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Pedagogy at university in transition: reflections from the Bologna Process and the voices of pedagogical managers in Engineering courses in Portugal

Pedagogia na universidade em transição: reflexões a partir do Processo de Bolonha e da voz de gestores pedagógicos de cursos de Engenharia de Portugal

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Abstract

The present paper discusses the role of Pedagogy and the promotion of teaching quality at university within current reform policies in higher education resulting from the Bologna Process. These policies have also influenced public policies in Brazil and

theoretical-methodological elements are presented which may support a future study in that context. In order to understand the impact the Bologna Process upon innovation and the supervision of teaching practice, an exploratory study was conducted in Portugal based on interviews to six pedagogical managers of Engineering courses from three public universities. Innovation and supervision seem to operate in a transitional territory, incorporaring conflitual logics which somehow result from tensions inherent to current changes. However, signs of a more reflective and collective pedagogical culture were found, which may foster the reshaping of the teching profession in the academic setting.

Keywords: University. Pedagogy. Supervision. Engineering.

Resumo

O presente texto discute o lugar da Pedagogia na universidade e a promoção da qualidade do ensino, no quadro de políticas atuais de reforma do Ensino Superior provenientes do Processo de Bolonha. Entende-se que tais políticas também influenciam as políticas públicas no Brasil e apresentam-se elementos teórico-metodológicos facilitadores para futura análise nesse contexto. Com a finalidade de compreender o impacto do Processo de Bolonha no âmbito da inovação e da supervisão da ação docente, realizou-se uma pesquisa exploratória em Portugal, a partir de entrevistas a seis gestores pedagógicos de cursos de Engenharia de três universidades públicas. Conclui-se que a inovação e a supervisão se movem num terreno em transição, incorporando lógicas contraditórias de algum modo decorrentes de tensões inerentes às mudanças em curso, mas no qual podemos entrever sinais de construção de uma cultura pedagógica mais refletida e coletivizada, potencialmente instigadora da reconfiguração da profissionalidade docente no meio académico.

***Palavras-chave**: Universidade. Pedagogia. Supervisão. Engenharia.*

Research scenario: Pedagogy as a conflictual environment

The study that was the basis for the present text, carried out in Portugal, is part of a wider project that includes the Brazilian reality and aims at understanding the way that universities, particularly their faculty, have experienced recent changes with (in)direct implications for pedagogy. Although our focus is on the pedagogical management of engineering courses, it is understood that its conclusions have a greater range in relation to university pedagogy as an environment of tensions and transformations, mostly due to the political scenarios where it operates. In the Portuguese case, this scenario is the Bologna Process, which comprises European higher education. In Brazil, what can be highlighted is the Support Program for the Restructuring and Expansion of Federal Universities, Reuni, launched by the Ministry of Education, more specifically by the Secretary of Higher Education (SESu). It is also important to mention that the Bologna Process, due to its importance and the scope of its purposes, has also influenced public higher education policies in Brazil and some of its determinations have been established by specific decrees and regulations, resulting in the proposal of the New University, whose representatives are the Federal University of Bahia and the Federal University of ABC, which have already adjusted themselves to the format established by Reuni. Hence the need of studying these realities comparatively, for even though they are different, both are linked by the fact of having to deal with and experience significant transformations.

Since 1998, the European Union, through its commissions, meetings of deans, student associations and ministries of education, has articulated the concretion of changes and defined proposals for higher education policies in its member countries, aiming at building the so-called European Higher Education Area (EHEA). In 1999, the Bologna Declaration was signed and presented to the scientific and academic community of Europe. Marked by globalization and neo-liberal institutional management purposes with an implicit market-driven and competitive nature, the proposal aims at making European universities,

their teaching methods and scientific production more attractive to the youth facing their North American competitors.

These new policies have an economic character that points to a certain type of university designed under utilitarian and pragmatic bases, transforming knowledge into an asset to be traded, announced, and made available for equivalent amounts of time in order to assure what is called "convergence" among countries and their curriculum plans and credit systems within three generalized training cycles: a more general cycle that prepares students for the working market (undergraduate degree of, at least, 3 years) followed by two more specialized cycles (master's and doctor's degrees), comprising a total of eight-years.

In countries such as Portugal, where undergraduate degrees lasted an average of four to five years, the institutions made an unprecedented effort towards curricular review, which involved a significant part of the academic community in the debate of study plans, learning goals and outcomes, and teaching and evaluation methods. On the other hand, the discourse associated with the Bologna Process, appealing to a student-based education, has prompted some institutions to abandon transmission pedagogy and to renew pedagogical practices. However, the conditions for these changes have not been created, and several problems are continuously observed: the absence of a collegial culture of pedagogical supervision that allows the development and the assessment of practices; the scarcity of institutional structures that support and encourage innovation and professional development; maintenance of the separation between research and teaching, and the devaluation of teaching in academic careers; the growing demand for faculty scientific production, which greatly determines the funding of institutions (VIEIRA, 2009a). If we add to these factors the shortening of the curricula, the reduction of faculty, and the rise of the number of courses and the number of students per course, it will not be difficult to understand that in spite of the Bologna Process pedagogy occupies a place of tensions and there is a risk of maintaining universities in a space of pedagogical archaism, providing information rather than formation

(ESTEVES, 2010). Even when there is innovation, a movement of pedagogic pragmatism is often observed, where reflection upon practice gives way to the rampant application of didactic procedures without solid foundations and without a consistent assessment of their appropriateness to and effect on different scenarios. Change is often superficial, operating at an individual rather than a collective level, without involving a deep redefinition of faculty professionalism and the status of pedagogy at university. This does not mean that there are not more consistent initiatives, focused on the articulation between teaching, research and professional development, where faculty innovate and disseminate their practices, although they are scarce (GUEDES et al. 2007; HUET et al., 2009; VIEIRA 2009b).

A growing appreciation of a managerial view of higher education, to which the Bologna Process is not alien, has caused the dissemination of technocratic outcomes control mechanisms, such as assessment agencies and the harmonization of the European educational systems, and also internal quality assurance systems within institutions. These mechanisms, focused on institutional excellence and on an idea of measurable education, tend to relegate the subjects — their background, their stories, their convictions and aspirations — to a backstage role (LIMA; AZEVEDO; CATANI, 2008; SILVA, 2011). Therefore, it is in a scenario of contradictions, which centralizes, quantifies and objectively determines the processes that control teaching at the same time it exposes the need of creating new teaching practices, that universities undergoing the Bologna Process have the opportunity of transforming pedagogy by overcoming models that are unable to account for the supercomplexity of the current world and the need to develop critical and active subjects (BARNETT; COATE, 2005). The main challenge is to make education a "community property" (SHULMAN, 2004), which means to go from a denied pedagogy to a more public pedagogy — more recognized, debated and shared. During this transition, it is of the utmost importance to understand the way it is experienced by the subjects. Within the present article, the focus will

be on the experience of the actors who occupy a privileged position in the pedagogical management of engineering courses.

With no generalization purposes, we searched for the understanding of a pedagogical architecture in transition at universities. By listening to the voices of managers of engineering courses, we aimed at apprehending their perception about the impact of ongoing reforms and about the supervision of teaching when exercising their function, thus enabling a reflection on the role of university pedagogy in professional development and in the promotion of quality teaching, but also about pedagogy as a space for the preservation of a certain singularity in the face of standardization policies resulting from the Bologna Process. Assuming the existence of a praxeological epistemology in the conduction and the supervision of training practices, our intention was to discover an *experienced* pedagogy in scenarios where pedagogy as an academic activity is still widely invisible and greatly *denied*.

Where does pedagogy stand in engineering courses?

Colenci (2000) highlights a formal definition of engineering, which comes from the Engineers Council for Professional Development, as

> the creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation or safety to life and property (COLENCI, 2000, p. 36).

Thus, being an engineer can be defined by its formal and technical aspect, but the training of an engineer must also entail the commitment with his/her social role. In order to reshape technology on the basis of a radical reading of its assumptions, its conceptions and its

true possibilities, it is necessary to rethink the human self as a defined and defining subject of this gear. Consequently, a pure technological training without the presence of the humane with all its complexity and challenges is no longer possible. The training of engineers must be be focused on the human being, who is the beneficiary (or not) of the most daring and advanced technologies.

Yet, how autonomous are the institutions to define the profile of the engineers they want to educate? Nóvoa (2000) highlights the rise in the influence of the professional regulation associations in the creation or redefinition of courses in Portuguese universities. This process has been going on in Brazil for a long time and plays an important role in the establishment of curricula and in the education of professionals in areas such as Health, Engineering, Law and so on. Such phenomenon points out the fragility of higher education institutions in the face of the imposition of a set of technical competences defined by such corporations, which reduces their autonomy regarding student training and may instrumentalize this training. In Brazil, as well as in Portugal, engineering courses have been suffering growing influences from external entities that control and accredit courses and/or professionals, such as ABET (Accreditation Board for Engineering and Technology[1]), a non-governmental organization that acts in areas such as applied science, computing, engineering, and engineering technology in the USA and several other European and Latin American countries. Through in loco assessments, changes in the core curricula are proposed and the competences to be developed by training programs are defined, which necessarily affect pedagogic practices. In a globalized world, where discourses regarding quality and homogenization through assessment processes is emphasized, the engineering sciences, due to their strategic function in the development of countries, play a pivotal role in the control-regulation of their training courses. As far as the place of pedagogy in the case of engineering is concerned, it is

[1] Available at: <www.abet.org>.

necessary to consider also the tensions that result from its close relation to the technological and scientific development of society.

The university, however, is a space where science meets technology and innovation, where the bond between education, research and extension must contribute towards the improvement of life quality, reduce inequalities, and care for the environment. It is necessary to educate a professional that acts with courage and wisdom to deal with critical social problems in a world at boiling point. This way, the mission of the university cannot be exhausted by a market logic nor be oriented by economic development alone, which demands a constant reflection about the purposes of the training curriculum, understanding it as "[...] set of all the knowledge experiences provided to the students [...]" and as constituting the "core of the institutionalized process of education" (SILVA; MOREIRA, 2004, p. 184). Within this perspective, teachers will act as mediators in building up a curriculum that is permanently reshaped through reflection and integrates phenomena and problems with social and scientific relevance in the school routine. That is, teachers are in charge of problematizing the prescribed curriculum and the curriculum-in-action, as well as the scenario where both take place, thus becoming architects of formative training.

Thinking about engineering courses from this point of view implies rebuilding some espistemological paths that are necessary to the understanding of the space that must be occupied by the practice of teachers/engineers. It is also possible to say that the construction of a pedagogical grammar within this scenario may provide a more political dimension to the teaching action, essentially translated into its problematization:

> What do my practices say about my assumptions, values and beliefs about teaching? Where did these ideas come from? What social practices do they express? What makes me maintain my theories? What views of power do they embody? What interests do my practices seem to serve? What limits my opinion about what is possible in teaching? (SMYTH, 1989, p. 7).

According to Nóvoa (2000) the development of the university pedagogy depends not so much on techniques taught to the teachers as on the self-reflection and the collective reflection on the teacher's own knowledge/practice.

The need to encourage a more accurate reflection on the social processes that are connected to the generation of material and symbolical assets requires engineering courses to surpass the preparation of technicians and assure the political dimension of that enterprise. This implies that the student masters instruments and methods in a lucid, critical and committed way, within historically desirable, ethically sustainable and deeply understood values and purposes. The role of pedagogy is to awaken and instigate the students' competence of knowing to think their own actions through teaching practices. This way, Demo (2005) states that the quality of professional development is assured as long as the students are involved in the construction of knowledge and in learning how to learn, experiencing education as an empowering space.

Vieira (2009a) points out some demands to assure the effectiveness of a quality pedagogical culture: implanting a culture of (self) evaluation; inquiring into pedagogy and forming communities of practice; articulating teaching, research and faculty professional development; encouraging faculty to seek pedagogical training; defining education as a participative process that transforms its subjects. In relation to the last aspect and based on projects focused on the transformation of pedagogy, some pedagogical principles understood as rules of a possible pedagogical grammar at university are proposed. They might guide teaching practices within the scenario of a democratic education, favoring greater autonomy to the students, a new configuration of faculty's professionality and a greater valorization of the space of pedagogy at university. A proposal is presented for a pedagogy based on the *intentionality* of its purposes, the *transparency* of its goals, assumptions and practices, the *coherence* between all of these components, the *relevance* of training as regards the diversity of students and the socio-professional reality, *reflexivity* as a

condition for divergent thinking and the development of a critical mind, the *democraticity* of relationships and knowledge building processes, the promotion of *self-direction* regarding the students' learning, and *creativity/innovation* in relation to the pluri/inter/transdisciplinary understanding of knowledge and reality, and the capacity to intervene in professional contexts (VIEIRA et al., 2002, 2004; VIEIRA, 2009a, b).

A pedagogy that emphasizes these principles might be able to build itself as propulsor of a new and revitalized way of looking at the kwowledge/practice of the teacher-engineers, demanding that reflection, criticality and the analysis actions and intentions are a central part of their professional career, for "it is not just a matter of intervening in nature and in society, but intervening in the sense of being humane" (DEMO, 1994, p.12). This process may be strengthened by self-study and by the self-regulation of practices brought by a pedagogy aimed at autonomy.

Criticality and self-reflection become particularly necessary in courses that are predominantly technological, such as engineering, due to their proximity to an excess of rationality that has been dominating scientific productions and all the bureaucratic apparatus of the organization of labor in modern societies. Then, we need to deconstruct the positivistic model that has been part of the debates about the woes of the allegedly unfinished project of Modernity, a project that has been going on since the illuminism, culminating with the technological advances caused by the industrial production process and supported by the positivist science. Morin (1973) and other authors have helped us reflect about the possibilities of science and technology in a world that needs to recover the proposal of human happiness, and about the full development through rational knowledge in favor of mankind. As far as higher or university education is concerned, the challenge is to educate the citizen and the modern professional with a reconstructive questioning competence, not just foment the simple reproduction of knowledge and practices.

There are, then, two pivotal dimensions of professional action that must be assured by the curriculum for a scientific and technological

education: the social and the techno-ideological functions. As Freire (1996, p. 61) highlights "education is a form of intervention in the world", which implies a dialectic tension between reproduction and the disclosure of dominating ideologies. Within a scenario where conflictual rationalities for higher education co-exist, pedagogy may bring about a dialogue integrating students and teachers, creating a space of self/co-regulation for the quality education of subjects that are able to use reason, techniques and technology in a way that is ethically and politically engaged to a project aiming at restructuring today´s society for the common good.

The role of supervision to understand and improve practices

The educational perspective that has been adopted so far implies the valorization of pedagogical supervision, understood as the theory and practice of a critical regulation of teaching and learning processes so as to understand and transform them (VIEIRA et al., 2010; VIEIRA; MOREIRA, 2011).

Any pedagogical supervision model assumes, explicit or implicitly, a certain conception of pedagogy to the detriment of others. If we agree with a conception of pedagogy as a moral and political activity that may perform a role in personal and social transformation, then we have to define pedagogical supervision in the same way. This implies that it will be supported by democratic practices. In order to avoid the association of supervision with control and inspection, we could use the spelling *superVision* (WAITE, 1995a; GLICKMAN; GORDON; ROSS-GORDON, 2004), to make evident the central role of the *vision of education* in supervision practices, thus opposing a hierarchic, instrumental and reproducing perspective of these practices in favor of a collegial, inquiry-oriented and transformative approach. The prefix "super" will indicate the adoption of a "helicopter view" or "meta vision" (BROCKBANK; MCGILL, 1998, p. 251), which on the one hand implies a distance from practice to

carry out its observation and analysis, but on the other takes us back to practice through a strategic "zooming effect" (SÁ-CHAVES, 2000, p. 125), allowing its understanding and improvement.

Collegial supervision is particularly relevant in the scenario of pedagogical management between peers, which is the case of the coordination of higher education courses and demands the definition of criteria that allow one to distinguish between the legitimate and the illegitimate exercise of power, i.e., between a *facilitating* power and a *coercive* power. According to Robinson (1995) carrying out this distinction implies knowing the extent to which the process of influence of a subject upon another entails the qualities of critical dialogue, based on values such as respect, commitment with valid information and freedom of choice, and on attitudes such as openness, public scrutiny and facilitation. In a collegial perspective, the most important purpose of the supervisory relationship is understanding and collaboratively renovating educational practices, including the problematization of the contexts where they are developed and the active resistance towards all types of oppressive and anti-democratic authority.

It is not possible to ignore that the quality of supervision is conditioned by several contextual factors which must be taken into account. Therefore, it is pertinent to have the notion of the "situational supervisor" (WAITE, 1995b), who is in charge of knowing and questioning the scenarios of pedagogical action. The higher education pedagogical manager must ask, for example, whether the ongoing policies offer autonomy for the institutions and the faculty to define curriculum plans adjusted to educative and social realities; whether the institutions cultivate values of democracy and collegiality, and whether they are open to reflective, inquiry-based practices; whether the way they function allows a management of time and space that favours dialogical supervision; whether there are material and human resources necessary to innovative pedagogical projects; etc. In adverse scenarios, where these conditions do not exist, it is mandatory to create such cultures, or at least the possibilities, i.e., ways to approximate the

real and the ideal, building *re(idealistic)* practices, which necessarily embody a tension and a commitment between dominant conditions and desirable conditions (VIEIRA, 2010).

The voice of pedagogical managers: the construction of a new pedagogy?

The exploratory research reported here aimed at understanding, making visible, and problematizing the view of pedagogical managers about the changes that were brought about by the Bologna Process, and the pedagogical supervision mechanisms in course coordination. Five engineering faculty members with pedagogic management positions have been heard — one Pedagogical Council President (PCP) and four Course Directors (CD) —, through a semi-structured face-to-face interview, which was recorded and transcribed to carry out the analysis[2]. Table 1 presents some of the participants' characteristics, who belong to three different Portuguese public universities (Universities of Minho, Porto and Aveiro)[3].

[2] The research was carried out between September 2010 and February 2013, and it also involved interviews with seven teachers that did not carry out pedagogic management functions. However, the analysis was focused only on those who carried out these functions. Each course is coordinated by a Course Director, who manages the Course Board, which comprises faculty and student representatives. Each group of courses of a certain area (in this case, engineering) is managed by a Pedagogical Council, an organ where several courses are represented by students, Directors and other faculty members. The Course Boards and the Pedagogical Council are collegiate organs whose members are elected by the academy, except for the faculty members that run them and are chosen or nominated by the Scientific Councils of the colleges. Among the functions of these organs, it is possible to highlight the follow-up of the courses and their annual assessment, based on an online platform where the faculty members record and self-evaluate the subjects they teach, as well as the coordination of the external assessment of the courses, carried out by a national agency for assessment and accreditation (A3ES).

[3] In order to assure the anonymity of the participants, they are regarded as males and the universities they come from are not identified. There are two women and for men in this group. The participation of two other Presidents was forecast, but they declined the interviews.

Table 1 - Interviewees' data

Course	Function	Degree/Category	Age	Years of serice
Engineering Courses	PCP	PhD/Associate professor	40-50	28
Mechanical Engineering	CD	PhD/Associate professor	40-50	12
	CD	PhD/Associate professor	40-50	12
Electronic and Computer Engineering	CD	PhD/Associate professor	40-50	16
	CD	PhD/Associate professor	50-60	27

Source: Research data.

The script of the interview, sent beforehand to the participants, included questions regarding the changes resulting from the Bologna Process in the courses, in the innovation initiatives, in the role and challenges of the pedagogic managers and in the institutional measures that support improvements in education.

The analysis of the participants' accounts, carried out in an interpretative and essentially inductive way, resulted from a phenomenological-hermeneutical exercise (JAPIASSÚ,1992), searching for meanings built in the dialogues between interviewer and interviewee, where voices overlap to elaborate a theoretic-practical construct with a sort of a new meaning regarding teaching and pedagogic management in engineering courses. During the interviews, the predisposition of the subjects to talk about their own practices was evident, allowing the perception of a lack of space in their daily routine to expose their ways, to simply sit and be heard and share their doubts about what might be "right" regarding their practice and their thoughts. It is also possible to observe how far the interview can provoke and evoke the thinking and the reflection by the direct exercise of having to form a sentence and transform it into language, creating a speech that keeps getting shaped during the dialogue, during the encounter of voices sharing the same scenario.

Based on the teaching experience of the interviewees, it is possible to infer that they are in an advanced stage of their professional

careers, where maturity and productivity mark the subjects, both men and women, in their academic paths. However, it was stated that many of the engineering Course Directors are auxiliary professors that have a few years of experience on higher education. Such aspect might indicate that the position of Course Director neither requires teaching experience nor previous years of research. On the other hand, professors on higher ranks might not fill these positions because they are more engaged in research projects in the university. Thus, this indicates that teaching management occupies the second place when it is compared with other academic tasks, namely research.

Regarding the changes brought about by the Bologna Process, the interviewees highlight the curricular review, the discipline accreditation system, a better student mobility, a greater emphasis on research competences and the expansion of methodologies that had been previously experimented in a more individual way, e.g., project work, which allows the articulation of different disciplines and competences within the courses, aiming at a more integrated training, as well as education oriented to the development of professional competences, including crossdisciplinary competences such as the being open to innovation and team-work (GUEDES et al., 2007). Issues such as the change in the evaluation practices (less centered in exams) and a closer focus on collaborative work between teachers and students are also addressed. Innovation tends to be seen as a practice that improves students' learning outcomes, which might imply a direct connection between curricula and the business world, in a logic that previews an adjustment to market demands.

Although some innovation initiatives comprise several teachers/disciplines and are encouraged by pedagogical managers, the pedagogical autonomy of teachers is respected, for they must be the main managers of their practices. It is possible to state that the supervision of teaching takes place at the intertwining of reproducing and transforming strategies, within a space where faculty feel supported both to enact change and to keep traditional educational modalities. Actually, it is recognized that a number of teachers have not changed their practices,

and structural constraints are indicated such as the excessive number of students, excess of work, growing bureaucracy of academic activity, overvaluation of research and the lack of teacher training actions, which tend to be scarce, discontinued and detached from practice. The collected statements also emphasized the time needed to enact change by the internalization of new terminology and new practices. Lack of time was perceived in the view of the aforementioned constraints, highlighting, once more, the growing bureaucracy regarding faculty work, which is strongly associated with the logics of accountability underlying internal and external systems of quality assurance.

According to the voice of the interviewed managers it is possible to notice that the supervision of teaching integrates movements of approximation to teaching practices through informal management procedures as well as movements that keep those practices at a distance through more bureaucratic management procedures. Exercising supervision aims mainly at improving the impact of educational actions on learning outcomes by being less focused on the teachers and on the pedagogic processes. On the other hand, Course Directors point out, implicit or explicitly, constrains in the exercise of their function regarding the possibility of intervening in their peers' teaching practices, mostly when they occupy a higher professional rank. Thus, the legitimacy of the pedagogic manager is questioned due to a clearly hierarchic power system, which is still significantly expressive in the Portuguese scenario.

The subjects that occupy pedagogic management positions tend to translate the values and the traditions that constitute the institution which they are part of into their own activities. As part of the history of universities, they behave cautiously and, sometimes, distantly from their peers, due to the sense of teaching autonomy that defines their academic practice. However, even within a seemingly posture of mere reproduction and conformity, there is a subtle way to supervise educational activities by using strategies that aim at their transformation. By working to reassure institutional policies of quality assessment that have been defined by institutions within the Bologna Process, the interviewed managers

confirmed practices that suggest some sort of advance and change. For example, it is possible to observe that when they exercise supervision by coordinating course assessment processes through instrumental apparatus (network platform, records, questionnaires, etc.), they exercise a task that, even though it seems to keep a distance from teaching practices, gets closer to pedagogical activities, and the possibility of supervision that assumes an empowering nature occurs.

The logics of bureaucratic control implies a type of reproductive supervision based on conformity, operated by a set of technological instruments that support the record and the publicization of the curriculum units planning, the teaching strategies and the teaching assessments carried out by students and teachers. However, it ends up creating an indirect space for collective pedagogic reflection — indirect, given that this is not its goal, but it may become empowering as it can provide a means to an effective reflection on teaching practices, either as teachers organize their daily routine to record it, or at the moment to justify certain results, such as a high number of failures, and define remediation plans. Even though the participation of the students in the assessment of teaching is questionable, it is an activity that demands some level of reflection about the teaching actions and the learning trajectory. These are movements that, still insufficiently, make up a path that surpasses supervision as a control activity, creating possible shortcuts so that the way to an effective *superVision* can be effectively cleared up.

This way, supervision presents signs that its central goal is to encourage an aware and deliberate professional action (VIEIRA; MOREIRA, 2011), even though the factors that limit pedagogy are present in the academic milieu. Although supervision integrates a significant bureaucratic component, it causes a deconstruction of the teaching action and it is through this path that empowerment as reflectivity and as the search for new practices is gradually incorporated. The work between peers is an example of this deconstruction, although it is still a fairly shy activity in the faculty routine. Even being shy, this work has a certain repercussion for the supervision carried out by the managers,

which might assure the dissemination and encouragement of practices that present fruitful results. Thus, other faculty members might think about their own teaching practices more seriously.

In short, the supervision of the pedagogic action seems to combines the logics of bureaucratic control with the logics of singularity of teaching practices (this logics is not empowering yet, but it respects the teachers' pedagogic ways of doing), which are combined with a third logics of professional training corresponding to the model of the teacher-engineer, that translates itself into the teaching programs. Then, there is the intertwining and circularity of three logics that define the way of (self)supervising educational activities in engineering courses (Figure 1). The first two overlap and end up by completing each other and influence the logics that defines the teacher-engineer model (the third logics), made from a pedagogy that is not completely distant from traditional models, but where there are signs of transition to practices that are more based on an integrated and interdisciplinary education, having implications on teaching and evaluation methodologies.

ASSESSMENT-REGULATION

Figure 1 - Supervision ativitity logics

Source: Research data.

It is important to highlight, however, the hybrid nature of the supervising processes that were inferred from this exploratory study. Along with a normative control logics linked to institutional policies of quality assessment, where accountability starts to assume a pivotal role, it is possible to observe a less directive supervision, apparently distant from teaching practices (and therefore singling them out or keeping their singularity), which also entails a certain regulation based on theoretical-conceptual instruments coming from the engineering training itself and from the innovation rhetoric associated with the Bologna Process. It is exactly within these logics that it is possible to exercise a potential empowering path through:

- the responsabilization of the agents of the teaching/learning process, students and teachers;
- the use of a pedagogic terminology that helps understanding teaching and learning processes;
- continuous exercises to analyze teaching practices based on their results;
- encouragement to project methodology, involving practices that make students participate in the construction of knowledge and in the development of crossdisciplinary competences;
- the use of record and communication resources that create the possibility of self-regulation and collaborative regulation of teaching practices.

According to Vieira (2010) the supervision of educational activities takes place in the space of possiblity, in the intersection of the real and the ideal. The scenario and the academic background define and limit the supervision exercise, and this is visible in the collected interviews, where one guesses an impulse to change constrained by observed tensions, but where some transformation paths are drawn.

Final considerations

It is possible to infer from the interviews that there is a private teaching action system that may be undergoing a transformation within a pedagogical architecture that is more reflective and collective than it appears to be, but where contradicting logics coexist as a consequence of paradoxes inherent to the ongoing changes and of the difficulty in breaking up with traditional ways of pedagogic work.

If it is true that the tendencially instrumental reasoning of teacher-engineers privileges a technical and pragmatic rationality (mathemitizable) that comes from their formation in engineering, of a positivistic character, it is also true that the Bologna Process integrates the same rationality in parallel with the appeal to the renovation of teaching practices towards a more student-centered pedagogy. A pragmatic orientation distances subjects from their critical and reflexive condition. However, according to Habermas (1989), through communicative reason, based on discourse and developing competences to interact with others, instrumental reason might soar up to an empowering condition. It is in the dialectic movement of contradictions that, according to Chauí (2000), the historic reality gets modified and the logics/rationalities are made, remade and reinvented. Thus, the importance of pedagogical coordination as a space that might provide reflection and dialogue, reveal misunderstandings, assume dichotomies (or false dichotomies) which are part of teaching practices, and promote sharing spaces that create conditions to a proximity to a more transforming and critical pedagogical grammar, made from blended senses, principles that get consolidated according to the pace of practices and that demand a dialogic participation of everyone involved – managers, teachers and students. Within this process of change, one must recognize that there are no correct answers and that pedagogy will always have to deal with tensions and uncertainties; as one of the interviewed Course Directors said: "it is easy to evaluate the quality of a paper, but there is not a formula to measure teaching".

The creation of spaces and time devoted to reflection and dialogue must be assured in teaching practices and in the supervision of their quality, respecting the specific knowledge of the teaching area in order to assure its own logics and preserve the singularity of the change process, a process that is local but that presents global repercussions in society, far beyond Bologna.

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