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Filling the gap in development of competences for different contexts of psychologists activity: undergraduate apprenticeship in communities of practice and situated learning of professional skills.

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FILLING THE GAP IN DEVELOPMENT OF COMPETENCES FOR DIFFERENT CONTEXTS OF PSYCHOLOGISTS ACTIVITY: UNDERGRADUATE APPRENTICESHIP IN COMMUNITIES OF PRACTICE AND SITUATED LEARNING OF PROFESSIONAL SKILLS

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ABSTRACT

The work is focused on "psychologists in modeling" mental models that tutors and students build in communities of practice of Undergraduate Apprenticeship to analyse and solve problems of professional practice in different contexts of psychologists activities: Clinic, Social, Justice, Labor and Research.
Unit of analysis is examined through a four dimensions matrix, to study cognitive change in professional modeling. Questionnaires about situation-problems were administered to 250 students of Psychology at the beginning and the end of Undergraduate Apprenticeship of Professional Practice during 2004 and 2005 at Buenos Aires University. Questionnaires about conceptions of development of students competences were administered to 45 Tutors during their work time in 2005.
Results show diversity of competences built in different activity systems. The challenge is to widen social stages for the construction of heterogeneous and multidimensional profiles of professional skills.

Keywords: tutors, students

AIMS

- To analyse mental models of Students in University Course of Psychology built for analyse and solve intervention problems situated in contexts of Psychologists Practice and identify the shifts happened between the beginning at the end of Undergraduate Apprenticeship.
- To analyse heterogeneity and diversity of experiences and meanings, in the process of developing professional competences through "communities of practice" in different Areas of psychologists practice: Clinic, Social, Justice, Labor and Research
- To identify strengths, critical knots and obstacles in cognitive change of mental models for Professional Practice of Psychology at Undergraduate Apprenticeship
- To articulate Students mental models with conceptions of learning and apprenticeship goals that Tutors of Apprenticeship show.

INTRODUCTION

This work has been developed in the frame of UBACYT Research named *"Building mental models for problems of professional intervention in Students of Psychology. Participation in communities of practice and situated learning"* from 2004 to 2007. In our former paper to XXVII International Congress of Psychology in Stckholm, Sweden, (Erausquin et al. 2000), "To become a psychologist: practice communities as contexts of academic learning", we had already

pointed that Psychology is a scientific discipline whose assimilation strongly involves the own self. Knowledge ought to prove its power with the analysis and help to solving complex human reality. Theories should be tools that psychologists "use" to understand the multidimensional objects of their study".

During the decade of history of Professional Practice Undergraduate Apprenticeship in Faculty of Psychology, Buenos Aires University, Research Team has questioned the Psychologists Practice Modelling in the following direction: How are theory and practice articulated in the process of learning-and-teaching of Psychology in the University Courses? Are the conventional "pedagogical devices" that we have at University an appropriate way to make possible meaningful and relevant learning in our discipline and develop in Psychologists a rich and complete appropriation of a "box with diversity of tools" turned into professional competences? How much can the learning achieved in that way contribute to apply knowledge to analyze and solve problems in professional practice or in the research field? Can we consider one only direction between basic and applied knowledge, between theories and practices, in Psychology? What kind of devices could increase the skill to transfer the knowledge to new domains of problems? Which could be the motive and the function of involving undergraduate students in joint practice that psychologists and other actors develop together in social institutions?

A crucial moment in the history of Psychologists Professional Practice Education was the process of Institutional Self-Evalution developed in 1999 in Faculty of Psychology at Buenos Aires University: professors, teachers, students and heading people participated in a joint reflection and collaborative activity about the Studies Plan of Career and the Professional Profile of Psychologist they want to promote at academic field. In that basis, current work is supported by Research developed by a team led by Erausquin C. since 2003, about "different figures of situated Psychologists" that were built as "natural categories" with the narrations of Students of Psychology, throughout prototypes and examples of educational experience in different Areas of Professional Practice. The team studied through deep interviews and qualitative analysis the reasons that Students of Psychology remembered have got to choose the Career, their awareness of influences in the choice, the social representations of the role of Psychologists that emerged in their speech, the problems that they identify in different fields, the tools it was supposed they would work with and the competences they conceived relevants for their future performance. Categories for analyse students representations of Psychologist role were built.

Professional Education was situated in the core of Academic Education in Undergraduate and Graduate Studies at University. The team decided to study the process of "becoming a

professional Psychologist" in the new devices of Apprenticeship created at University, involving students and tutors in specific, heterogeneous and different communities of learning beyond the walls of University, at "real" contexts of practice of social stages. The team built a specific tool, the Questionnaire of Situation-Problems of Psychologists Intervention and administered it to a small sample, in a pilot study, in 2003. The 30 Subjects Witness Group were Students that developed Psychologists Apprenticeship in Clinic, Social-Community, Work and Research Areas in that period of time. The team administered also the Questionnaire to a Control Group of Students that didn´t develop the Apprenticeship, because students still had the option of doing or not doing it during Undergraduate Psychology Course. The team constructed a Complex Matrix for Data-Analysis, based in a multidimensional contextualysed Unit of Analysis based in cognitive-contextualist frame. Dimensions were defined and in 2005 first analysis of comparative study between students with and without Psychologists Undergradute Apprenticeship were published (Erausquin et alt., 2006). In each Dimension, Axes were identified to describe movements and possible and wanted directions in the changes to promote through Apprenticeship. Professional Practice Apprenticeship was institued as an Obligatory Subject in 2002 and since therefore Students of Psychology have been able to choose developing it in one of different Areas: Clinic, Justice, Education, Social-Community, Work or Research. Currently, Students of Psychology Undergraduate Course can develop two academic units of Apprenticeship and frequently they do it in two different Areas, as it has been studied in the Recently Graduate Psychologists Following Research (Erausquin et alt. 2006).

CONCEPTUAL FRAME

* **"Units of analysis"** and **"zone of proximal development"** - Lev Vigotsky

*** "Scaffolding"** in development of skills and its use in **expert-novice devices**. - Wood, Bruner and Ross, Cazden.

* **"Zone of social construction/appropriation** of knowledge, meanings, senses and motives, building social and personal identities"- Newman, Griffin, Cole, Lab of Human cognition

* **"Apprenticeship"** - institutional-cultural focus -, **"Guided participation"** - interpersonal focus - and **"Participative appropriation"** - personal focus - in **"Communities of practice"** and **"Community of learners» -** Barbara Rogoff , Jean Lave and Etienne Wenger.

* **"Activity Theory", Third generation**, Cognitive change through **Exchange, Historicity and Multi-voicedness, Tensions, Contradictions and Conflicts** in **"Expansive learning" at Work** . Internalization and Externalization. - Y. Engestrom.

* **"Mediated action and mediating tools or cultural artifacts**", Irreductible tension between agent and tools in the stage - James Wertsch.

* **"Mental models" and Cognitive Change in Educational Contexts and socio-cultural settings**. Shared mental models and negotiation of meanings. **From Implicit to explicit, from simple to complex and from realism to perspectivism - Episodic constructivism** - M.J.Rodrigo, Schnotz.

* **"Construction of competences for Education at School" -** Philippe Perrenoud.

* **"Reflection into, from and after the practice, reflection of reflection from the practice" -** Donald Schon.

The metaphor of **"scaffolding**" of Bruner, Woods et al. is used to explain the device that is built in the Professional Practice Apprenticeship. We have used it for understanding the process that is developed between tutors and students in the **appropriation** by students of the competences, skills, attitudes that identify the professional role in each field., in the paradoxical sense of "strategic fiction", that assigned Newman, Griffin and Cole to **"cooperative task"**. People may begin solving a problem together, doing a diagnosis, playing a role in the interview, **as if they were** professionals– the novices – . The performance precedes the competence: the action anticipates the comprehension. We think that the cognitive change happens in the Vygotskian **"zone of proximal development**", in the sense of a zone of interactive construction of knowledge, with different alternatives of departure, open representations between individuals, a teacher-expert-tutor guiding the development of the novices competence in an asymmetric but reciprocal appropriation of knowledge, responsibility and power to decide the actions.

The Critical Perspective in Psycology and Pedagogy of Socio-Historic-Cultural Theory develop a situated and dialectical point of view about Cognition. Frame which is based in Lev Vygotsky thought. In line to James Wertsch "action mediated by artifacts or mediation tools", mainly Yrjo Engestrom concepts of **"system of activity"** have inspirated our construction of a "unit of analysis" that may reflect the complexity and interdependence of dimensions into the subject of Psychologists Training. Yrjo Engestrom (2001) has studied the relation between microcontext, macrocontext and human actors in diverse settings of **"Work in Change"** and emphasized the role of **tensions and contradictions:** work changes by changing the context and changing the actors mind, through a process of "**internalization and externalization"**, plus the confrontation of different models and activity systems, negotiation and translation of meanings, purposes, attitudes. The process should respect the differences by including them in new "task unities" without eliminating the diversity.

The focus tries to overcome modernity "split conception" between body and mind, emotion and knowledge, society and individual (Castorina and Baquero, 2005) (8). Feelings, attitudes, values and emotions may introduce discontinuities – meaningful ones – in the "conceptual change" of students of Psychology becoming psychologists.

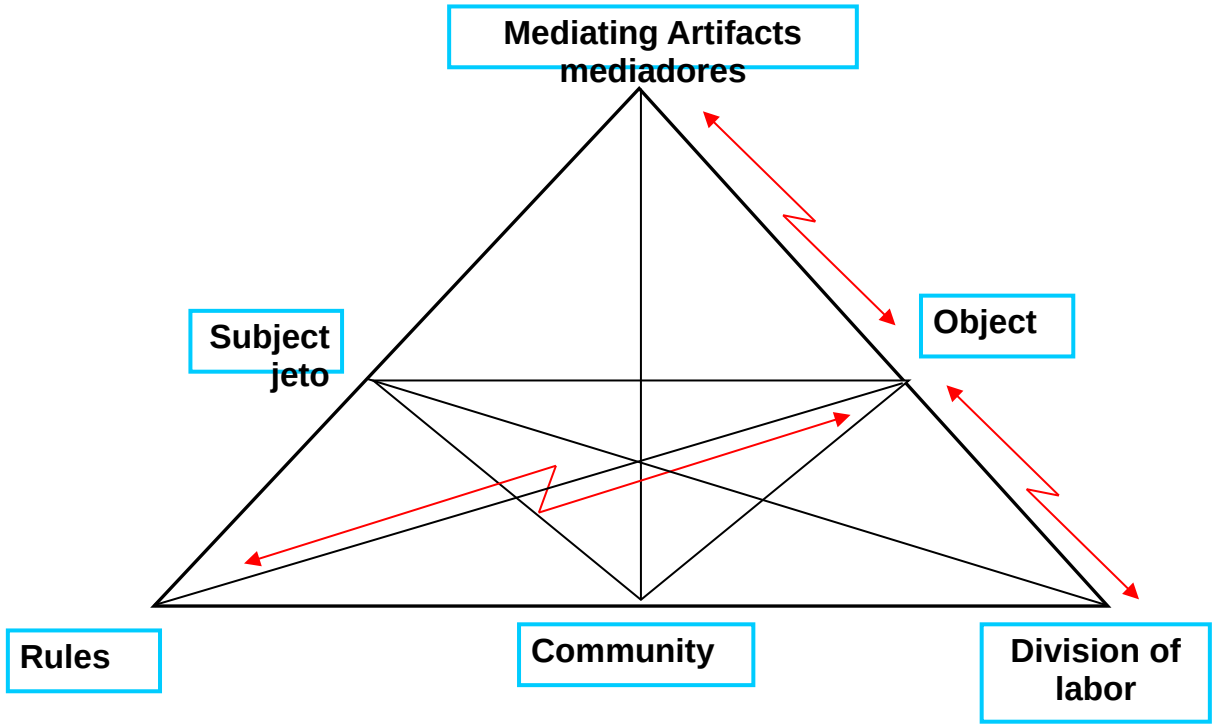
We focus in "**cognitive change**", as it has been studied by María José Rodrigo (1994, 1997, 1999, 2001) (9), in educational settings. To distinguish from a more stable representation such as "schemas", Rodrigo used in 90s the concept of "mental model", created by Johnson Laird in 80s. ***Mental models*** are ***"psychological constructions, dynamic and temporal representations, based on a specific part of our beliefs and knowledge about the world, that are activated by the content of the task or the situation, and depend on our personal intentions related to the event we have to cope with"*** (Rodrigo:1997).

To formulate, analyze and solve a problem that demands professional intervention of psychologists, students of Psychology build a discursive configuration that supposes a mental model. In former paper presented to *XXVIII International Congress of Psychology* in Beijing, China, 2004, "The apprenticeship in "communities of practice": a cognitive contribution", we pointed that our **"unit of analysis"** – "the very small unit in which you can divide a problem of study without loosing its essential nature" (Vygotsy, 1998) – was *"the mental models that the students of psychology build for the reflective analysis of problems situated in contexts, which need a professional intervention strategy from the psychologists in different fields of activity"* (Erausquin, Basualdo et al. 2004) (11).

Pyshologists in process of training develop a "participative appropriation" of tools (Rogoff 1997) (12), building general and specific "competences" for the professional activities in different contexts of "communities of practice" (Lave and Wenger, 1991).(13)

A **competence** is something you know how to do, a skill, but more than that, it is a **strategic ability**, necessary to face complex situations. It´s not a procedure, a rule, a recipe, although it may include them if necessary. ***"A competence is a capacity of effective action toward a family of situations, that people can construct because they have the necessary knowledge and the ability to mobilize that resource in an appropriate way and in an opportune time, to identify and solve the problems"*** (Ph. Perrenoud, 2004). It is remarkable a **"contextualist shift**" in the conception of **"learning"** (Pintrich, 1994, Baquero, 2001), no more considered only a mental and individual event, but a complex activity, involving mind an body, emotion and cognition, in the core of interpersonal exchange. Learning is not purely cognoscitive, is a change in some sense impredictable, situated into the participation and understanding of social situations, an actually heterogenous process of production and negotiation of meanings and senses. Nowadays, it is urgent to gather resources for developing competences to make professional activity of psychologists successful and efficient, throughout activity systems of academic settings, built for improving the quality of education and enhancing psychologists

activity. Practicum is a suitable space for “developing competences”, because is situated between work and education, and students are embedded in tasks units outside University walls , working with professionals in “real” contexts and through “real” activities of social relevance.



“Mediational Expanded Basic Triangle”, (ENGESTROM, 1991), an “artifact” for drawing units of análisis, in socio-cultural theory, for understanding the process of school learning as well as psychologists interventions in educational contexts.

METHODOLOGICAL STRATEGIES

Descriptive and exploratory study with qualitative and quantitative data analysis. The work is based on a contextualized re-meaning of **Conceptual Change Theories** (Rodrigo 1994, 1997, 1999, Rodrigo and Pozo, 2001), applied into **educational contexts** from socio-historic perspective and linked with "systems of appropriation and construction" of competences in sociocultural stages (Perrenoud, 2003).

Writing, specially **narrative genre writing** (Schlemenson, 2004) has the power to reconstruct and transform the objective reality with communication and personal appropriation, as well as it transforms the memory in thinking, wishes and goals. **Narrative writing** introduces beliefs and also deconstructs our knowledge as fix and institued, with a perspective that is an outcome of personal experience as well as crossed by culture and history. ***Narration highlights narrator subjectivity as much as situation in which he/she is embedded***. Writing means projecting, turning objective the subject, building a text that can be read by others and that allows them to participate in a collaborative reflection with multiple perspectives, through negotiation and exchange of senses and meanings.

According to former diagnostic (Erausquin, Basualdo, 2004, 2005) a ***unit of analysis was defined*** and categories were built for understanding information offered by students and tutors narrations. Dynamic and complex figures were drawn, joint with the concept of ***mental models about situation-problems for analyzing and solving***. The **Unit of analysis** is "mental models of Psychology Students for professional intervention on problems situated in different contexts of Psychologists activity". It´s composed by four **Dimensions**: a) Situation-problem in the context of Psychologist Activity, b) Intervention/Action of Psychologist, c) Tools used by the intervention agent in Psychologist Activity, d) Outcome of Activity and Attribution of Causes or Reasons to it. In each one of the dimensions, different **Axes** are displayed, conforming lines or patterns of development and tensions were identified in the process of "getting professionalism" of psychologists in socio-cultural and historic contexts. In each axis, five **Indicators** point out qualitative differences of mental models, ordered in the direction of enhancement and improvement in the process of getting professionalism.

Indicators are not uniform for all the Axes, nor it is supposed a "representational hierarchy"- genetic, of power or efficiency -, in a fix and strong sense, for analysing the movements along the Axes. Tools for data collection and categories were used to analyse Mental Models of "Psychologists in modeling", "Recently Graduate Psychologists", "A Comparative Study of School Psychologists and School Teachers in the same stage", "Tutors and Mentors of Professional Practice in Undergraduate Apprenticeship of Psychologists Modeling", "Psychology Teaching in modeling" and "Tutors and Mentors of Professional Teaching of Psychology in Undergraduate Apprenticeship", since 2003 until 2007, and since 2007, tools and categories have been adapted and re-contextualized in the research to analyse Mental Models of Tutors, Mentors and Coach modeling Professional Practice of different Careers - Engineering, Law, Companies Administration - .

In current work, data were collected through a writing consultation with a set of open questions, named ***Questionnaire about Situation-Problems of Professional Intervention in Psychologist Activity,*** administered at the beginning and at the end of the educational experience of Undergraduate Apprenticeship to 98 Students of University Psychology Course who developed Professional Practice in the first term of 2005 and 152 who developed Professional Practice in the first term of 2004 in different fields: Clinic - 87 subjects -, Social-Community - 55 subjects -, Organizations Work - 15 subjects -, Education - 43 subjects -, Justice - 43 subjects - and Research - 7 subjects -.

At the same time, it was administered to 45 Tutors, Coach and Teachers, - globally named at current work as Tutors - at the beginning of an "Updating Course of Tutorial System Teaching at University", a Questionnaire about their representations of actual Psychology Students learning and about their teaching mail goals in Undergraduate Apprenticeship concerning to development of Students competences in "the process of becoming Psychologists". The sample comprehends different Areas of Apprenticeship namely: Clinic, 20; Education, 5; Social-Community,7; Justice, 6, Organization Work, 2 and Research, 5.

Current work presents some links about results of the second Questionnaire administered to Tutors and results of Mental Models Questionnaire administered at Pre-Post Apprenticeship to Students.

DATA ANALYSIS

1ST. DIMENSION: SITUATION-PROBLEMS

A GENERAL STRENGTH IN PSYCHOLOGISTS DEVELOPMENT OF COMPETENCES

AXIS 6: FROM REALISM TO PERSPECTIVISM

Indicator 1: ***no analysis of the problem***.
Indicator 2: ***only one version of reality, as if it were the unique possible, like in common sense***
Indicator 3: ***the belief or the doubt of unique perspective is based on scientific knowledge of discipline, beyond the common sense*****.**
Indicator 4: ***perspectivism in the competence of dis-centering oneself from a unique perspective of the problem***
Indicator 5: ***comparative analysis of different perspectives for developing and solving the problem***

Note that the increase of perspectivism at the end of Apprenticeship is significant in the sample and the increase of comparative analysis of different perspectives in Undergraduate Students is a relevant achievement. The increase of perspectivism in the analysis of the problems and the reduction of answers that center in unique perspective for understanding the problem - from common sense and from scientific perspective beyond common sense - are linked with the multivoicedness and complexity of educational events in Psychologists Apprenticeship.

1ST DIMENSION: SITUATION-PROBLEMS IN CONTEXT OF PSYCHOLOGISTS INTERVENTION

HETEROGENEOUS OUTOCOME IN PSYCHOLOGISTS DEVELOPMENT OF COMPETENCES

AXIS 7. FROM INDIVIDUAL WITHOUT CONTEXT TO INTERPERSONAL PSYCHO-SOCIAL NETWORK OF SUBJECT

Indicator 1: Problem is situated in individual de- contextualized or in the social-institutional field without linking it with actors as subjects.

Indicator 2: There is a trend to individualize the problem beyond structure or general factors or to social defining the problem, beyond the intentions, wishes or subjective beliefs.

Indicator 3: he/she combines subjective and singular issues with structural issues or factors, showing regular behaviors and diversities.

Indicator 4: he/she combines subjective and interpersonal factors with issues concerning conflicts intra and inter systems.

Indicator 5: he/she combines subjective and interpersonal factors with conflicts and situation of ethical dilemma.

In Clinic Area, at the end of Apprenticeship, there is a significant reduction of the trend to situate the problem only in the individual and there is a significant increase of the combination of structural factors with singular/subjective issues, while the other Indicators stay the same or almost the same between Pre-Test and Post-Test. Only a small increase about situations of ethical dilemma

In Social-Community Area, at the end of Apprenticeship, otherwise, there is a significant increase of issues concerning the dynamic of intra e inter-systems conflicts and tensions. Only a small increase about situations of ethical dilemma.

In Education, situations of ethical dilemma are stronger in Pre-Test and Post-Test, but the significant increase is in the combination of regular behaviors and singular subjects.

In Justice Area, at the beginning and the end of Apprenticeship, conflicts and ethical dilemma are stronger but there is no significant increase in Indicators 4 and 5.

In Organizations Work Area, increase of conflicts dynamics, mainly inter-subjective and psycho-social conflicts, is relevant in the sample.

In Research Profile, increase of mentions of ethical dilemma is significant and relevant in the sample.

2nd DIMENSION: PSYCHOLOGIST PROFESSIONAL INTERVENTION

HETEROGENEOUS OUTOCOME IN PSYCHOLOGISTS DEVELOPMENT OF COMPETENCES

AXIS 3: ONE OR MORE AGENTS IN INTERVENTION ON THE PROBLEM

Indicator 1: He/she doesn´t mention agents in intervention on the problem.

Indicator 2: It´s mentioned one agent in intervention but isn´t the Psychologist.

Indicator 3: It´s mentioned only one agent: the Psychologist.

Indicator 4: It´s mentioned intervention of Psychologist and other agents activity, without joint construction of the problem nor the intervention.

Indicator 5: It´s mentioned intervention of Psychologist and other agents activity with joint construction of the problem and the intervention.

In Clinic Area, a small increase of intervention of Psychologists and other agents without joint construction and a significant increase of joint activity with co-construction of the problem and the intervention, Indicator 5.

In Education Area, a significant and relevant increase of joint activity with co-construction of the problem and the intervention: 23% of increase Indicator 5.

In Social-Community Area, a significant increase of joint intervention of Psychologists and other agents, bus without co-construction of the problem and the intervention, Indicator 4, with a light reduction of Indicator 5.

In Justice Area, a significant increase of Indicator 4 reveals the importance of inter-agency of interventions, but the strong reduction of Indicator 5 of 13% reveals the difficulties for collaborative construction of the problem and the intervention by different agents.
In Organizational Work, a reduction of mentions to other agents with exclusion of Psychologists favor the relevant increase of the activity of only one agent, the Psychologist, (60%), with a significant reduction of Indicator 4 and 5, that show joint and collaborative activities and constructions.
In Research Profile, is stronger joint activity with collaborative construction of problems and interventions in Pre-Test and Post-Test, but not the increase, that is stronger in joint activity without co-construction.

3rd DIMENSION: TOOLS IN PSYCHOLOGIST INTERVENTION
A GENERAL WEAKNESS IN PSYCHOLOGISTS COMPETENCES; MOVING A HISTORIC OBSTACLE FOR COGNITIVE CHANGE
AXIS 1: ONE OR MORE TOOLS IN PSYCHOLOGISTS INTERVENTION ON THE PROBLEM

Indicator 1. He/she doesn´t mention tools.
Indicator 2. He/she mentions only one tool related with only one dimension of the problem.
Indicator 3. He/she mentions only one tool related to different dimensions of the problem.
Indicator 4 . He/she mentions different tools related to different dimensions of the problem.
Indicator 5. He/she mentions different tools related to different dimensions of the problem, with articulations to each other and relationing with appreciation of the context.

In the general sample, most subjects are mentioning different tools related to different dimensions of the problem, which is a historically relevant outcome in Advanced Students of Psychology comparing with results of the beginning study at 2003 (Erausquin et alt., 2005) and there is a small increase of Indicator 5, but a small increase of Indicator 2, with mentions of only one tool related with only one dimension of the problem shows that yet "variety of tools" goes through an obstacle or problem in cognitive change for a portion of Students of Psychology.

4TH DIMENSION. RESULTS AND ATTRIBUTION
A GENERAL WEAKNESS IN MENTAL MODELS OF PSYCHOLOGISTS INTERVENTION. MOVING THE OBSTACLES IN LOWER LEVELS.
AXIS 1: RESULTS AND ATTRIBUTION TO ONE OR MORE CONDITIONS

Indicator 1. He/she doesn´t mention results or attribution.
Indicator 2. He/she mentions results without attribution.
Indicator 3. He/she mentions results with attribution to only one condition: a) a competence of the agent, b) the context, c) interpersonal dimension, d) intrapersonal dimension of subject of intervention.
Indicator 4: He/she mentions results with attribution to different conditons, at least two condicions.
Indicator 5: He/she mentions results with multiple attribution, articulated and appreciating the context, to different conditions of production of results.

Most of the sample, in Pre-Test and Post-Test, are concentrated in Indicador 3, *mention of only one condition of the results*, that is a progress, because Indicator 1 and Indicator 2 diminish significantly. That is a historically significant progress, considering the results at the beginning of the study in 2003: it was a very rejected or ignored dimension in Psychology Students analysis of interventions on problems situated in contexts. But the reduction of Indicator 4 and the increase of Indicator 5 - only one case - is a very lonely movement in the Psychologists competence, pointed out by higher levels of the Axis.

TUTORS DATA ANALYSIS OF 2ND. QUESTIONNAIRE

1st.Question: What do students of Psychology learn in Undergraduate Apprenticeship?

Tutors and Professors of Apprenticeship answered:

CATEGORIES	**Frequency**	**Percentage**
No answer	2	4,3
1. To acquire tools and to go deeply into psychological knowledge linked to the professional role.	5	10,6
2. To face problems in situation, re-meaning theoretical knowledge and binding it with professional practice	**15**	**31,9**
3. To work on different kinds of professional practice linked to fields of activity and problems situated in contexts.	3	6,4
4. To work in interdisciplinary team	4	8,5
5. To approppriate the professional role through the performance in context and through the relationship with patient/consultant/user/participant	**13**	**27,7**
6. To think oneself as becoming psychologist, from the task and in order to choose an specific field of professional activity	5	10,6

Total	47	100,0

There is a significant difference among the fields. In Clinical Area, frequency of *To work in interdisciplinary teams* is minimum. In Education and Justice, frequency of the answer is relevant. In Social Community field, it is meaningful the frequency of *To work in different kinds of professional practice* linked to fields of activity and problems in context. *To think oneself as becoming psychologist in order to choose an specific field of professional activity* is important in Areas of Vacancy: Social Community and Justice. *To acquire tools and deep knowledge* is relevant in Research, a very new Area of Professional Practice.

***Questionnaire about Situation-Problems of Professional Intervention in Psychologist Activity*,**

1 -Think in a *situation-problem* in which you have participated **-** or you have observed or has been narrated to you **-** in which a *professional psychologist* intervenes/acts, according to his/her role and functions. **Describe** the problem mentioning the most significant elements of the situation. **Explain** the elements concerning to the history of the problem - before the intervention - and concerning to the context in the moment of the intervention

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2 - Tell each one of the actions through which the *professional* (or the team) intervenes in the problem, detailing the moments and steps of the intervention. A. Who decided the intervention?. B. Which were the aims the professional had in the intervention he displayed? C. On what or whom did he intervene? ¿Why?

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3 - Which tools did the professional use when he intervened? Why?

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4 - Which result reached the professional with that intervention? To what you attribute that result?

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MATRIX OF COMPLEX ANALYSIS: DIMENSIONS, AXES AND INDICATORS OF MENTAL MODELS

DIMENSION I: SITUATION-PROBLEM

AXIS 1: From the simple to the complex in the problem
AXIS 2: From description to explanation of the problem
AXIS 3: From the un-specificity to specificity of Psychology and its links with other disciplines in the statement of the problem
AXIS 4: From no mentioning the background to the historicity of the problem
AXIS 5: From one-direction causality to complex entanglement of causality
AXIS 6: From realism to perspectivism
AXIS 7: From individual without context to the interpersonal network of the subject

DIMENSION II: PROFESSIONAL PSYCHOLOGIST INTERVENTION

AXIS 1: Who decide/decides the psychologist intervention?
AXIS 2: From the simple to the complex in the actions of professional psychologist intervention.
AXIS 3: One agent or more in professional intervention
AXIS 4: One or multiple aims of professional intervention
AXIS 5: Actions on subjects, linking wefts and/or institutional devices
AXIS 6: Action of indagatory and/or help to the actors in their resolving the problems
AXIS 7: Pertinence of intervention in relation to the problem and the specificity of the professional role
AXIS 8: From involving, worth and distance of narrator with agent and intervention

DIMENSION III: TOOLS USED BY PROFESSIONAL PSYCHOLOGIST

AXIS 1: One or more tool/s in relation to the dimensions of problem and intervention.
AXIS 2: General or specific feature of the tools.

DIMENSION IV. RESULTS OF PROFESSIONAL INTERVENTION AND ATTRIBUTION OF CAUSES OR REASONS OF SUCCESS OR FAILURE

AXIS 1: Mentioning results, from attribution to one or more causes or conditions.
AXIS 2: Consistence of results and attribution with the problem and the intervention.

CONCLUSIONS

***** In socio-cultural stage of Argentine University, cognitive and motivational change in "mental models" of *Students becoming Psychologists* during Undergraduate Apprenticeship are stronger in ***1st*** Dimension, refering to the cutting and analysis of the problem, than in 2nd Dimension, refering to the professional intervention of Psychologists and other agents in the problem. And the growing of professionalism in 1st and 2nd Dimension are stronger than in 3rd and 4th Dimension, referring to the Tools of Intervention and the analysis of Results with Attribution to Conditions for the Success or the Failure in the Results. Tendencies are consistent in Tutors mental models.

- During Undergraduate Apprenticeship in University Course of Psychology, significant shifts considered *general strengths* are developed in "mental models" of *Students becoming Psychologists*, according to de Matrix of Complex Analysis built in the Research. Increase of perspectivism and dis-centering of a unique perspective for analysis of the problems show in all the Areas of Psychologists Practice the enhancement of the competence for analysis of problems situated in context of professional intervention. It is strongly correlated with increase of complexity in analysis of problems and articulation between actors, factors and dimensions, including intersubjective and psychosocial wefts, Axis 1 (Erausquin et alt.2007). Tendencies are consistent in Tutors mental models. The dominant representation that Tutors show about Students learning is about the appropriation of the role through the relationship with another subject and the re-meaning of the theories in each situation that future professional faces.

For *Psychologists in modeling* different profiles are developed in the different Areas of Psychologists Activity, as different kinds of cognition and identity of the professional role.

Heterogeneous shifts take place in the units of analysis of the problem: where the problem is situated and which is its extent.

Although is a general enhancement in the units of analysis, it is no-homogeneous in the different Areas of Practice.

Social-Community and Labor *Psychologists in modeling* reach most advanced goals than Clinic, Education and Justice. Some Research students reach the most advanced goal.

Social-Community and Labor are in touch with interpersonal conflicts as part of the practice while the Clinic is more exposed to pathological structures. This prevents them from working with the units of analysis subject-context.

Heterogeneous shifts also take place in the recognition of the agent/s intervening in the problem, the inter-agency and multivoicedness in the activity field.

There is a general enhancement in the recognition that the agency of the intervention is the Psychologists and other professionals. This enhancement is no-homogeneous in the different Areas of Practice.
Education and Clinic reach most advanced goals.
Justice and Social-Community show the importance of the inter-agency but also the obstacles and difficulties with the joint construction of the problems and the interventions between different agents.

Social and institutional systems of activity that order and structure the professional actions are relevant for determining that diversity: in the case Justice and Social-Community the inter-agency cannot be taught because there is no real exchange, negotiation of meanings or reciprocal appropriation between the agents: judges, lawyers and the professional psychologists.

Intervention tools have been a *general weakness* in Psychologists education in socio-cultural stages of Argentina.
There are dominant tendencies to model the intervention on different actors, individuals, groups or situations on the basis of one tool, the "listening", understood from Psychoanalysis perspective in an idealized way, almost as an emblem for psychologist's identity, with the sense of "sensitivity to the emergency of subject".

That emblem has prevented Psychologists of using of a variety of tools articulated with different dimensions of the problem and the intervention.

(Tutors are aware of the *Psychologists in modeling* need of growing in appropriation of tools, but the progress is still slower in this Dimension.)

- An important affordance is the work on situation-problems. The problem requires solving, not applying previous concepts. Strategic knowledge of alternatives of problems solving doesn't depend only of theoretical principles, includes some know how and episodic knowledge construction that requires re-meaning in the context.
- Working with situations-problems is a very useful tool in "contexts of practice, of discovering and of criticism that socio-historic-cultural perspective of expansive learning supposes linked with the protagonism of actors" (Engeström, 1991:256). "Who learn should have the opportunity for drawing and realizing in the practice a new opening, a new model for their activity. Students will produce a new way of doing the work…, namely, they should learn something is not there yet, they reach their future activity while they create it" (Engeström, 1991:254)