**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

ISSN 2307-7999
e-ISSN 2310-4635

ARTÍCULOS DE REVISIÓN

# Collaborative learning: Theoretical foundations and applicable strategies to university

## El aprendizaje colaborativo: Bases teóricas y estrategias aplicables en la enseñanza universitaria

**Nestor D. Roselli**[12a]

[1]Pontificia Universidad Católica Argentina, Ciudad Autónoma de Buenos Aires, Argentina.
[2]Centro de Investigación en Psicología y Psicopedagogía, Ciudad Autónoma de Buenos Aires, Argentina.

[a]Professional degree and PhD in Psychology. Major: Education Psychology. Main Researcher at CONICET. Director of the Psychology and Psychopedagogy Research Center at the Universidad Católica Argentina.

**Received**: 07-10-15
**Aproved**: 05-01-16

**Correspondencia**

**Email:** nestorroselli@uca.edu.ar

**Citar como:**

Roselli, N. (2016). Collaborative learning: Theoretical foundations and applicable strategies to university. *Propósitos y Representaciones, 4*(1), 219-280. doi: http://dx.doi.org/10.20511/pyr2016.v4n1.90

**Notas**

This research work was funded by the National Agency for Scientific and Technological Promotion (Argentina), PICT 0960.

**Summary**

Collaborative learning is a construct that identifies a current strong field, both in face-to-face and virtual education. Firstly, three converging theoretical sources are analyzed: socio-cognitive conflict theory, intersubjectivity theory and distributed cognition theory. Secondly, a model of strategies that can be implemented by teachers to develop socio-cognitive collaboration is presented. This model integrates and systematizes several academic group animation techniques developed within the collaborative learning field. These integrated techniques, within a coherent and unified didactic intention, allow talking more about strategies than independent and dissociated techniques. Each strategy is specifically described, which refers to six areas: encouragement of dialogue, listening to others and reciprocal assessment; collaboration for negotiation and consensus building; activity organization; study and appropriation of bibliographic information; conceptual development; collective writing. These strategies proposed (designed to stimulate the collaboration between 2, 4 and exceptionally, 6 or 8 students) are not the only possible strategies, they can be combined with the ones the teacher might suggest. The strict pattern of each strategy is a characteristic of the proposal. The teacher is also encouraged to benchmark the results obtained using each strategy and those obtained using individual or non-collaborative strategies. Finally, conclusions and recommendations for the implementation of these strategies are discussed.

**Keywords:** Collaborative learning, cooperative learning, teaching, constructivism, team work.



**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

**Resumen**

El Aprendizaje Colaborativo es un constructo que identifica un campo de fuerte actualidad, tanto en educación presencial como virtual. En primer lugar, se analizan las tres fuentes teóricas convergentes: la teoría del conflicto sociocognitivo, la teoría de la intersubjetividad y la teoría de la cognición distribuida. En segundo lugar, se presenta un modelo propio de estrategias que el docente puede implementar para desarrollar la colaboración sociocognitiva. Dicho modelo integra y sistematiza diversas técnicas de animación grupal con fines académicos desarrolladas dentro del campo del Aprendizaje Colaborativo. Precisamente es esta integración, dentro de una intención didáctica coherente y unificada, la que habilita hablar de estrategias más que de técnicas sueltas y disociadas. Se describe concretamente cada una de las estrategias, las que se refieren a seis ejes: Estímulo del diálogo, la escucha del otro y la evaluación recíproca; Colaboración para la negociación y creación de consenso; Organización de la actividad; Estudio y apropiación de la información bibliográfica; Elaboración conceptual; Escritura colectiva. Las estrategias propuestas (pensadas para estimular la colaboración entre dos, tres, cuatro y, excepcionalmente, seis u ocho estudiantes) no son las únicas posibles; se pueden combinar o asociarse con variaciones que el propio docente puede crear. Una característica de la propuesta es la estricta pautación de cada estrategia. También se alienta al docente a evaluar comparativamente los logros de aprendizaje obtenidos con cada estrategia con los obtenidos con modalidades individuales o no colaborativas. Finalmente, se exponen conclusiones y recomendaciones para la implementación de dichas estrategias.

**Palabras clave:** Aprendizaje colaborativo, aprendizaje cooperativo, enseñanza, constructivismo, trabajo en equipo.

## Introduction

### Objectives.

The present work has two main objectives: one basically theoretical and the other essentially practical. In both respects, the existing literature on collaborative learning presents problems of systematization and integration of all available information.

With respect to the theoretical aspect, it is necessary to compare the different converging conceptual sources. This is the first work´s objective. In this regard, three foundational theories are analyzed: socio-cognitive conflict theory, the intersubjectivity theory and the distributed cognition theory, also referring to the computer-mediated collaborative learning and the current group dynamics.

With respect to the practical aspect, the work proposes an integrated strategy model (later will be explained the reason for use of this term, rather than technical) that teachers can implement within a collaborative educational concept. People talk about model because they are not merely dissociative techniques, but modes of operation that all point to the development of collaboration of major educational segments or axes of all collaborative teaching: encouragement of dialogue, listening to others and mutual assessment; collaboration for negotiation and consensus-building work; organization of activity; study and appropriation of bibliographic information; conceptual elaboration; collective writing. Consequently, such strategies are not intended as individual techniques, but as part of a theoretical-practical unit covering all teaching event. The real collaborative learning involves an ideological and operational union; and in this sense, both objectives are convergent.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

**Theoretical Foundations.**

Collaborative learning is a concept that defines a theoretical and research area of great interest and strong identity. Although the issue of intellectual cooperation has a long tradition in the field of research for psychology and education (Melero Zabal & Fernández Berrocal, 1995; Roselli, 1999a; Rodriguez Barreiro, Fernández, Escudero & Sabirón, 2000; Barkley, Croos & Major, 2007; Strijbos & Fischer, 2007), regularly associated with the idea of working in a group or team, only in the decade of the 80's and specially the 90's, the idea gains a new impetus, giving rise to the epistemic field recognized as collaborative learning.

In fact, in this new version of cognitive co-participation, the term "collaboration" displaced the most traditional term "cooperation". In this sense, although there is no an absolute criteria, and even it comes to the use in an indiscriminate way, it usually sets a difference between both of them (Dillenbourg, 1999; Dillenbourg, Baker, Blaye & O'Malley, 1996; Lewis, 2003; Panitz, 1997). There exists a certain consensus that defines cooperation as a division of functions based on the distribution of the task which would lead to a second stage of assembly group. The collaboration would be, instead, a collective process from the beginning, where all of them are jointly involved for task performance. This does not imply that there cannot be a natural differentiation of roles, but this is a spontaneous emergence of interactive dynamics. According to Dillenbourg (1999), it would be a horizontal differentiation, not vertical, as in the case of cooperation.

However, the difference is deeper than the aforementioned, as recognized by Barkley et al. (2007). It involves a difference of epistemological grounds. The research on cooperation is basically Anglo-Saxon; Johnson and Slavin brothers are the most prominent representatives (the most representative titles in Spanish are: Johnson & Johnson, 1999; Slavin, 1999; Huertas, 2001, who although being a Professor at UA Madrid, makes a synthesis of these authors). In this current, the burden of education falls on the teacher, who

holds the knowledge to be learned by the students. The Cooperative work is the application, by the teacher, of group techniques aimed at achieving this goal; in that regard, its use is instrumental and complementary. Cooperation is not a widespread ideology of all teaching; it is part of the process, where the peer cooperation is used as way to strengthen learning achievements. These techniques find their ideal space in primary and secondary school. They are not intended for higher education, where the population is adult and knowledge is highly specialized. However, in recent times Spanish manuals relating to the use of collaborative techniques at university (Barkley et al., 2007; Exley & Dennick, 2007) have appeared. These manuals even appeal to this name, but the functionalist approach emphasizes its Anglo-Saxon source.

By contrast, the collaborative learning approach is part of a social constructivist epistemology (Bruffee, 1993) or using the words of Quiamzade, Mugny and Butera (2013), a "social psychology of knowledge". Knowledge is defined as a process of negotiation or joint construction of meanings, and this applies to the whole process of teaching. Although the main idea of the concept is the recognition of the value of cognitive peer interaction, collaborative learning also involves teachers and, in general, the whole context of teaching. In this sense, it is not about circumstantial application of group techniques, but the promotion of exchange and participation of each member in order to build a shared cognition.

The theoretical source of collaborative learning, neo-Piagetian and neo-Vygotskian inspiration, is quite different from the line of cooperative learning, closer to the "small groups" current and social skills. In the "collaborationist" perspective three important theories converge: socio-cognitive conflict theory, intersubjectivity theory and the distributed cognition theory (Roselli, 2007), they are an expression of the socio-constructivist boom in psychology and education.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

**Socio-cognitive Conflict Theory.**

The socio-cognitive conflict theory is part of the Social Psychology School in Geneva, responsible for its systematization, called "interactionist paradigm of intelligence". This position must be understood in the context of Piagetian thought, as a critical derivation of this. In this regard, it can be called as neo-Piagetian, despite the importance assigned to the socio-cognitive interaction by its representatives bring them to the Vygotskian perspective. In fact, it may be considered as a socio-constructivist approach (Dillenbourg et al., 1996).

For this theory, the socio-cognitive conflict is the determining factor of intellectual development. This is transmitted in the core of the social interaction, primarily in the context of cooperation between peers. The multiplicity of perspectives that converge in this type of social situations, provided they are inherently difficult and give rise to an explicit social disagreement, makes possible cognitive decentering of the subject and thereby intellectual progress.

The concept of cognitive conflict is implicit in the equilibration theory, often understood as disturbance of equilibrium in the subject-object relationship. As Coll says (1991): "In what we might call the orthodox version of Piaget, cognitive conflict appears basically as a result of lack of agreement between subject´s assimilation schemes and the verification of the corresponding physical observable means, or as a result of the internal contradictions between different subject´s schemes" (p. 116).

For Social Psychology School in Geneva, this is an individualistic idea of development. The cognitive conflict that enables operational progress is mainly social that means an exchange situation (cooperative) with others happens.

Before being single, conflict is social. It is thanks to this that the subject can overcome cognitive egocentrism (concentration in its own pre-existing schemes). Only through knowledge of other's perspectives, the subject can modify their own schemes. It is not a static knowledge, but an active negotiation with (the) other (s) to reach consensus.

**Intersubjectivity Theory.**

For Vygotsky, like for G. Mead, inter-psychological processes precede genetically to the intra-psychological processes. This implies that individual consciousness emerges due to and through communicative interaction with others. The importance of this primary social interactivity is that through it the instruments and signs of culture are "internalized". Semiotic or cultural mediation is fundamental to all human activity, whether directed towards the physical world and the social world. It is understood then why, for this current, interaction with others (and the interaction of the subject with himself) is basically dialogic because it is an interaction mediated by language and other symbolic systems. Consciousness (as intra-psychological phenomenon) emerges then from the intersubjectivity, understood as mediated communication (the inter-psychological process precedes the intra-psychological process, according to the well-known "general genetic law of cultural development", by Vygotsky).

It is important to note that this causation is not mechanical or unilateral. Several representatives of this current (Baquero, 1996; Cubero & Rubio, 2005; Rogoff, 1993[a]; Santigosa, 2005; Valsiner, 1991) emphasize the role of individual dynamism against the sociocultural environment.

For AC Theory, the sociocultural approach is not only applicable to the genetic dimension of early development (formation of primary consciousness), but also the whole linking and communicative context where personal psychological growth is at stake through levels of learning (cultural appropriation). Collaborative work is undoubtedly and in a


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

privileged mode, one of these contexts. In this case, the relationship with others does not imply only the confrontation of different point of views, but the possibility of building a real intersubjectivity from the convergence of individualities, where collective is irreducible to individual. The significance of this intersubjective construction in collaboration falls on the significant achievements and resulting individual cognitive progress.

In the neo-Vygotskian collaborative learning approach, the value of socio-communicative experience not only falls on the access to a plurality of perspectives, but on the benefits that entail social coordination itself: the scaffolding and mutual aid, reciprocal stimulation, the expansion of the scope of action or representation, the complementation of roles and intersubject controls of contributions and activities.

The most renowned representatives of this line are, undoubtedly, Cole, Valsiner, Rogoff, Perret-Clermont (in his second season), Wretch and Cazden (all participants of the most important foundational work of this group: "Perspectives on Socially Shared Cognition" [Resnick, J., Levine, J. & Teasley, S., eds.], published by the APA in 1991). In Spanish one cannot fail to mention the special article called Infancia y Aprendizaje (Childhood and Learning), No. 27-28, edited on the 50th anniversary of the death of Vygotsky, which includes three chapters that specifically relate to peer learning: one belonging to Coll, the other to Forman-Cazden and the last one to Webb.

**Distributed Cognition Theory.**

This current is highly heterogeneous and, therefore, it does not lead to a theory in the strict sense and each author in this position does not make a systematic theoretical formulation either. In fact, the intention of the approach is descriptive and pragmatic rather than explanatory.

This heterogeneity is from a position very close to the sociocultural approach (for example, Cole and Engeström) and the situated cognition (Lave, Suchman), until one closer to social- cognitive systemic processing models (Hutchins, Dillenbourg).

The concept of distributed cognition emerges as a critical posture in cognitive psychology and, even more, in cognitive science. The essential idea is that information processing is performed on a human scale; it is not an exclusively individual, mental or internal phenomenon. Human cognition is integrated into the social and cultural context in which it happens (in this sense, it is about situated cognition) and, therefore, cognitive functioning should not be considered in terms of individual conscience, but "distributed" in the environment of tools and involved social agents. This implies that the group can be considered as a unit of cognitive functioning, that is, a cognitive system. But this system also includes, as elements of the system and not as mere external context, concurrent technologies and instruments. The environment, says Perkins (2001), "is truly a part of thinking" (p. 136). So, it is acceptable to say, for example, that a student *thinks with and through* his book.

Following this author, it is appropriate to distinguish between physically distributed cognition (notes, folders, calculators, and computers), the socially distributed cognition (teams or working groups, organizations) and symbolically divided cognition (diagrams, concept maps, graphics).

Some authors emphasize the social distribution of cognition (Hutchins, 1991; Dillenbourg & Self, 1992; Minsky, 1986). In this regard, Resnick says (1991): "The metaphor of cognitive systems as social systems... makes the cognitive science community more open than a decade ago to the idea of knowledge as distributed through several individuals whose interactions determine decisions, judgments and troubleshooting" (p. 3).


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

It should be noted that the concept of distributed cognition is developed as a way to address the study of human-computer interaction (Hollan, Hutchins & Kirsh, 1999; Dillenbourg et al., 1996). This approach consists in considering the user-system interaction as a socially distributed process. The idea of extensible cognitive system beyond the purely individual, allows defining the group as a processing system, where individuals would be considered as agents or components thereof. A cognitive system becomes a society of agents, regardless of who they are (neurons, individuals, subgroups). This analogy between individual cognition systems and social cognition systems draws no little criticism (Nickerson, 2001), but there is no doubt about its heuristic value.

In this context, the relationship of this approach with the so-called "new connectionism" is understandable. We refer to the Parallel Distributed Processing (PDP), and more specifically the computational model of neural networks, which is useful for understanding the collective processing events. The use of these models allows, among other things, the simulation of distributed cognition systems, by handling several degrees of complexity (Bruno, 1999).

**Other Sources.**

The aforementioned theoretical sources are the expression of the strong rise of the constructivist and social-constructivist perspectives in psychology and education, which put the emphasis not only on the result of cognitive association, but on the process of negotiation and construction of shared meanings. But we must also take into account the current strong development of information and communications technology, which created an own research sector: the computer supported collaborative learning (known in Spanish as "ACMC",), more specific expression of computer mediated communication (CMC). The fruitfulness of it has even generated serious works aimed at providing a synthesis of the contributions and systematization of the field (Dillenbourg, Baker, Blaye & O'Malley, 1995; Dillenbourg & Schneider,

1995; Rodríguez Illera, 2001; Valcke & Martens, 2006; Weinberger et al., 2007; Beers et al., 2007).

In general, there is a consensus that the application of existing communication technologies to education involves strengthening a cooperative conception of learning, in other words, socio-constructivist (Gros Salvat, 2002; Kanselaar, Erkens, Jaspers & Schijf, 2001; Kirschner, 2001; Koschmann, 1996).

It would not be fair to finish this list of background of the subject without making a reference to the group Dynamics Current, which in the 60's had a strong development, especially in relation to dynamic psychology (remember the "operative groups", the "T-groups" and the "therapeutic groups"). It should be also kept in mind that the uncritical and abusive use of group techniques in education in those years caused a significant loss of prestige, especially as the emphasis on the socio-relational as emotional aspects overlooked the specific cognitive aspects that are essential to school learning (which does not happen with the current trend of collaborative learning). Anyway, working with groups, an heir of that tradition psychosocial dynamics, never lost validity in the organizational, social work, health and community education fields (García et al., 2008).

**Strategies for Cooperation Development.**

The contemporaneous boom of socio-constructivist currents on education and, more specifically on collaborative learning, is sometimes more rhetorical than real, giving rise to ingenuous, spontaneous and abstract postures of what cognitively accompanied work involves. It is thought that social condition is a primary and natural datum of human development and, therefore, there is a spontaneous disposition of students to available sociability. It is not taken into account that the individuality "habitus" is very rooted in educational institutions, mainly regarding academic learning and knowledge appropriation. Acting in coordination with others, creating


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

consensus, availing others' points of view, are treated as good social abilities concerning sociability and cohabitation development, but much less with intellectual appropriation. The subject of (academic) learning is the individual; sometimes it is difficult to understand that it may be an idea of collective cognitive subject.

When you try to break individualist teaching-learning inertia, it is usually and ingenuously believed that it is sufficient to create horizontal connectivity situations between students to achieve effective learning. This conception is erroneous. Socio-cognitive collaboration may and should be developed as a competency itself (Roselli, 1999b). Teachers should teach how to effectively work within a collaborative environment, and they should do so by using intentionally planned and more guided specific strategies. More specifically, the work proposes an integrated strategy model the teacher may use in different times of the teaching process. These strategies refer to different aspects (axes) that are regularly involved in every teaching-learning knowledge process: interaction with others, negotiation and preparation of consensus, organization of activity, information appropriation, conceptual elaboration, communicative writing. They are not the only ones; every teacher can build their own repertoire from these guiding references. Moreover, not all of them should be introduced abruptly and by blocks. It is desirable to have a progressive introduction, without overlooking the fact that the final objective should be the implementation of a comprehensive collaborative didactic model, and not the use of certain random and temporary collaborative strategies. The idea of collaborative learning involves a general transformation of didactic attitude, that is, a change in foundations themselves on teaching and learning. For this reason, it is preferable to talk about strategies for collaboration development and not simply techniques (as usually defined within the Anglo-Saxon environment). It should not be forgotten that, by definition, strategy is a wider construct than technique; techniques are selected based on strategies. Techniques themselves are a boat lacking direction.

**Idea of Collaborative Didactic Model.**

Although this matter was previously referred to, it is not unnecessary to reiterate the sense of model concept within this work concept. A model means mainly integration of parts as a coherent whole. A model is a conceptual construction purported to be used as an action guide and orientation. It is mainly a formal entity that enlightens the practice, but it is not the practice itself. For this reason, it is not a rigid and closed rule, but a sufficiently flexible guide to operate in various didactic contexts. Talking about model the most important thing is coherence and conception unit. This is the main difference between integrated collaborative model-based didactics (that is, an authentic collaborative didactics) and didactics that not only use temporary collaborative techniques to make learning more dynamic or achieve specific purposes in a teaching phase. Anglo-Saxon literature contains several references to this pragmatic application of collaboration (Barkley, Croos & Major, 2007), but this work proposal goes beyond. This is a proposal for structural change in didactic model, not only in procedural techniques. For this reason, we talk about strategies, accepting that, even though the next listed proposals include a technical dimension, they are not limited to it, that is, they integrate into a conception that defines action guidance rather than specific procedures (and only that).

In short, all strategies of the proposed model have a *leit-motiv*, in the sense that they are targeted to recover and develop the socio-cognitive link, coordination with others, co-participation in conceptual construction and learning of community action. Progressive implementation of these strategies finally leads to the realization of a coherent and authentic collaborative didactic model. In other words, the strategy model is presented in a route of entry for the development of a collaborative didactic model.

The model presented above is part of an action research project currently implemented in several universities in Argentina. The basic project idea is to make a progressive and gradual transformation of didactic


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

teaching model, passing from a fundamentally instructive-individualist model to another comprehensively collaborative model. In other words, by applying the strategy model proposed, we try to advance towards the implementation of a didactic model with an entirely collaborative identity (theoretical and practical). The option for university level is not casual. At this level, teachers have more autonomy to make fundamental changes. On the other hand, collaboration in learning situations needs a significant dose of self- regulation, critical sense and maturity by students, mainly in order to understand the sense of didactic intention attempted to be implemented, exceed resistances and achieve necessary adhesion.

## Model of Strategies Applicable in University Teaching.

The proposed strategy model of Collaborative Learning is shown below. These strategies are classified according to the socio-cognitive aspect they are purported. It should be taken into account that all these strategies are thought to be applied in person, but it is possible to adjust them for application in virtual environments, resorting to several communication technologies. In fact, there are significant computer program developments specifically designed for socio-cognitive collaboration.

### Strategies for Promoting Dialogue, Listening to Others and Reciprocal Evaluation.

#### *Chain Brainstorming or exchanging of ideas.*

Objective: Promotion of expressiveness, spontaneous communication and participation.

Description:

- Groups of eight subjects.
- The teacher proposes a subject, of empirical significance, in relation to the issue.
- Every subject, in a round, writes a short phrase and write it sequentially in a group board.

- The round is reiterated three times.
- Each group board is collectively compared.

***Mediated opinion transmission.***

Objective: Faithfull listening transmission.
Description:

- Groups of four subjects.
- Fact or problem given by the teacher, in each tetrad, S1 gives an opinion to S2, and S2 does the same with S1. At the same time, S3 gives an opinion to S4, and S4 does the same with S3.
- Then, third-party messages are re-circulated among S1 and S3, and S2 and S4, and among S1 and S2, and S3 and S4.
- Finally, each subject writes an opinion from others based on what was transmitted.
- Joint assessment in each tetrad and group-class assessment.

***Reciprocal peer assessment.***

Objective: Stimulation of other's assessment.
Description:

- In pairs.
- Each subject corrects and assesses written answer(s) (of an exercise) of their alter, at his/her discretion.
- Based on the correct model shown by the teacher, each one is corrected by a member of another couple or both.

***Assessing commission.***

Objective: Promote collective assessment criteria and inter-subjective control stimulation.
Description:

- Groups of four subjects.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

- Each group subject production is assessed by a peer committees (members of another group), who issue a written opinion.
- Four subjects under evaluation compare and discuss their opinions.
- Each subject counter-argues or responds to the evaluation received.
- The teacher sets out their expert criterion in general, solving particular conflicts.

***Participation symmetry.***

Mandatory alternation of participation.
Objective: Participation equity maintenance
Description:

- Groups of four subjects.
- The group performance participation is regulated so that each subject, following a mandatory sequence, must make a contribution or solve an item.
- Inputs are registered in a group board.
- Technique may be completed with the assessment of each input, in a mandatory sequential order.

Participation quota.
Objective: Equitable participation dosing.
Description:

- Groups of four subjects.
- Each subject has a certain participation quota, that may be freely administered, but at the end of the task, it should have been used.
- If, during task development a subject failed to use the whole quote, they shall have a mandatory credit for the next task.

**Collaboration Strategies for Negotiation and Consensus Creation.**

***Patterned critical discussion.***

Objective: Exchange and clash of ideas promotion.
Description:

- Groups of four subjects.
- In relation to a given problem, each one prepares his own arguments and, in turn, submits them to the group.
- The other members support or reject.
- The subject exercises his right of objection.
- Finally, among all of them, four positions are arranged and classified.

***Critical debate with position alternation.***

Objective: Development of the capacity to put oneself in someone´s place.
Description:

- In pairs.
- In a discussion (e.g.: experimentation with stem cells), each subject of the group-class spontaneously argues or defends a position (orally or in writing).
- Based on the products, the teacher associates subjects of different opinions and requests a change in roles, so that each subject should look for arguments contrary to their spontaneous opinion.
- The alter comments and extends arguments.

*Variant*: Pairs are formed by similar opinions, so they should arrange a common argument.

***Collective weight of alternatives in a decision-making situation.***

Objective: Development of the group analytical capacity.
Description:


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

- Groups of four subjects.
- In view of a decision-making situation given by the teacher, list all possible alternatives, ordering them hierarchically.
- Select top alternatives of the ranking and give details about pro and cons of each.

***Round table with a moderator and preparation of agreed conclusions.***

Objective: Capacity to bring positions closer and create consensus.
Description:

- Groups of four subjects plus one more.
- In an issue given by the teacher, each subject makes a brief dissertation in front of the group-class.
- A moderator brings positions closer and prepares agreed conclusion, he writes and reads them to the group for approval.
- Each subject shall be a moderator in other groups.

***Commented conference.***

Objective: Criticism and perspective extension stimulation.
Description:

- Groups of four subjects.
- A subject of the group prepares and makes a dissertation in front of the group-class.
- Other two subjects of the group, upon reading the dissertation in advance, make a critical comment, which is also exposed in the class.
- A fourth subject acts as a moderator and promoter of agreed conclusions.
- In successive occasions, roles should be exchanged.
- The other groups discuss for a short time, and a representative of each makes a comment or a complementary reflection.

***Discussion group with observers ("fish tank").***

Objective: Social meta-cognition stimulation.
Description:

- Groups of four debaters and four observers.
- Four debaters consider the issue proposed.
- Four members of the other group act as observers.
- After discussion, four observers make an analysis on socio-cognitive exchange.
- Then, functional rotation of both groups.

**Activity Organization Strategies.**

***Performance of theoretical or bibliographic mini-research papers.***

Objective: Development of capacity to organize himself and organize joint conduction of a task of certain complexity. Activity systematization.
Description:

- Groups of four subjects.
- Based on the issue proposed by the teacher, divide the task according to these functions, distributing them among its members: a) search in bibliographic grounds on line and in webpages, b) search in libraries and bookstores, c) specialist and expert interviews, d) consultation to experts via email.
- Based on partial reports drafted by responsible members, prepare a single report that will be orally exposed to the group-class.

***Performance of exploratory empirical mini-research papers.***

Objective: the same above, but, in this case, the task is more complex.
Description:

- Groups of four subjects.
- Based on the issue proposed by the teacher, divide the task according to these functions, distributing them among its members:


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

  - Information from secondary and tertiary sources: a) bibliographic search, b) interviews with specialist and qualified witness, c) search of statistical data and documentary material.
  - Information from primary sources: a) field observation, b) questionnaire application, c) interviewing.
  - Information processing and assembly.
  - Drafting of a single report that will be orally exposed to the group-class.
- All members should participate (even partially based on function division) in activities of items A, B, C and D.

**Strategies of Bibliographic Information Study and Appropriation.**

***Reciprocal teaching ("puzzle" or "jigsaw classroom").***

Objective: Development of the tutorial function.
Description:

- Groups of four subjects.
- One member (rotating function) is called by the teacher, creating an ad-hoc group with all selected members from each group.
- The teacher works intensively with them a bibliographic material.
- Subsequently, each student returns to his group and shows that bibliographical material to its three other peers through directed reading for a situation.
- The peer-tutor answers questions and ensures a correct understanding of peer-students.
- Finally, with the peer-expert tutorial, the remaining three make a conceptual synthesis answering a series of guide-questions.
- The role of peer-tutor rotates according to the bibliographic sequence.

***Home study.***

Objective: Systematization in class of the home bibliographic reading.
Description:

- Groups of four subjects.
- The teacher assigns in advance the bibliographic material and a reading guide, and requires an individual home reading.
- The appointed day, the teacher assigns a certain time for individual re-reading, then implements a revision phase per pair by using the reading guide.
- Finally the two pairs of each group meet and perform a conceptual synthesis, responding a series of guide questions provided by the teacher.

***Group development of reading comprehension.***

Objective: Develop Reading comprehension through the exchange and intersubjective consensus.
Description:

- Groups of four subjects.
- From a conceptual-expository text, produce in groups:
  - A brief summary (variable length).
  - Thematic title (alternative if any).
  - Recognize the main ideas, differentiating from peripheral ones.
  - Recognize the structure (parts, sub-items, levels of analysis, argumentative sequence).

**Conceptual Development Strategies.**

***Comparison in pairs of class notes and joint development of an improved version.***

Objective: Improving the retrospective understanding through interpersonal verification and mutual comparison of class records. Stimulation of cognitive decentralization.
Description:

- In pairs.
- It is explicitly required that everyone takes class notes.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

- Then, each student is associated with an alter, completing both a comparison between the two notes.
- As a result, each pair creates an improved version.
- Some pairs presents their findings to the group-class with teacher comments.

***Thematic integration (bibliographic) in pairs.***

Objective: Development of conceptual integration skill
Description:

- In pairs and groups of four subjects.
- Each pair is responsible for performing the required thematic integration (based on different sources of information) by using a guide, a text shall be also produced.
- Then each pair meets with another to jointly evaluate both productions, developing a new writing.
- This is corrected by the teacher and returned for group consideration.

***Circulation of questions and answers.***

Objective: Develop the ability to formulate relevant and core questions regarding thematic content.
Description:

- Groups of four subjects.
- Each group proposes the main questions that should be made for a student to know the degree of mastery of a topic.
- Each group´s questions are answered by another group (random order).
- Each group in charge of making questions evaluates the answers given by the other group.
- All groups make questions and give answers.
- Finally, the teacher assesses the group evaluations.

***Preparation of conceptual organizers in Groups.***

Objective: Stimulate creativity and power of conceptual synthesis.
Description:

- Groups of four subjects.
- After a thematic development, each group interactively develops:
- Thematic diagrams and synoptic charts.
- Conceptual maps.
- Each group compares its production with another group.

**Collective Writing Strategies.**

***Division of functions in the writing of a collective report.***

Objective: Systematize the complex activity related to a collective writing.
Description:

- Groups of four subjects.
- Agree on the structure and points, conceptual ideas or items that will have to be reported, completing a short list of them.
- Divide the functions for writing: a subject will recover the idea (that can be explained among all members), someone else will dictate and another will write. The fourth subjects will monitor the process.
- The final text will be read and edited by everyone.
- Depending on the type of information, the roles can be switched or not.

***Compatibility of individual texts to produce a collective test.***

Objective: Develop the analysis and synthesis capacity in comparing texts.
Description:

- In pairs.
- Agree on the structure and points, conceptual ideas or items that will have to be reported by listing them.
- Each subject writes their own text.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

- Individual writings are compared in pairs and a new agreed text is generated. One of the texts can be used as a basis for writing.

## Conclusions

The Collaborative Learning Theory is the most representative expression of educational socioconstructivism. Actually, it is not a unitary theory, but a set of theoretical lines that highlight the value of socio-cognitive constructive interaction and coordination among trainees. Three of these currents deserve special reference as being the basic sources of the Collaborative Learning Theory: the neo-Piagetian socioconstructivism or sociocognitive conflict theory, the neo-Vygotskian approach of intersubjectivity and the model of distributed cognition or network thinking. These three currents can be placed in an "individual-group" axis, as the emphasis is placed on the individual or collective interaction as such. The order in which they have been named defines the respective location on the axis.

The Sociocognitive collaboration requires learning: that means, it can and should be taught. The teacher is responsible for students to learn to work effectively among them, transforming the classroom into a teaching-learning community. In this sense, the teacher has a variety of strategies that can be implemented at different levels, depending on different types of task (Roselli, 2011). The most important here is to understand that it is not only about random pedagogical training resources for collaboration and less than mere group animation techniques; it is a proposal for a new educational model that leverages academically, effectively, the natural sociability of the institutional context of teaching, basically collective. This educational model includes working in groups, but not only that. Collaborative educational scheme goes beyond the mere collectivism (complete all in group); it includes and maintains individual levels and connects the own learning with others.

The model offered in this work is not the only possible one; it is only a reference from which each teacher builds on his work (depending on the episteme, individual character, the characteristics of their students and the institutional framework).

The most rewarding and motivating thing is that the teacher raises it as a participatory action- research pedagogical innovation, involving faculty and students (Roselli, 2008). In this context, it may even implement non-collaborative (comparative) control conditions. It can also implement comparative levels between non- patterned and patterned group work forms by the teacher in advance, as a way to ensure an effective organizational scheme, whose absence commonly makes collective coordination difficult.

Another relevant problem is the resistances to change, especially the hidden ones. These can come from teachers themselves or declaratively involved in collaborative learning experience, as well as students. Collaborative schemes inspire both by the innovative mark posed and because the rescue of sociability creates a better working environment, but imply new and very rigorous demands of work and performance (preparation of materials, fulfillment of the tasks entrusted, timeliness, single adequacy to collective operation), not everyone gets to understand the facts. Institutional regulations do not often help a lot. The background of these resistances is undoubtedly individualistic culture that, beyond declarations, permeates educational institutional settings. In this sense, the implementation of collaborative strategies should be progressive, consensual and accompanied by a permanent critical reflection of the achievements.


**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

## References

Baquero, R. (1996). *Vigotsky y el Aprendizaje Escolar*. Buenos Aires: Aiqué.

Barkley, E. F., Croos, P., & Major, C. H. (2007). *Técnicas de aprendizaje colaborativo*. Madrid: Morata.

Beers, P.J., Boshuizen, H.P., Kirschner, P. A., & Gijselaers, W. H. (2007). The analysis of negotiation of common ground in CSCL. *Learning and Instruction, 17*, 427 – 435.

Bruffee, K. A. (1993). *Collaborative Learning: Higher education, interdependence, and the authority of knowledge.* Baltimore, MD: Johns Hopkins University Press.

Bruno, M. (1999). La cognición socialmente distribuida como forma particular de procesamiento distribuido en paralelo. *Revista IRICE*, *13,* 135-143.

Coll, C. (1991). *Aprendizaje Escolar y Construcción del conocimiento*. Buenos Aires: Paidós.

Cubero, M., & Rubio, D. (2005). Psicología histórico-cultural y naturaleza del psiquismo. En M. Cubero & J. Ramírez (comps.), *Vygotsky en la Psicología Contemporánea*. Buenos Aires: Miño y Dávila.

Dillenbourg, P., & Self, J. (1992). A computational approach to socially distributed cognition. *European Journal of Psychology of Education, 7,* 353-372.

Dillenbourg, P., Baker, M., Blaye, A. & O´Malley, C. (1995). The evolution of research on collaborative learning. En P. Reimann y H. Spada, *Learning in Humans and Machines. Towards an Interdisciplinary Learning Science* (pp. 189-211). London: Pergamon.

Dillenbourg, P., & Schneider, D. (1995). *Collaborative learning and the Internet*. TECFA, University of Geneve. Recuperado de http://tecfa.unige.ch/tecfa/research/CMC/colla/iccai95_1.html.

Dillenbourg, P., & Self, J. (1992). A computational approach to socially distributed cognition. *European Journal of Psychology of Education*, *7*(4), 353-371.

Dillenbourg, P., Baker, M., Blaye, A., & O´Malley, C. (1996). The Evolution of Research on Collaborative Learning. En P. Reimann y H. Spada (Eds). *Learning in Humans and Machines. Towards an Interdisciplinary Learning Science* (pp. 189-211). London: Pergamon.

Dillenbourg, P. (1999). What do you mean by collaborative learning? En P. Dillenbourg (Ed.) *Collaborative-learning: Cognitive and Computational Approaches*. Amsterdam: Elsevie Science.

Exley, K., & Dennick, R. (2007). *Enseñanza en Pequeños Grupos en Educación Superior. Tutorías, Seminarios y otros Agrupamientos*. Madrid: Narcea.

García, D., Robles, C., Rojas, V., & Torrelli, A. (2008). *El trabajo en Grupos. Aportes teóricos e instrumentales.* Buenos Aires: Espacio.

Gros Salvat, B. (2002). Constructivismo y diseños de entornos virtuales [Constructivism and the design of virtual environments]**.** *Revista de Educación, 328*, 225-247.

Hollan, J., Hutchins, E., & Kirsh, D. (1999). Distributed cognition: a new foundation for human-computer interaction research. Recuperado de www.HCI.UCSD.EDU.

Huertas, J. A. (2001). *La interacción en el aula. Buenos Aires: Aique.*

Hutchins, E. (1991). The social organization of distributed cognition. En L. Resnick, J. Levine and S. Teasley (ed.), *Perspectives on Socially Shared Cognition.* Washington: American Psychological Association, pp. 283-307.

Johnson, D., & Johnson, R. (1999). *Aprender Juntos y Solos*. Buenos Aires: Aiqué.

Kanselaar, G., Erkens, G., Jaspers, J., & Schijf, H. (2001). Computer supported collaborative learning (Essay review). *Teaching and Teacher Education, 17*, 123-129.

Kirschner, P. (2001). Using integrated electronic environments for collaborative teaching /learning. *Research Dialogue in Learning and Instruction, 2*, 1-9.

Koschmann, T. (Ed.). (1996). *CSCL: Theory and practice of an emerging paradigm*. Mahwah, NJ: Lawrence Erlbaum Associates.



**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90

Lewis, R. (2003). Pourquoi apprendre à collaborer. En C. Bernadette & D. Peraya (Eds). *Technologie et Innovation en Pédagogie. Dispositifs Innovants de Formation Pour l`Enseignement Supérieur.* Éditions De Boeck Université: Bruxelles, cap. 10, pp. 137-139.

Melero Zabal, M., & Fernández Berrocal, P.(1995). El aprendizaje entre iguales: El estado de la cuestión en Estados Unidos [Peer learning: the state of the art in USA]**.** En: P. Fernández & M. Melero (Eds.), *La Interacción social en contextos educativos* (Cap. 2, pp. 35-98). Madrid: Siglo XXI.

Minsky, M. (1986). *La Sociedad de la Mente*. Buenos Aires: Ediciones Galápago.

Nickerson, R. (2001). Algunas reflexiones acerca de la distribución de la cognición. En G. Salomón (ed.), *Cogniciones Distribuidas*. Buenos Aires: Amorrortu.

Panitz, T. (1997). Collaborative versus cooperative learning –a comparison of the two concepts which Hill help us understand the underlying nature of interactive learning. *Cooperative Learning and College Teaching* [artículo en línea], *8*(2) Recuperado de www.ufv.br/dpe/edu660/textos/t14_aprend_colab_def.rtf

Perkins, D. (2001). *La Escuela Inteligente*. Barcelona: Gedisa.

Quiamzade, A., Mugny, G., & Butera, F. (2013). *Psychologie Sociale de la Connaissance*. Grenoble : Presses Universitaires de Grenoble.

Resnick, L. (1991). Shared cognition: thinking as a social practice. In L. Resnick, J. Levine & S. Teasley (eds.), *Perspectives on Socially Shared Cognition* (p. 1-20). Washington, DC: American Psychological Association.

Rodriguez Barreiro, L., Fernández, R., Escudero, T. & Sabirón, F. (2000). La investigación sobre el aprendizaje colaborativo: Enfoques, métodos y resultados [Collaborative learning research: approaches, methods and results]**.** *Anuario de Pedagogía, 2*, 305-338.

Rodriguez Illera, J. (2001). Aprendizaje colaborativo en entornos virtuales [Collaborative learning in virtual environments]**.** *Anuario de Psicología, 32*(2), 63-75.

Rogoff, B. (1993). Children's guided participation and participatory appropiation in sociocultural activity. In R. Wozniak & K. Fisher (eds.), *Development in Context*. Hillsdale, NJ: LEA, pp. 121-153.

Roselli, N. (1999a). *La Construcción Sociocognitiva entre Iguales*. Rosario: IRICE.

Roselli, N. (1999b). El mejoramiento de la interacción sociocognitiva mediante el desarrollo experimental de la cooperación auténtica. *Interdisciplinaria, 16*(2), 123-151.

Roselli, N. (2007). El aprendizaje colaborativo: fundamentos teóricos y conclusiones prácticas derivadas de la investigación. En: M.C. Richaud y M.S. Ison, *Avances en Investigación en Ciencias del Comportamiento en Argentina*. Capítulo 18, Tomo I, pp. 481-498. Editorial de la Universidad del Aconcagua: Mendoza.

Roselli, N. (2008). La disyuntiva individual-grupal. Comparación entre dos modalidades alternativas de enseñanza en la universidad. *Revista Ciencia, Docencia, Tecnología, 36,* 87-120.

Roselli, N. (2011). Diferencias en el proceso de construcción colaborativa a través del chat según el tipo de tarea. *Revista de Psicología*, *29*(1), 3-36.

Santigosa, A. (2005). La noción de interiorización desde una visión cultural del desarrollo. En M. Cubero & J. Ramírez (comps.), *Vygotsky en la Psicología Contemporánea*. Buenos Aires: Miño y Dávila.

Slavin, R. (1999). *Aprendizaje Cooperativo*. Buenos Aires: Aiqué.

Strijbos, J., & Fischer, F (2007). *Methodological challenges for collaborative Learning Research*, *17*(4), 389-464.

Valcke, M., & Martens, R. (2006). The problem arena of researching computer supported collaborative learning: Introduction to the especial section. *Computer & Education, 46,* 1-5.

Valsiner, J. (1991). Building theoretical bridges over a lagoon of everyday events. A review of apprenticeship in thinking: cognitive development in social context by Barbara Rogoff. *Human Development*, *34,* 307-315.

Weinberger, A., Stegmann, K., & Fischer, F. (2007). Knowledge convergence in collaborative learning: Concepts and assessment. *Learning and Instruction, 17*, 416-426.



**Propósitos y Representaciones**
Ene.-Jun. 2016, Vol. 4, N° 1: pp. 219-280.
http://dx.doi.org/10.20511/pyr2016.v4n1.90