainable development. Those who knew to invest in education to broaden access to training and to improve educational standards and training obtained in the most spectacular and long-lasting economic growth. [6]

Education is the essence of human capital. Education is a means to disseminate knowledge, develop skills and create values, and formative levels aimed at both cognitive components which bring together aspects of intellectual of the tender texture of education, which is supposed to encompass skills components, accomplishments,

skills and specific skills training and direction profile of specialization and affective components of attitudinal targeting-responsiveness, flexibility, motivations, attitudes and beliefsfeelings, in a Word, the conduct of the educated subjects.

In terms of sustainable development, innovative learning problem arises, which can bring about change through anticipation. Thus, educational systems which do not develop the ability to exploit knowledge in various situations, creativity and innovative spirit cannot be considered efficient and quality.[10]

In order to ensure the necessary skilled workforce and skills, it is necessary to develop a system of educating and training to meet the needs of the labour market and of a knowledge-based economy requires relevant information regarding the evolution of trades and professions, the evolutionary trends of the labour market, skills and qualifications needs of companies, the degree of correlation between demand and supply of manpower and the identification of gaps, offering programmes of vocational training providers and its suitability to the needs of applicants.

„ Education today has to be reported to the high-stakes psychological, cultural, economic, social skills and often contradictory. Its ultimate finding of freedom, equality, solidarity, dignity, prosperity in modern society”.[4]

„ Preparation of highly qualified human resources, to ensure competitive, sustainable development in all areas, requires new concepts,

methods and means for supporting educational activities, training and retraining”.[7]

The transition to an economy and a knowledge-based society requires, as an objective necessity, develop a system of educating and training, flexible and transparent, should ensure increased adaptability and mobility, and responding to the needs of qualified workforce.

The investment in continuing vocational education and training is important. The last time economic transformations and new opportunities arising from each person calls an effort to adapt and build their own qualifications on the basis of new knowledge acquired over time and in different situations. Vocational education and training, regardless of whether it takes place within a formal system, in the workplace or in informal way poses for each key developments in career and personal development.

„ After all, our full individual and social life is structured through education. Education is at the heart of our becoming. The future is through education in the present moment, the here and now.”[9]

Continuing vocational training is important to support the transformation of labour being the main instrument through which it can adjust to the new requirements, thus facilitating mobility between different sectors of activity. The accumulation of knowledge and skills allows improving position on the labour market, resulting in the same time and increase productivity. Rapid changes in all areas will result in a range of new skills needs much more dynamic. Investing in training benefits both the individual and the whole society [12].

2. The concept of integral education

The concept of integral education is discussed in two aspects. The first aspect is considering the teachable and educational technologies that can give a systemic and integrative thinking necessary to present society, and the second aspect deals how integral education is involved in technical training.

The new educations are characterized by democratization, humanization and modernization . Thus, in the child's education should be charged on the basis of a set of objective laws of biological, psychological, social, taking account of individual properties, beliefs, ideals and skills needs. „ World in which we live is a vast, awesome and complicated. Every part of it is connected and dependent on all other parts. Under the current

education system, new integral vision refers to the world as an interconnected system. This perception is based on integral education which defines a new integrated approach to teaching. Applying the method of integral education, students do not learn separate topics, but rather, each topic is presented, illustrating its connection to all the other topics.”[1]

All education is based on the holistic concept of scientific knowledge, which has demonstrated the impossibility of a single global research disciplines and explain complex matters of reality.,, It presupposes harmonization of dimensions and forms of education; on completion of training, interaction with the evaluation, resulting in the completion of the educational action, education unit.” [2]

An example of a demonstration of integral education meets at The Circle School-Harrisburg Pennsylvania where, „ full education represents the natural successor of modern education “ [11].

Modern education is based on the traditional education, as the education of modern education and transcends all, incorporating traditional and modern methods, adding to them and methods of their own.

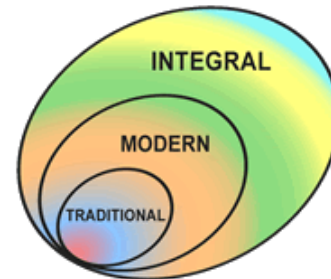


Figure1: Eggs:Traditional -Modern-Integral

For this school the full education is that every child is unique, and teaching and assessment methods are flexible and can be tailored to each. Also, such education „enhances the relationship between school and family, school and society” in preparing graduates for life.

Educational technology answers the question "how?", "what ways and means" is the formation and development of the personality, "which" are the techniques specific to the transformation of a representative of the human species into humans, social development and the human transformation throughout its existence. Integration of educational technology in the framework of formative education implies that the school to focus on the development of thought, by selecting the contents,

forms and methods of training and assessment criteria, that is, to develop the educational technology that develops a particular learning style with a lasting effect.

Modern education determines a different approach to education through curriculum, integrated curriculum, which involves connecting the topics of real life, treating the content of interdisciplinary, transdisciplinary, variants. [3]

At the level of schools, general objectives cannot be achieved without the contribution of all curricular areas, so that teaching staff must form a team and act accordingly.[8]

3. Technology and Mechatronics education

Mechatronics receives European citizenship in March 1986 when the Advisory Committee on Industrial Research and development of the European Community recognises that, „Mechatronics is a major need for European research and educational programs.” Mechatronics was thus recognized as a reality in continuous development, both in the economic and educational sectors.

Mechatronics technology is based on the fact that the resource information, which is the default for mechatronic systems intelligence is inexhaustible, and can increase the performance of a product with minimal material and energy, but a considerable contribution of intelligence. This justifies the interest in the world of technology of Mechatronics which proved to be a nedisipativă technology and less polluting. [8]

Applied in education and research, Mechatronics concepts allow a greater involvement of students in the learning process. Mechatronic learning platform has the following main objectives:

- Students become *responsible for their learning*. They define learning objectives and issues that are relevant to their work, and to understand how specific activities relate to those goals, and using the standards of excellence to assess how well they have achieved their objectives.

- *Learning is an intrinsic reason*, students living in pleasure and excitement to get involved in the learning process. They develop a passion for the rest of his life to solve problems and to understand new ideas, concepts.

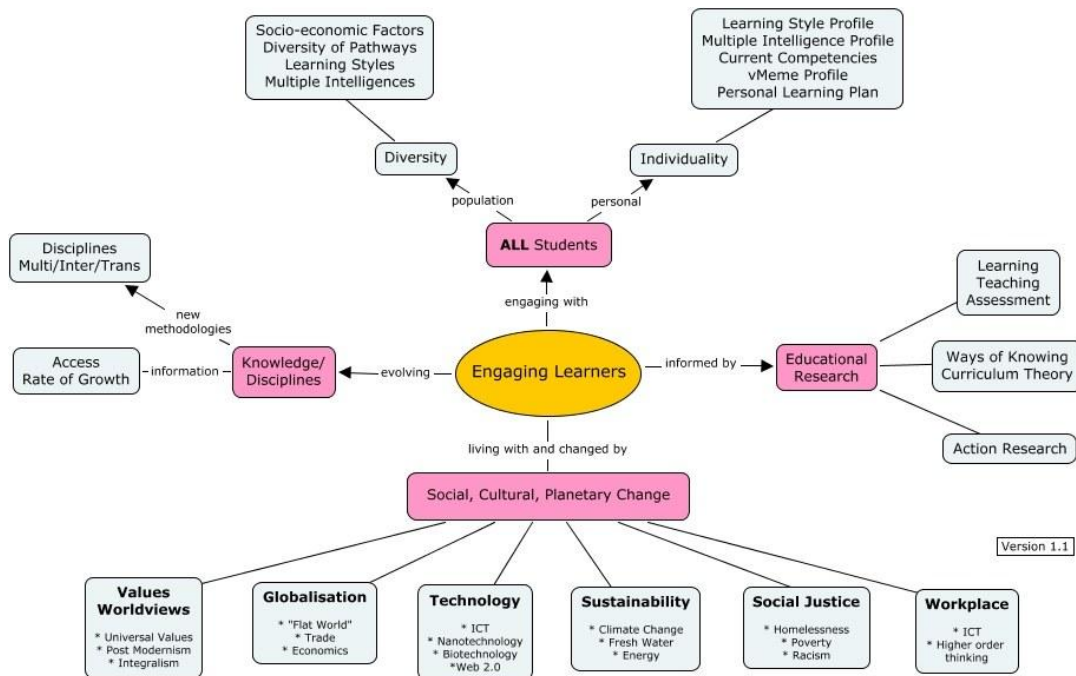


Figure 2: Impacts of learning process

- The development of a strategic thinking that will allow continued development, finding new ways of learning and solving problems. Ability to learn how to learn includes building of mental

models of effective knowledge and resources, even if the models are based on complex information and constantly changing. The students involved can apply and transfer

knowledge in order to solve problems creatively and can make connections at various levels.

- *The establishment of collaborative relationships*, so that learning should be understood as a social activity. Students must be prepared to accept the ideas of others in the same manner as they would be able to expose them and their own, to demonstrate empathy and courage in the battle over the talks, acquire the ability to identify the strengths of themselves and of others.[13]

In this respect it is important to develop the following skills: information, training, mental, and social action. (figure 2).

4. Mechatronics education platforms

Mechatronics platforms ensures the conceptual approaches, the methods of operation and tools for achieving the goals of integral education and the development of educational technologies. Mechatronics training platform has two defining traits:

- Students discover concepts and connections and the ability to apply them in the interaction with the physical world, and technology with others.

Such a discovery-oriented exploration provides the ability to make decisions, to envision concepts.

- Students become producers of knowledge because it produces products for themselves and society, which synthesizes and integrates their knowledge and skills.

By using technology, students are able to make significant contributions to the knowledge of the world.[5]

Mechatronics platforms developed to date can be: fixed, mobile, portable and virtual. Fixed platforms contain tools for education and research in the laboratories of Mechatronics, mobile platforms are made of modules that allow the achievement of reconfigurable structures.

Portable platforms allow conducting experiments anywhere and anytime and are made of modules that have prices and reduced weight. Virtual platforms include virtual laboratories, virtual libraries and databases.

Implementation of methods and techniques of innovation and creativity turned to exploiting the potential of innovative mechatronics educational platforms in order to develop integrative thinking, to stimulate creativity, flexibility and ability to adapt to the teacher and the student to meet the

ever-changing needs and readiness of the labour market.

Mechatronics platforms represent complex technical systems, which integrates in their structure of mechanical elements (mechanisms, transmission, etc.) in the field of electric and electronic (actuators, sensors, microcontrollers, filters, etc.) and computer science. While the mechanical structure is built on the functionality of programming, favoring transdisciplinary thinking, specific mechatronics. Teamwork facilitates the formation of social and organizational skills.

Team members are encouraged to work in teams by several factors:

a) The stimulation caused by action together, each individual attraction for each other and a team as a model. The presence of others, engages, stimulates augmented action learning;

b) The mutual influence of human and operational processes. The first level is an objective process that can be measurable: the action itself and its product. The second level is that which relates to the group and the individuals that compose it, it is a subjective process, involving affective aspects of interaction;

c) Conjugation of three collective operating logic implies that the team to work rigorously and flexible at the same time, dividing the tasks and roles of the covering of the whole problem, defining the rules and respect them.

4. Conclusions

Education is the disciplinary activity, domestication and cultivation of human moralization, and its purpose is to develop in the individual all the perfection of which is unlikely (Kant), and the action of the individual himself, developing a myriad of interests (Herbart)

A viable education can only be a full human education, after the formulation of both the poet Rene Daumal.

Mechatronics are platforms of reform, change, because change is induced by several factors, among which conjugates in first place is the ability to innovate, and its willingness to cooperate, to connect high-performance and competitive activities in the field of knowledge. These skills are acquired through education, giving creative people, able to formulate hypotheses, able to communicate and to cooperate in the effort to achieve the common objectives

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