Contribution to the Modelling of the Production System Skills

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ABSTRACT:

Nowadays, the skill management is an important factor in the new forms of the work organization. Man's unlimited capacities are the main driving forces behind the evolution and the success of the Entreprise.

the organization models have long been ignored , the human resources were considered as a secondary resources in the strategy of the company. Over the last years, however, the requirement to develop more complex skills began to be felt, to better confront the world economic changes.

Hence, the skill management regarding the market needs leads to the modelling of the learning system. In this paper, We specify, first of all, the concept of skills, the specifications of the service production systems and the skill production systems.

Finally, after a study of the main models proposed in this area, we suggest the modelling of the learning process.

Keywords : skill, Learning process, Modelling, Automation, Performance, Regulation

I. Introduction :

The enterprise which operates in a more and more unsteady environment where the economic and technological changes do not stop evolving, has to adopt a new, structured approach in the investment of the human resources.

The problem of integration and allocation of human resources adequate to the enterprising process seems more and more at the center of the decision-makers'attention.

Indeed, the skill development has become a strong necessity to face the various changes of all the technological and organizational levels. The current strategy of the company, thus considers Man as one of the key elements of its performance

As a result , the human resources management moves from the post management to the skill management.

To achieve this objective, the company needs human skills ,through their know-how and capacities, which can find adequate solutions to all encountered problems and rapidly adapt itself to new technologies as well as to the new types of market.

The management of the skills and learning systems constitutes an answer to the challenges met by these companies.

The investment in the trainings is a strategic approach aiming at developing the skills of the learners and realizing the productivity performance of the environment.

The environment of the training system contains then three entities which interact with each-other, as shown it the following plan:

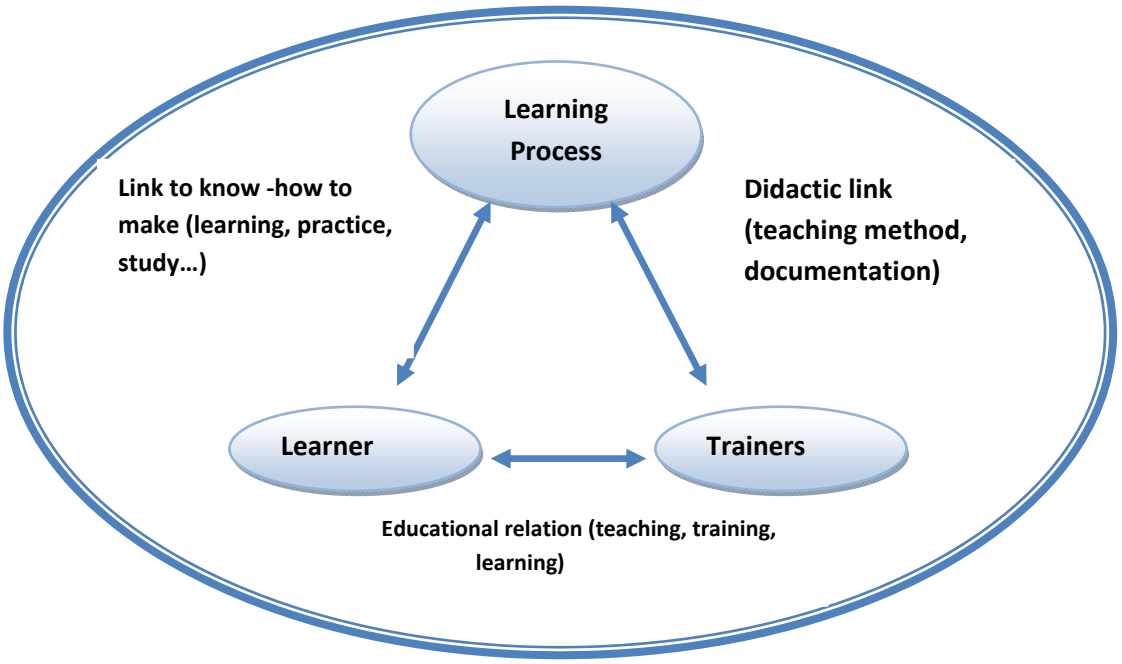


Figure 1: Environment of the training system

The aim of this paper is to suggest a model of a learning system in the light of the systems of the production of goods and services.

II – Specification and analogy between the systems of production of service and production of skill

1 - Specification of a system of production of services

The systems of production of services are characterized, by the target object, the used resources, the structure of piloting and the tasks through which the realization is organized in process:

- The target object can be material or immaterial
- The used resources are identical to those used in the systems of the production of goods
- The piloting of the systems is often similar to that practiced in the classic systems of production
- The realizations of the tasks organized in process are achieved by humans. We can consider that the customer can sometimes contribute to the realization of the task (for instance in hospitals, the patient can contribute in the realization of the task of healing via his or her commitment in the process of cure).

2 - Specification of the learning system

The systems of production of skills can be regarded as systems of production of services possessing the following characteristics:

- The target object is the skill.
- The used resources are human , technical, financial and consumable.
- The tasks of learning are tasks of assembly of skills.
- The customers are the learners.
- The learner plays a key role in his or her own transformation via his or her personal implication in the tasks of learning
- The process is cyclic

3 - Analogy between the systems of the production of services and learning systems.

The problem lies in the study and the modelling of the systems of production of skill - system of learning - following the modelling of the systems of production of services.

The systems of production of skill can be likened to the systems of production of service : the analogy is entirely coherent and can be considered as completely similar to the systems of production of skill through the typology of engineering projects , as illustrated in the following table:

Type of engineering project	System of production of skills {Learning system }
Engineering of the object	Specification of the trainings to be taught
Engineering of the operating system	Specification of the tasks, the humans, and the learning process
Engineering of the information system	Specification of the tasks , humans , the information processing, the data and knowhow
Engineering of the piloting system	Specification of the management and resources procedures , skills and knowledge and definition of the strategy
Engineering of the measurement and the evaluation of the performances system	Specification of the objectives and the performance indicators
	Specification of the tasks, the operators of the processes of measurement and evaluation of performance

III. Approaches to the learning system

1. The systematic approach

The systematic approach that we propose allows us to better analyze the environment in a global way, to fix specific targets, to define realistic constraints and to avoid certain errors in the decision-making.

The systematic approach of an organism is composed of three entities : the piloting system , the information system and the physical or operating system

- The piloting system allows the definition and the initiative of taking all decisions necessary for the production of objects issuing from operating activities. It rests on a set of rules and of procedures to maintain a level of performance considered acceptable.

- The information system plays the role of ensuring the connection between the system of piloting and the operating system. It also allows the management of internal data within the company as well as ensuring the real time division of all the information.

- The physical or operating system is seen as a set of resources placed at the disposal of the various activities for the efficient achievement of tasks. It is connected with the environment by the external flows "entrances" and with the other systems by internal flows of information.

The study of these three models, hence , leads us to establish the synthesis illustrated by figure 2, by cutting the system of piloting in two sub-systems : "decision-making and performance measurement ".

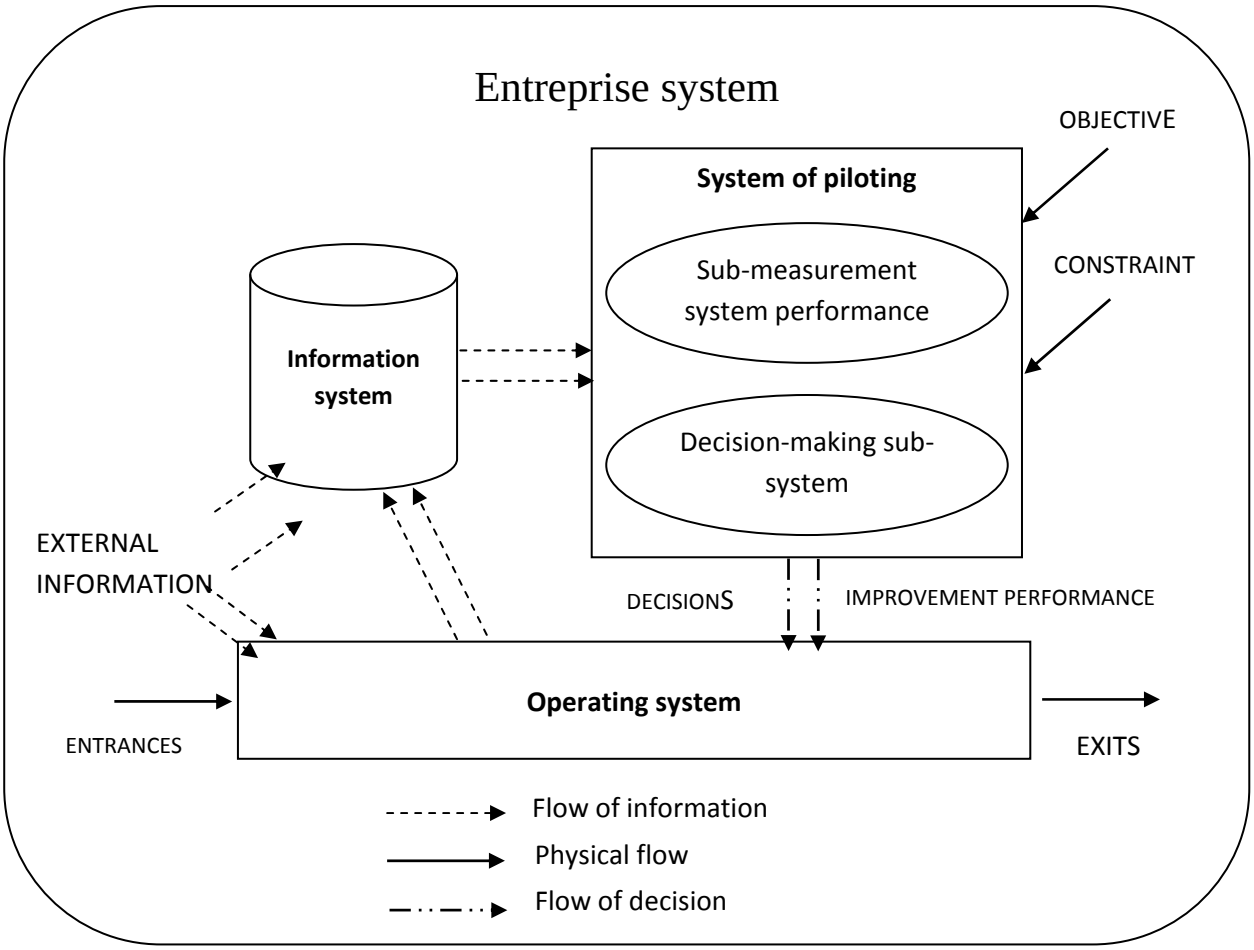


Figure 2: decomposition of the enterprise system

2. The process approach

At first, we attempt to model the learning process, by bringing to light the main interactions between under processes of the studied system. A global cartography of the various processes is as follows.

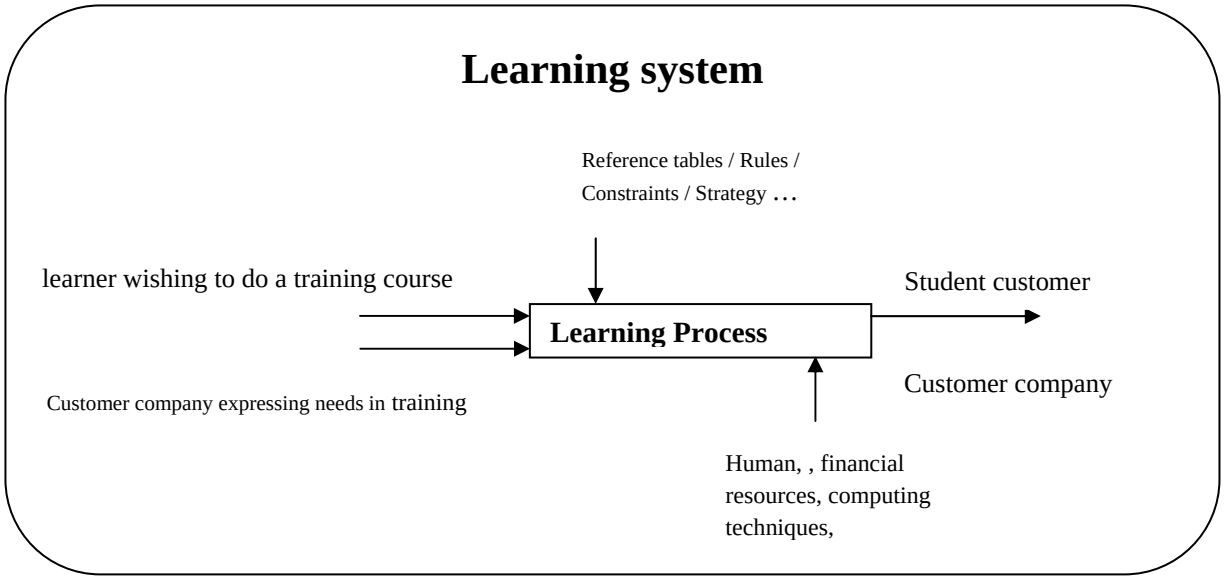
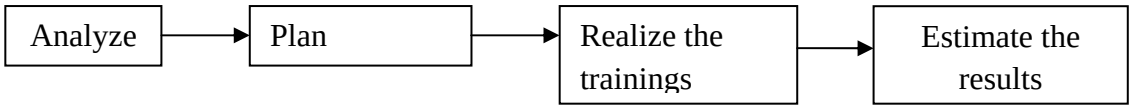


Figure 3: global view of the learning process

➔ **Description of the process**

The learning process englobe the steps of the analysis of needs, planning, realization of learning and the performance appraisal.



➔ **Customers of the process:**

- The direct customers of the learning system are the individuals who do the training course (learners).

- The indirect customers are companies interested in a given type of training and expressing their need for the systems of training and participants who manage these trainings.

➔ **Final result :**

The final result of the process is to produce a set of competent learners and to improve in the best cost the performances of the trainings and the learners by the acquisition of knowledge necessary for the easy integration in the professional field.

We can then ask the following questions:

1- Have the participants been satisfied ?

2- Have the business managers been satisfied?

3- Have the performances been improved?

IV - Modelling and automation of the systems of production of skill

1 – Description of the model

The model which we propose is schematized by the following figure :

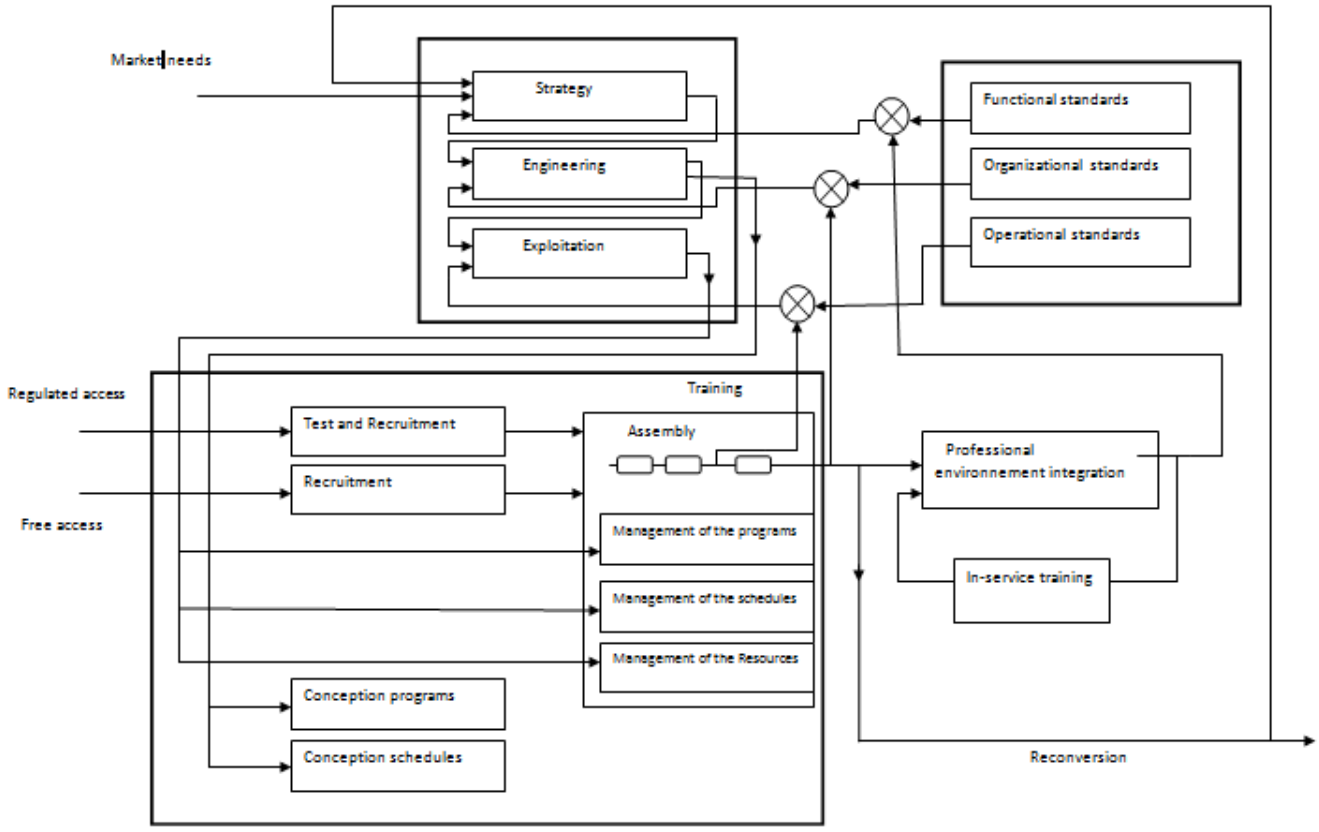


Fig 4 : Modelling the learning system

2 - Description of the piloting section

2-1- Models and performance indicators for exploitation

Changes concerning internal operational modifications in the system are common and are an integral part of daily life .Some Indicators Performance-system which produce measures on variables of state of the system to detect dysfunctions can be implanted.

Among indicators we can quote:

- The respect for the program: it is a question of verifying that the dates of realization of the trainings suit those initially planned.

- The respect for the hourly volumes of modules and elements of the module.
- The occupation rate of classrooms.
- The availability of the tools of training.
- The quality of tools.

2-2- Models and performance indicators for the re - engineering

The re - engineering consists in transforming all or part of the system, on the basis of the indicators of progress set up by the level of strategic piloting by relying on the organic and operational models of the system.

- The organic model allows to measure the efficiency of the implemented organization to realize the functions of the new system as previously defined. The IP of structural piloting model quantifies the productivity of the organization " investment, number of teachers, set of resources, equipment, level of mastery of the processes, the quality level, … "
- The operational model allows to characterize the exploitation performance of the system of competence production .

These indicators are relative to the levels of integration of the system, the rate of abundance, delay in the training.

Indicators of operational order associated with the production of the competence are implemented thanks to indicators of processes bound to variables of actions as, the teachers, the allocated resources, the methods of learning, the learning stages. It is a question of verifying that the obtained results are satisfactory considering the investments during the phases of assembly in the learning system.

2-3- Model and performance indicators for the strategy

The supervision of a system of production of skill, and the implementation of the indicators of performance, dedicated to this supervision, lead us to make sure that the system maintains its function of training in its environment, and to activate a project of re- engineering if it is necessary. Thus the performance is relative to the market thus it is necessary to take into account on the one hand the internal variations of the system and on the other the environmental modifications of the system.

At first, it is a question of implementing indicators of progress, bound to the priority objectives of evolution.

They consist, in particular, of the expression of the key factors of performance which translate the key factors of success. Hence it is necessary to establish indicators of strategic piloting "strategy of innovation, deadline of introduction of new sectors ,criteria of recruitment of the learners, … "

The strategic piloting leans on a functional model of the system which allows to identify all the external constraints to which is subjected the system to determine its degrees of freedom during decision-making to distant horizons.

It thus implements IP models of strategic level which objectify the continuity of the system, their orientations and their location in its environment " rate of profitability, rate of outcome of the research projects, … "

3 - **Description of the operational section**

Operational processes	Activities
Conception Programs	Estimate the distance between the acquired skills and the required skills
	Identification of needs
	Elaboration of the programs
	Determination of the hourly volumes
Conception Schedules	Determine precedences
	Affect needs (human and material) by unity of training
	set schedules
Recruit	Define the conditions of integration
	Reception and control of entrance
Train	Launch training
	Assembly of elements

4 - Description of the processes supports

Process	Activities
Manage Resources (including the learners)	Affect the Resources
	Follow the presence of the human resources
	List the activities to be affected
	List the available resources
	Follow the rate of presence of the learners
	Draft the training reports
Manage Programs and Schedules	Follow the realization of the programs
	Follow the realization of the hourly volumes

V - Conclusion

In this paper we summarized the situation of our reflection on the modelling of the systems of production of skill following the example of the systems of production of service , and proposed a global model which gathers the operational part and that of piloting on the basis of the approach process.

However the presented model remains very global, and to be directly useful it would require to be detailed until a finer grading level. Indeed our modelling of the processes stops at the level of the cartography and every process would deserve to be clarified and be modeled with attention. It seems to us imperative to define carefully the tasks to be realized and the procedures to use so the precise definition of the performance indicators would be the object of our next paper.

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