Abstract - This paper aims to locate a challenging theme in which the ability to understanding the interplay between the objective and subjective meanings in performance evaluations becomes a key competence for professionals involved in organization analyses in the engineering. It claims that this demand often leads professionals to develop additional expertise that helps them to improve the ability of unfolding the wide spectrum of meanings surrounding the performance phenomena, and that the theoretical direction of the predominant conception needs enlargement since the educational process phase. It follows describing the introduction of a multidisciplinary approach of performance to students in classroom and research activities, as part of a strategy for pedagogical practice improvement of a Master Degree course since 2003. Finally, it shows the outcomes of how the proposed approach improved the work of the students, both in individual work and collective projects, particularly on issues of research concerned with abstract dimensions of reality, which normally are not faced by professionals.

Index Terms - Performance evaluation, Education in engineering, Analysis of organizations, Reflexivity

THE SCNARIO OF PEOPLE-TECHNOLOGY INTERACTION

The insert of new technologies in the society changes signally several parameters of our daily lives. When new technical objects are introduced in the context of the professional works, or simply as products or services consumed by the society, our expectations grow relatively to the produced impacts, particularly in relation to the values that concern the well, the good, comfort, satisfaction, and other, individually or collectively. Always grows up a tension state with regard to the consequences and meanings that the new technologies produce in general in their interaction with the people and ecosystem.

The consequence, in the field of the professions, is of always to appear new demands of interpretation, critical evaluation and projects. Both, related to the own technical objects or to the specific impacts caused in the general society. Those demands are unfolded in several linked knowledge areas both of the natural science and social science, in slopes of technological and humanistic studies.

On this track, professionals in specific situations seeing themselves before the new technologies, sometimes with potential of creation of improvements not noticed before, and, other times, with demands of correction of undesirable problems more and more complex and difficult of operating, some of which at least never imagined before.

A good example happens in the field of the Engineering of Production, where the repercussions of new technologies of processes or products, that are developed in the areas of mechanics, electric, computer science, automation, biotechnology, and others, influence the work of the professionals involved with analyses of organization directly, in any places where those technologies were produced, or just used in varied scales. The success of the Work Organization discipline, developed in the Engineering of Production, each time more has been influenced by subjective meanings related to performance conception.

These influences, typically treated under the title of Production and Operation Management, possess a character of multi-disciplinary and interdisciplinary issue, and could be affirmed that to deal correctly with them brings the themes of the understanding of the interrelationship between technology, people and ecosystem, in the organizational contexts, to the first plane. This, leads the professionals to seek interpretative tools that unfold the landscape of performance meanings as deeply as possible.

THE NEED OF INTERPRETATIVE TOOLS

The need of interpretative tools is reinforced by the difficulty of doing the interaction of the dimensions of the objectivity and subjectivity in the works of the engineering. It is considered that the analyses and critical evaluations, applied in that interaction, must be worried about to produce a wide interpretation of the social production of knowledge, searching approaches that makes the systemic vision, so much developed in the fields of the engineering, to interact with other visions of the world. It is important to answer the economical, psychosocial and political subjects simultaneously, without losing the vision of unity of the whole, overcoming the different forms of dualism, that are demarcated in the contemporary scientific thought.

IMPROVEMENT OF THE REFLEXIVITY

“Reference [1]-[2]-[3]” affirms that the model of rationality predominantly associated to the interpretation of performance meanings in the works of the engineering is the instrumental
This thing can be considered as an object or an action delimited for reflexive observation. It is configured as a result of the observer's reflection under influence of the theoretical and practical criteria of association of the stabilized references for evaluation. In what is concerned to the transformations perceived by this view of performance one can experiment the exhibition of:

- A degree of "general success of the activity to the light of some standard for achievement that may not itself be precisely articulated" [6]; or
- A "pattern of recognized human behavior and culturally codified".

The first exhibition allows the evaluation of expectations systemically planned, including the association of results presented by any "objects" not humans (models, product, resources, services, process, etc.) with presence in performance.

The second exhibition understands the presence of the rules, habits, symbols, etc., that you/they were taken as warranty in the organizational action, and they are observed as repetitions in the acting sequences interpreted.

The validation of the "explanations" on the produced meanings is under the responsibility of the recognition that the references used are in the "stabilized" local stock of knowledge.

The performance so recognized becomes an experience totally known, repetitive, in that all the meanings presents are recognized and associates to the accumulated knowledge. The action as a whole is expected in the context of the accomplishment of the work.

In the poststructuralist perspective, the perception of performance is simply the one of "a presentation, invoking the "ephemerality" and insubstantiality of the worlds it constructs" [5]. It is seen containing a unique experience, in a connection between the past and the present, to be solved later, in other performance in the enfolded reflexive process.

This perspective always captures meanings of the moment and is applied to any "significant", human or not that is observed. The agent-observer can think about any type of knowledge "present" or "absent" and this reflection will influence his/her performance in agreement with "his/her" own world vision. There is no commitment with the establishment of a line of continuity with theories in the produced explanations [7], and the validity of the "findings" depends on make sense to local agents agreement and/or to specialists, depending on the produced meanings.

For an attentive and well informed observer, the poststructuralist perspective corresponds to a primary experience of performance in which the theoretical vision worries fundamentally with the dynamics of updating of meanings, generating the possibility of multiple visions of the sequences of events observed. There is always a space of freedom open to the reception or to the improvisation of new significances. The observed object dispute its prescription with a process of incorporating other characteristics to the same prescription in the
actualization of the contextualized performance been evaluated; everything that it is wanted predicable can be contaminated by meanings "absentees", producing "new" meanings.

In the polarization of the modern and poststructuralist conceptions of performance, for composition of the perspective of interaction of multiple visions, two basic ideas prevail:

- The first corresponds the one of the modern vision, that follows the premise that the social facts and aesthetic accomplishments are always recovered from the past and they are reverse updated to each acting exhibition, in agreement with a "script" previously assimilated or drifted;
- The second corresponds to the one of the poststructuralist vision, that, in spite of not rejecting the idea of existence of a character of "repetition" of meanings in the current performance [7], it is presupposed that everything can be taken as contextual in the observation of the facts and aesthetic accomplishments, in a discontinuous and only way. In that case, the articulations of the accomplished knowledge are subject mainly to the preferences and local interests, and they are updated in the own performance, giving to the phenomenon a character of singularity.

From these remarks, the performance regarding any phenomenon can be considered, at the same time, as resulting from the observer's reflection founded in the stabilized references in the social production of knowledge (recovered objectivity of the past) and under the impulse of creative transformation of meanings, singular and particularized aspect of updating of each phenomenon only captured starting from a pre-disposition to see new meanings of contextual interactions in reflexive processes. This movement refers so much to the agent's perception of what comes of itself as of what it comes from the other ones in the situations of analysis, and the process also contains the influences of the agents' idealizations towards the future, in other words, it also possesses a prospective character.

The interactions of the technologies, environment and people of the organization can be seen as being produced and (reverse) produced socially in local and general level, to every moment, through the facts and aesthetic accomplishments produced. The organization can, therefore, to be observed simultaneously as structure and action, as product and process, as noun and verb interacting stabilized patterns of knowledge in the production of new meanings and reverse-configurations when "requested" in the interpretations and explanations of the "scenes" and evaluation processes, that they can "be systematized" also, inside of certain limits, in evolutionary cycles of learning.

While the modern vision bases on the recovery of the facts and aesthetic accomplishments apprehended in the past (specifications, norms, patterns, codes etc), brought to the sequences of human and/or human performance, the vision of the post structuralism stops in the flows of updating of meanings in the same observation scenes, without commitment with great theories [8]. In the interaction between the modern perspectives and the poststructuralist one, the researcher / analyst / planner of the organization, of an intermediate position, has the opportunity to accomplish a sweeping of the explanation possibilities, using all his/her potential of reflection of the captured meanings and, additionally, to produce configurations of the local experience and of the needs of improvement/ innovation/ solution accomplishment.

The process of critical evaluation of performance, in any degree of discrimination of the reality, can be constituted according to the objectives of the analysis, depending on the investigated objects and of the established operational limits, but without discarding any significance process associated to the analyzed organization a priori.

A STRATEGY FOR PEDAGOGICAL PRACTICE IMPROVEMENT

To follow, an institutional experience is described in that this performance conception is introduced and worked in the context of the engineering education in a course of Master's degree with insert in the area of production engineering.

The Program of Masters degree in Technology was conceived seeking to a professional's formation based in three guidelines: the domain of the inherent technology to a process; the management of the environment where the technological process develops; and the education in that technological environment. For this formation, professional from different graduation areas and diversified professional experience are accepted, although, every year, 60% of the students are engineers.

The trajectory of formation of the Master in Technology, in its current state, can be described by mediation of the two visions presented for performance. On one side there is a formal structure of disciplines whose menu and form of application were rationally idealized inside an instrumental view that aims at specific purposes for the organization. These elements are defined and regulated formally and they are susceptible to institutional evaluation with base in indicators, mostly of which are quantitative. These procedures are in agreement with the evaluation system standardized used by the Brazilian government for the master’s degree programs.

On the other hand, the Master in Technology formation can be described as an articulation of events of the social construction of the knowledge, of a unique nature with specific social temporality and the spatiality. The human group that pronounces, the undertaken of actions and the interfaces with the institution are fleeting. This transience is accountable for the historical and critical observation of several groups along the last years and of their depositions.

As a significant part of the academic formation rests on the conviviality of students with different formations, it is frequently dominated by a polarization between exact sciences and human, but this formation can never be standardized.

The space becomes, intentionally, the one of the events carried out in an multidisciplinary arena, where the collisions transcend the field of the theoretical concepts linked to this or
to that School, to penetrate in the foundations of the personal and professional identity.

In the field of the intellectual production mapped by what it is written and published, some works demonstrate an appropriation of values with epistemological intention differentiated, contributing with the identification of a new research methodology. These works reflect the united work of orientation driven by teachers of different academic formations, but interested in the same, or similar, object of research. In those researches, the multidisciplinary approach provides the opportunity of knowledge sharing where all of the areas come out beneficiaries.

In the Brazilian education process it is still common that the formations are very restricted to a specific area. In other words, the professionals of exact go out the university with little formation in the humanist area and social, and the one of the social area, little based in the teaching of the natural science.

This process, many times, is shocked with the performance concepts and performance management applied by the institution, constituting a valuable source of tension and of learning for the researchers and students.

OUTCOMES

The outcomes can be treated, still, according to the mediation of the two visions already mentioned. So doing, the accomplished and published researches, the papers and the participations in events give visibility to the knowledge (scientific and technician) recognized by the pairs and checked by the established performance indicators. In this sense, there are promising results. For other point of view, the results for the people are very interesting.

For the students that don't possess formation in engineering, the challenge has been to understand the speech originating from this area and to find intersections to approximate the professional luggage already acquired transforming all this learning in a differentiated vision that includes the found phenomena. In this case, the scientific methodology adopted in the areas of the engineering, for the attainment of the researches and the validation and publication of results, constitutes a great challenge for the ones that are not familiarized with the structure and the language applied in their models of conception and of representation.

For the students with formation in engineering, it is noticed a latent conflict frequently in the professional identity. The fatigue of the rationality and of the objectivity as elements of sustentation of the professional profile open space for the reverse-significance of values and the need in new knowledge ways for the social conviviality. For these students the objects of interest demand new epistemology and the gap of methodological resources in their formation of engineering is noticed by them critically. In these cases it is common a migration for objects of study very different from the worked along the professional formations and experience with aggregation of other research concepts and learning of new methodologies.

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This search, however, it is not universal, nor so little homogeneous among the engineers. Many of them look for the master's degree for the theoretical and methodological improvement of models supported by positivism, in search of solution for technological problems. In these cases, many times the interest for the direct and fast obtaining of publishable results represents a resistance to the conviviality with values less focused and several goals of different people. In these cases there is a demand for a “more rational course” to "optimize the development of the researches in the short time of the course", being eliminated the disciplines and the activities that don't "contribute to the theme of the research". This speech plays an important part in the arena of conceptual collisions that all are involved.

In some cases, in the practical field of the accomplished researches, the needs come in such a way that doesn't seem to be any doubts that there is a new demand of theoretical and methodological forms of analysis organizations, in which the relevance of the enlarged performance conception is immediately recognized. As real examples of natural spaces for research of this theme, three situations are mentioned.

The area of cultural events, of great economical relevance and of great cultural tradition in Rio de Janeiro, standing out the New Year's Eve and the Carnival, is not yet assisted by the modern systems of administration of widespread use in the corporations and industries of other branches, demanding investigation and appropriate solutions. This field has been explored by the production engineering.

In the context of the multinational companies implanted in Rio de Janeiro, it is investigated, from the optics of performance, the communicative action developed between agents of the production area and of the maintenance areas in the context of the system information management.

In the environment of the higher education institutions, it is in process the implantation of a national system for education assessment called Sistema Nacional de Avaliação do Ensino Superior (SINAES). In this system the performance conception appears as a driver, governing all the development of the systems of information and of necessary management. The enlarged proposal of performance here presented acts as reference for critical evaluation of the system and of the efforts that have been developed.

FINAL REMARKS

The engineering was capable to create the landscape that we inhabited, and for this reason it seems always clear the roles to be carried out in the society by the engineers. But the scenery that began to draw in the 20th Century doesn't suggest that this landscape is self-sustained next years and the effect of this reflection has been affecting in all the world the meanings of the engineering and their professionals' roles. The exercise of the engineering, scientific and technologically consolidated, is not exempted of uncertainties and intransigent personal anguishs by the socioeconomic pressures, among other, that seem to affect the search for the career, even in the more developed economies. In this context the conceptual reflection
on performance and, particularly, on the engineer’s professional performance is shown as a social imperative. In order to assist this professional, it is pertinent and necessary all of the contributions that revitalize the futures professional and personal formation, in consonance with the new visions of paradigm of science, which we lived together, and their epistemological unfolding.

The predominant understanding of performance only as a “depositary” of results is an outstanding aspect in the reflection applied in analysis of organization, because it is clearly insufficient in the treatment of subjective aspects of the social production of the knowledge, even with adaptations done in more updated versions of analysis [9]. The central point is that there is, even in those versions, no attempt of overcome the hegemony of the central instrumental rationality that continues hegemonic. Therefore, it is prudent to be careful of considering the limitations of the predominant model and disposal of theoretical references alternative to treat of the additional explanations concerned to performance.

From the representations of performances meanings of the organization, it is possible to derive configurations of technical and administrative structural aspects, of use of resources, of sharing of knowledge, of interpersonal characteristics of communication, of feelings, ideology, learning, dramaturgy etc. All dimensions interacting in a quite interesting way for orientation of the planning and professional action. Some representations don’t have precedents in the general or local levels of the organizations, offering the challenge of exposing unpublished reflections.

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REFERENCES


