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STRONGLY PROJECT-ORIENTED LEARNING SYSTEMS. CONCEPTS AND FUNDAMENTAL PRINCIPLES

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Abstract. **The main idea of the paper:** The success of a certain learning system heavily relies on the quality of the communication. **The complementary idea of the paper:** A learning system is efficient provided its activities are organized around certain projects. Not the learning process seen as a goal by itself will bring the educational system at the frontline of knowledge, but projects, on the occasion of which teachers together with pupils or students, solve the society’s problems in a natural manner.

1. PRELIMINARIES

Any learning system is assessed according to the competencies that are proved in the everyday life (economic, political, and cultural) by its graduates. The development of the society on multiple layers has reached that stage, in which technological discoveries have literally flooded any field of activity.

The spiral of the progress is self-refueling with energy and motivations, placing change on top of all the preoccupations.

There is no more time for conclusions and decantations. Research cannot remain simple research any more; consequently, it has to develop into an excellence-driven research process.

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Similar concepts tend to become ubiquitous in the everyday life: excellence, durability, eco-technologies, and so on. It is a kind of an ideatic vertigo, whose short-term outcomes are minutiously scheduled.

Unfortunately, the consequences of such an approach relative to the nature and to the human being itself have been neglected.

In this paper, we do not intend to offer an answer to the question "Humanity, where do you go?", but we rather wish to add some touches to an already florid picture, while having the declared goal to increase the efficiency of educational processes. All the remarks that we are going to make in the following sections take into account the academic environment. This is the most legitimate one to involve into resolving the present's issues and to draw the development path of the future information society.

In a more precise manner, it can be stated that the academic environment has to make efforts in order to learn how to produce:

- competencies in various areas of knowledge acquiring;
- competencies regarding the value of the impact that knowledge discovery exercises over the nature.

The academic environment is not just another enterprise, be it a profitable one, which produces consumer goods. The academic environment creates experts that make a certain area of science shine, through their contributions that are meant **to repair, preserve or optimize natural equilibria**.

It is not easy to materialize such a vision. The urge to research without disturbing the natural equilibria is equally difficult to respect as compared to the religious and philosophical principles that promotes the love for the fellow creatures. Nevertheless, if the academic environment does not accept this challenge, who else? The political system? The state institutions? Being crumbled by various diseases that are inherited from other political or social settings, these systems do not have the time to deal with the perennial equilibria of the nature, because they are totally absorbed by the logic of perpetuating the access to the transient power.

2. THE SHORTCOMINGS OF THE FUNDAMENTAL PARADIGM THAT CURRENTLY OPERATES IN THE EDUCATION SYSTEM

The dominant paradigm in the education system, even in the so called European Bologna system, is the one that is centred towards teaching. According to this paradigm, there are two essential actors: the teacher and the student. Let us note that this statement is true in

general and going down to the concrete level of the reasoning, and also keeping the order of the terms. The teacher makes all reasonable efforts, with the aid of modern technologies when it is the case, in order to transfer knowledge and abilities to the students, in his field of knowledge. The student has to prove that the knowledge transfer has been realized, thus undergoing an assessment process periodically. In this equation with two main unknowns, the Teacher has the task to keep himself connected to the latest developments in the field, in order for him to transfer knowledge that is not outdated. As a consequence, **the teacher has to be informed and to possess the capacity to efficiently transfer the knowledge to the students.** Practice shows that fulfilling these conditions is not always at hand. The student has the duty to be motivated and fully connected to the knowledge stream that is transmitted in the teaching process. The fulfillment of these constraints is not guaranteed by any system. Undoubtedly, positive outcomes can be obtained through using such a paradigm. Unfortunately, there are many scraps in this process. Some of them are even "patented". Obviously, there are some variations that are based on this paradigm, which is essentially bipolar. It is sure that, while ignoring the variations, there are numerous syncope in the learning process. Some of these syncope are enumerated as follows:

- (1) **Real communicational difficulties between teachers and students, which are due to the fact that they relate themselves to relatively disjunctive objectives and requirements;**
- (2) **The counterproductive stereotypization of the learning process. These stereotypes usually turn the teacher into a dynamic actor, and the student into a passive actor¹;**
- (3) **The systematic maintenance of a gap between the requirements of the real world and the capabilities of the graduates;**
- (4) **The administrative separation of the research activity from the teaching activity, which is implemented in practice considering various approaches in the academic environments;**
- (5) **The decredibilization of the learning system through its systematic sub financing;**

¹It is almost certain that the student's curiosity is not enough to determine his / her active involvement into the teaching process.

- (6) **The lack of some real connecting bridges between the academic environments with the local, national and international communities;**
- (7) **The creation of some study programmes that are centred towards the capabilities of the teaching body.**

The list of the syncores that may be encountered in the universities that pay tribute to the bipolar paradigm has not been exhausted, not even by far. It is true that there are numerous universities in the world that have tried and even managed to enrich the bipolar paradigm with practices that contributes to a boost of performance in relation to the educational system. Nevertheless, there is no place in the world where an experiment that may change the educational paradigm has already been initiated. The defining traits of such an experiment, as it is proposed by this paper, are presented in the next section.

3. CONCEPTS AND PRINCIPLES IN A LEARNING SYSTEM THAT IS HEAVILY ORIENTED TOWARDS PROJECTS (SIPOP)

From the very beginning, the reader is invited to study Figure 1, which presents, with certain intentions, the architecture of a learning system that is heavily oriented towards projects. The changes that are proposed by this architecture are major.

In the case of a learning system that is heavily oriented towards projects, teachers and students put more effort in order to fulfill the specific tasks they have to deal with.

As it can be noticed in Figure 1, the key concepts for SIPOP are **project, communication, lucrative competencies, research competencies and competencies that are related to the ability to assess the impact of changes that are generated by the implementation of the projects.** Moreover, Figure 1 suggests that the proposed development model relates to the paradigm of the spiral. Thus, it is founded on an organic iterativity, which determines the optimal operation of the whole system.

The Project

Considering the meanings that are promoted through this paper, the concept of project is perceived as a model for the organization of the didactic process, in such a way that learning is not based any more on the assumption that the technologies that are introduced and practiced along the school years are sufficient for the student in order

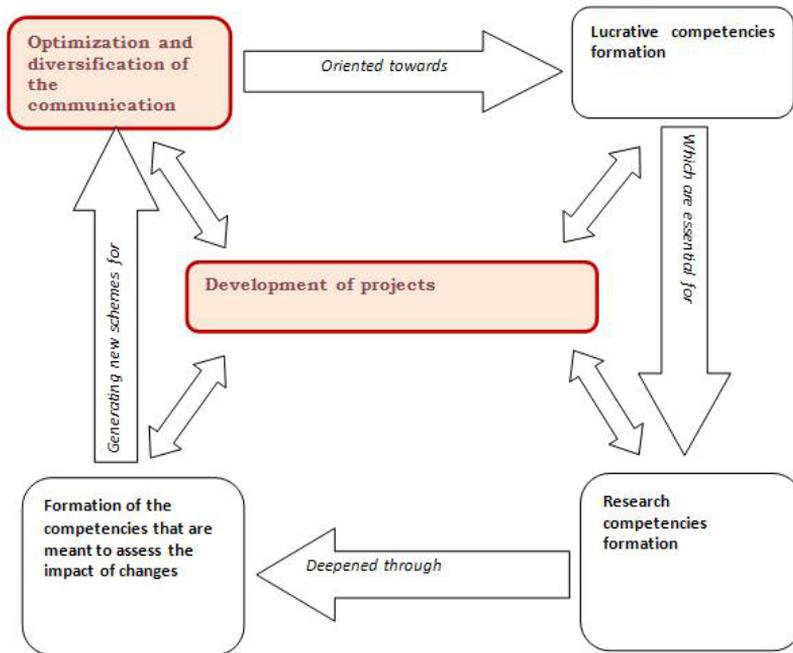


FIGURE 1. The architecture of a learning system that is heavily oriented towards projects

to successfully integrate in production. The new assumption, without bringing anything sensational, suggests that the problem (with all the features of a real-world problem), which needs to be solved, be used as a pretext in order to study with maximum intensity the technologies that are necessary in order to successfully finalize the project. The model is old: the apprentice learns to build walls guided by his craftsman. The tandem student-teacher gains organizational consistence and operates in a natural manner, according to the standards in the industry.

The Communication

The foundations of the communication process in such an approach are superior as compared to the communication style that is usual in the bipolar paradigm. Nevertheless, the optimal efficiency of the learning process in SIPOP can be obtained if substantial improvements are made, both regarding the shape and the content, to the communication that is established between students and teachers. We refer to the students that are assigned to a certain project, and the teachers that coordinate the dynamics of the project. In a concise

manner, it can be stated that the improvements relate to a permanent effort to dissolve the communicational barriers that may impede the co-operation among the project partners. This involves both the utilization of the classic methods and the various technologies that are based on communicating through an electronic backbone.

The Lucrative Competencies

They relate to the **students' capacity to use the appropriate technologies in order to successfully finalize a project**. This implies a proper choice of technologies, their utilization with a reasonable efficacy and, why not, the optimization of these technologies. The lucrative competencies are effectively and at a large scale built up only by making use of this miraculous concept of project. Let us note another very important aspect of the problem: **along with the competencies that relate to the products' engineering process, the managerial competencies are naturally acquired as well**.

The Research Competencies

We consider the formation of the students' capacity to document in order to find feasible answers for the problems they face during the evolution of a project. As an extension to the idea of gathering relevant information through documenting, we can mention the idea of authentic research, through which the solution of a problem that belongs to a certain field is solved or clarified. The framework that is offered by the concept of project is the optimal solution in this respect, too.

Competencies That Regard the Assessment of the Impact of the Changes That Are Generated by the Implementation of the Projects

The intention of this endeavour is to prepare and accustom the student to evaluate the impact of the changes, which the project determines in relation to the real world, considering the short and the long run, from a professional perspective and at a generally human layer. The uncontrolled accumulation of technological changes may provoke the inception or the augmentation of certain undesirable disequilibriums, in the equation of welfare and/or happiness of the human being. Figure 1 also indicates the fact that the 4+1 architecture of SIPOP has increased chances to coherently articulate a series of vital demarches for the success of any teaching process. Thus, the optimization and diversification of the communication, which is favoured

by the project oriented activity, has to target the formation of the students' lucrative competencies, as a solid premise for triggering the interest for research and documentation, both in a collective setting or independently. Finally, Figure 1 emphasizes the importance of the change impact assessment competencies formation, as a systematic modality to enhance the stability of the products that are realized on the occasion of projects. Moreover, the figure highlights the importance of generating new schemes for the communication optimization and diversification². The assessment of the impact of changes that are generated by the new products, which are realized as a result of the projects, is a problem that is often approached from various angles, but it is solved in an unsatisfactory manner.

4. A PROPOSAL REGARDING THE STRUCTURE OF A STUDY PROGRAMME CONSIDERING THE SIPOP APPROACH

The proposal that is represented in Figure 2 indicates, without any exhaustive intentions, the main directions concerning the design of a new study programme. Obviously, it is not easy concerning both the conceptual and the administrative layers but, it is certain that the outcomes would pay off all the effort that would be put in. Considering the template regarding the design of a study programme that is introduced in Figure 2, it can be anticipated that such an approach is inherently creative. Thus, the automatisms are replaced by flexible thinking patterns. Figure 2 also suggests that the list of the components that have a mandatory influence over the design process of a study programme has the following items:

- (1) The objectives that are specific to the programme;
- (2) The competence segments that are specific to the programme;
- (3) The projects that are assigned to each competence segment;
- (4) The theoretical foundations of the projects;
- (5) The WBS³ of each project, in other words the list of the activities that are performed in order to finalize the project, together with their breakdown (iterations, assessment of the activities,

²The communication is approached as a formalism for the representation of the models, based on which products are realized according to the model proposed by SIPOP.

³In the field of project management, through WBS we designate the structured activities assembly, which may lead to the success of a project. Naturally, in the context of this paper, it can be stated that the WBS's specification quality impacts on the efficacy of the segment in which the project operates.

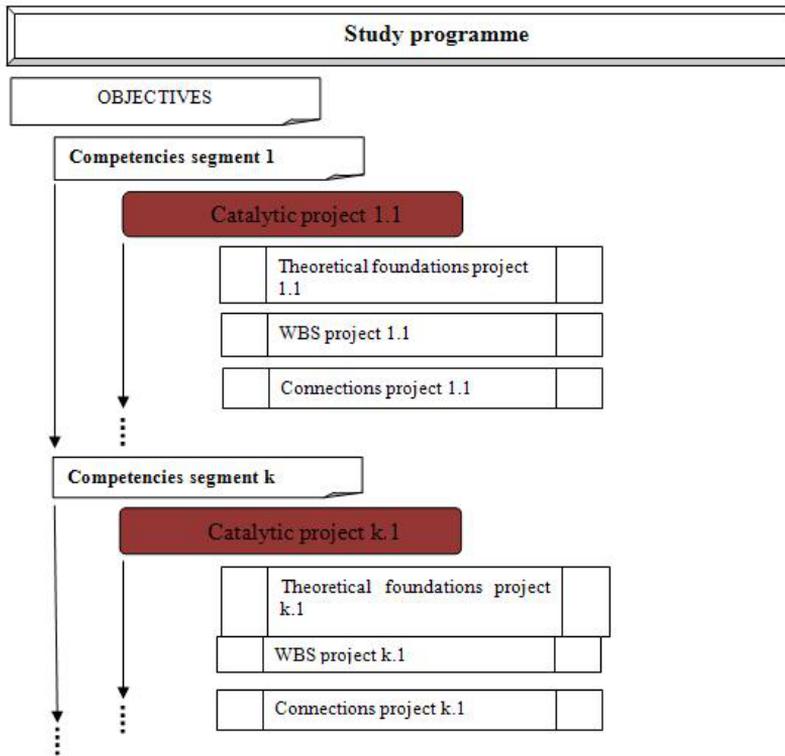


FIGURE 2. A proposal regarding the structure of a study programme

reward of the participants, communication, documentation and research techniques, etc.);

- (6) The connections of the projects with other real-world projects or problems.

In a future paper, we shall present a case study, which is meant to highlight the nature of such an approach, but also the possible mutations that it can produce in a teaching system.

REFERENCES

- [1] George D. Magoulas, G., D., Sherry Y. Chen, S., Y., **Advances in WEB-based education. Personalized learning environments**, Information Science Publishing, 2006.
- [2] Rosen, A., **E-Learning 2.0. Proven practices and Emerging Technologies to Achieve Real Results**, AMACOM, 2009.
- [3] Horton, W., Horton, K., **E-Learning Tools and Technologies**, Wiley Publishing, Inc., 2003.

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