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Methodological Confluence to Understand Flor De Ceibo

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Abstract

From 2007, Uruguay implanted a policy of Information and Communication Technology – ICT, which has three important features: i) universality in public education; ii) provision of computers for all students in primary and secondary education; iii) free access to ICTs for all families in the country. Learning, electronically mediated, is not restricted to the educational institutional environment because the insertion of telematics in everyday life is also promoted. In this scenario the Universidad de la República (UdelaR) creates Flor de Ceibo (FDC), a project that has two main objectives: i) to contribute to the training of college students committed to the reality of the country; ii) to collaborate with the development of this policy, generating spaces of learning and intervention. Professors guide a group of students from different degrees to work on telematics mediation in schools and communities. The research problem is to identify educational processes in line with the emergence of interactivity, considering a new communication dimension in relation to knowledge construction. It is assumed that relations with the knowledge and processes of construction and socialization of knowledge, in Multireferential Learning Environments mediated by ICTs, are tools that enhance new ways of learning for a intercultural citizen. To approach to the problem of study and to answer any of these questions is used the network analysis and the multireferential ethno research.

Keywords: ICT, Multireferential learning environments, Network analysis, ethno-research

1. Introdution

From 2007 Uruguay implemented a policy of Information and Communication Technology, ICT, which has three important characteristics: i) universal public education; ii) provision of computers for all students in primary and secondary education; iii) free access to ICTs for all families in the country. Thus learning, electronically mediated, is not restricted to educational institutional environment generated by the implementation of Ceibal Plan, because enables the use of the resource in the learning process and promotes the insertion of telematics in everyday life. Ceibal Plan and definitively the pedagogical proposal of Negroponte: One Laptop One Child (OLPC), are based on the idea of an information society characterized by a socio-technical economic level of development where knowledge is considered a supreme value. This enhancement of knowledge has affected the relations of production, work organization, social structure, mobility within that structure, and of course, ways to build and circulate knowledge itself. As a result of the implementation of Ceibal Plan in Uruguay, between years 2006-2009, the number of computers in households increased from 19% to 44%; internet access triples. Data from a study conducted in 2009 by the Ceibal Center[3] show that 87% of interviewed children report that they teach to use computers in their homes, especially their parents (73%), siblings (46%), others children (42%) and even teachers (9%). These numbers show forms of socio-constructivist learning in interactive and collaborative environments.

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[3] ‹http://www.ceibal.org.uy/docs/evaluacion_educativa_plan_ceibal_resumen.pdf› Access on: 19 Fev. 2012.

In this scenario the Universidad de la República (UdelaR) creates Flor de Ceibo (FDC), a project that has two main objectives: i) to contribute to the training of college students committed to the reality of the country; ii) assist with the development of that policy, creating inter/transdisciplinary training and intervention space. In FDC each teacher guides a group of students of different degrees to work on telematics mediation in schools and communities of the country. The integration of teachers and students from different areas of knowledge has enabled different ways of approaching to the territory, however in all groups is possible to identify three phases of work: diagnosis intervention and closing/assessment. At the Interdisciplinary Space (IS) of UdelaR, telling the teaching experience in FDC, Cisneros and Casnati (2010) specify the nature of relationships with communities based on participation, interaction and dialogue of knowledge. The authors consider that these are fundamental attributes to understand and agree with communities in relation to their need or demands, thereby complying with the objectives of the Project. Thus FDC seeks to learn, follow and use the experience to create spaces for reflection to facilitate the understanding of this complex reality; also emphasizes the relationship with the communities supported by interactivity and participation in activities and thus activities acquire a strong interdisciplinary[4] and multireferential emphasis[5]. The multireferentiality is favored as a result of the integration of groups of students and teachers with disciplinary knowledge and different formations. The performance of teachers working in a structure constituted by Territorial Tables also facilitates mutual learning and development of innovative activities (Casnati, 2009). The Territorial Tables are constituted by a set of teachers related to geographical territories where they operate; FDC define three tables: Centre Table with an axis that articulates the central, northern and north coast regions; East Table is linked to the south and east, and West Table tied to the south-west region. As a result FDC can be defined as a complex system, which configures a multireferential learning environment[6], which has specific features of these systems: is a heterogeneous combination of sets which are made up of similar parts which in turn also have differences; however such parts remain functionally interconnected. To understand these processes multiple viewpoints and knowledge are required. The instigative and dynamic work generates interest and many questions about the Information and Communication Technology (ICT) and its relation to education. Face to the attitudes of wonder, censorship and pure instrumental use that schools adopt with ICT, there is need to take, upon recognition of the phenomenon of interactivity as a new communicative dimension, the challenge that demands what may be called technicality of today's media culture: cyberculture[7].

As a result of these reflections, the research problem is to identify educational processes in line with the emergence of interactivity, considering it a new dimension of communication in relationships with knowledge and the construction of knowledge. It is assumed that relations with the knowledge and processes of construction and socialization of knowledge, in Multireferential Environments of learning mid by ICTs, are tools that enhance new ways of learning for an intercultural citizen who resists and creates. Some questions arise: college students in the Uruguayan educational context are building a counter-hegemonic form of learning, dealing with knowledge oriented by telematics interaction, cultural scenario dictated by the market and informational capitalism? How is this supposed new way? To approach the problem of study and to answer any of these questions is used the network analysis and multireferential ethno-research.

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[4] -Interdisciplinary, for Susana Mallo (2010) is a way of knowing, means developing specific strategies to build a cognitive process which is under study touching thus an object of study in an integral way, giving quotas of knowing that exceeds the disciplinary sum required to investigate the object of study defined.

[5] -The multireferentiality (Ardoino, J. 1998) is a response to the complexity of social and educational situations to explain intentionally in a rigorous way, a plural, dodge, diverse and complex reality as a potential alternative of resistance to the socio cognitive segregation (Froes Burnham, T., 2012)

[6]- -This paper considers that the environment appears as a result of interaction of subjects in their natural context and enables a dynamic conception of educational activities. Think educational environments from multireferential perspectives enriches the epistemological interpretations, enabling new possibilities for study, seeking emerging events, coordinating and creating new units of analysis from a conceptual framework to help better to understand the phenomena of building knowledge and relationships with knowledge.

[7]- Lévy (1999) defines the neologism "cyberculture" as a set of techniques (material and intellectual), practices, attitudes, ways of thinking and values that are developed together with the growth and evolution of cyberspace. Lévy (1999) defines cyberspace as a new medium that arises from the global interconnection of computers.The term refers to the physical infrastructure of digital communication and the oceanic world of information found there, as well as humans who sail and feed this universe. Lemos (2002) believes that cyberculture is the result of socio-cultural impacts of microcomputers that arises in the mid 70s influenced by the American counterculture of resistance to technocratic power; microcomputer motto is: "computer for the people".

2. Methodology of Network Analysis

Expressions like social networks, communication networks, "be on the network" refer to a term that by its frequency of use seems to characterize better than any the contemporary world. It is difficult, indeed, to find a representation that suits social relations interconnected by electronic means as suggesting the network image. Social networks are defined as a particular set of actors (individuals, groups, organizations) linked from a relationship or set of social relations. The study of the motivations, goals, passions that articulate those ties and the idea of describing the society in terms of networks is consolidated with the attempt to overcome the limitations of the structural analysis and study behaviors non-institutionalized. From the point of view of social theory it has been sought links with different theoretical bodies like action theory, exchange theory, role theory. Whitten and Wolfe (1988) indicate that network analysis born after the Second World War linked to the need of academics in anthropology and sociology to check the structural concepts. On the other hand, which is a relatively recent development, is the contribution of the Social Network Analysis as a tool to help to verify empirically, through methods more or less precise, the nature of relationships and the structural nature of the networks. Due to the development of computer technology, graph theory and advances in fields of algebra and topology, SNA has generated a methodology where the systematic analysis of the empirical data has elucidated the nature and dynamics of the linkages into a social network. The study of networks used in interdisciplinary research, facilitating the understanding of problems that need to be resolved through the contribution of disciplines such as Sociology and Psychology, Sociology and Geography, Sociology and Epidemiology. In this study the relationship is between Sociology, Education, Telematics and are analyzed connections and behavior of networks technologically mediated. In these networks actors are represented by nodes and their performance is manifested through the interaction of social relations or edges, which is an opportunity to understand the dynamics of each group forming a network.

For this experiment is selected one network of the groups of FDC integrated by a teacher and his students, generated from their interactions in the EVA platform and the analysis of SNA network is checked with the molecular processes that generated that network. The network arises from mutual social interaction supported by relational belonging and communicative exchanges but the actors have their motivations and therefore the network analysis presented allows perceiving different values, regularities in patterns of interactions that ultimately determine the structure. The network analyzed is constituted by 24 nodes and 153 edges. For calculating indices, visualization of network and data tabulation were used software Pajek-version 2.0 (for calculation of indices and visualization of networks), Gephy version 1.8 and MS Excel spreadsheet (for tabulating data). The behavior of each actor in the network, considering the interactivity, is evaluated from the parameters of centrality (Wasserman, Faust, 1994). To calculate the centrality of an actor means to identify the position where you are in relation to other actors in the communication network exchanges. Although is not a fixed position, hierarchically determined, the centrality in a network induces to the idea of power. As more central the individual is in the network better is positioned regarding the traffic information and knowledge, which in turn increases power in the network. In order to study the centrality, indices considered are: degree centrality, closeness centrality and betweenness centrality.

Degree Centrality is related to the number of ties that an actor has with other actors in the network and indicates the centrality of vertex. The vertex with a higher degree centrality is one that has a higher number of adjacent links with other actors involved in the same network.

Closeness Centrality, meanwhile, considers the distance between vertices and the proximity of an actor in relation to other actors in the network. Thus, closeness centrality is inversely proportional to the distance between the vertices. The smaller the distance from a vertex is, respect to the remaining network, the greater the closeness centrality will be. That is, according to this index an actor has a central place when the way he needs to go to connect with other members of the network is shorter; this has to do with the degree of freedom of the subject in the environment. With respect to the values of the indices of closeness centrality is also interesting to note the role of mediation of some actors for its strategic location on the network.

Betweenness Centrality can evaluate the interactions between two non-adjacent nodes from the vertices that are located on the way between them; so that for a vertex to have a high value of centrality intermediation it should be located across multiple nodes. The index shows how an actor can act as a bridge, facilitating the communication flow.

So, an individual cannot be too connected, i.e. establishing weak contacts but can have a fundamental importance in mediation. The role of mediator shows a position of power in controlling the information circulating on the network and displayed by the flow path. Then the index measures the frequency with which a node appears on the shortest way between network nodes. Regarding the **density**, it is considered that a network is dense when multiple players are connected. For Colemann (1988) the measure of the density has a special theoretical meaning because dense networks show that there is a maximum flow of information between actors. Density depends on the number of existing connections divided by the number of possible connections. For Bittencourt and Kleeman Neto (2009) the average density is related to the internal consistency of a network and the capacity to offer support of confidence to its members; how much higher density is the greater potential the network has. A network is considered denser the greater the number of connections (lines) it has. The density of the network is directly related to the number of connections that establish the nodes, rather than the number of nodes that are members, and this shows that the capacity of the network exceeds in great form the sum of the elements that compose. Another important aspect of density analysis is that the limit of connectivity achieved by the system occurs when all nodes establish connections with others, when all are linked with all directly, without any intermediary. Table 1 lists the values: degree centrality, closeness centrality and betweenness centrality of each actor in the network. In turn, the representation of figure 1 shows that it is an active network, moderately connected, where there have been place numerous exchanges of messages. As Table 1 shows the students Z1R, Z2R, Z3R, Z4R, Z5R and Z9R are actors who present high values of degree and betweenness centrality. These students have a fundamental role because energize the network environment when they introduce their colleagues in the dynamics of multireferential learning environment. They are students who have already worked on FDC in previous years, so they are designated as "referring students". These data are compared in relation to molecular reality of the multireferential learning environment that originated them.

Nodes	*Cg*	*Cp*	*Ci*
P21	26	1.39	6.46
Z1R	16	1.56	24.85
Z2R	22	1.60	8.29
Z3R	17	15.21	540.7
Z4R	29	10.86	6.17
Z5R	32	10.43	10.18
Z6	15	19.13	3.71
Z7	13	17.82	13.24
Z8	13	18.69	4.03
Z9R	17	17.82	2.52
Z10	9	2.39	5.48
Z11	8	18.69	19.15
Z12	10	20.86	7.10
Z13	12	2.0	24.15
Z14	6	19.56	0.0
Z15	8	18.69	21.16
Z16	8	2.0	6.36
Z17	6	2.21	73.03
Z18	8	26.95	10.3
Z19	7	2.21	21.66
Z20	9	2.26	29.21
Z21	3	3.13	0.84
Z22	6	18.69	9.36
Z23	6	19.13	19.86

Table 1: Values of Degree Centrality (Cg), Closeness Centrality (Cp), and Betweenness Centrality (Ci)

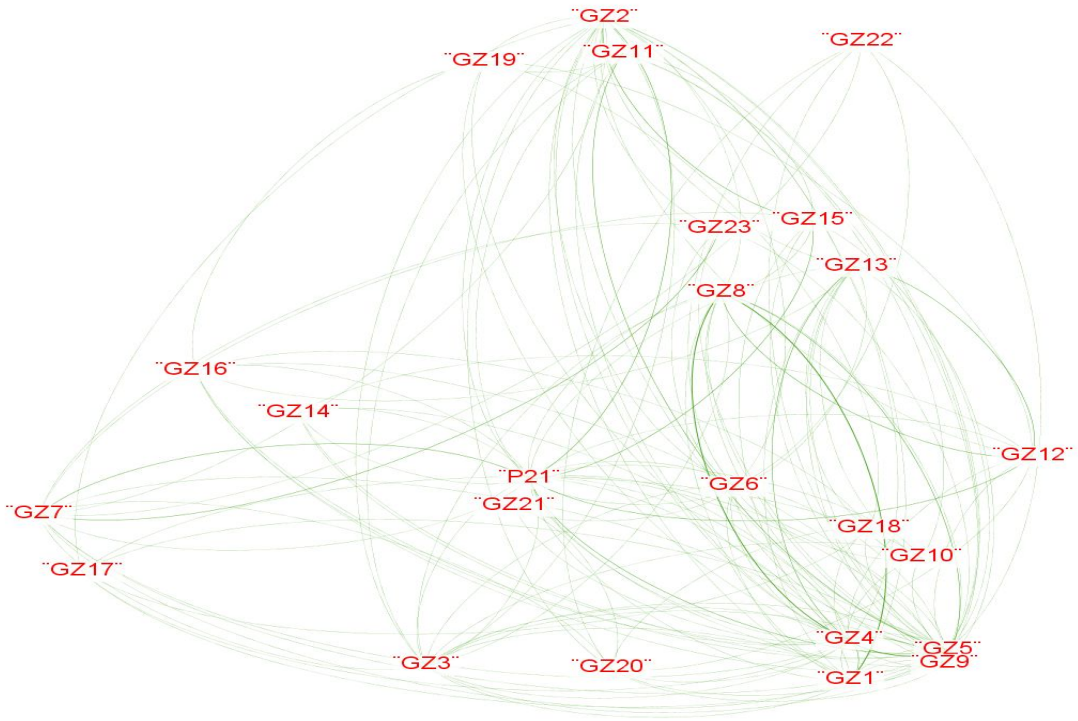

Fig. 1: Network Representation of a Group of FDC using the Program Gephi (Fuente, the Author)

3. Confluence with the Multireferential Ethno-Research

The method that is applied then allows appreciating the particular places in detail, using the multireferencial ethno-research. The intention is to find associations between heterogeneous multiplicities and connections necessary to give credibility to the description, in order to recognize how the phenomenon develops. Ethnography means description of lifestyle of a society or a group of people living in it[8]. The multireferencial ethno-research (Macedo, 2004), consists of capturing reality through an instrumental that considers the perspectives of subjects in activity, relating that place of the subject to a symbolic/institutional and cultural context available for observation, study and analysis. This is to map an object-process in which various narratives become qualified "in the landscape" of the research intention while fieldwork is developed and written; so in ethno-research are studied different levels, fractured, discontinuous spaces and varied moments.

Observing the messages of referent students their dynamic role is confirmed:

"Hello, here I leave a link to the manual of the XO able to serve and a attachment with the same!!! http://www.flordeceibo.edu.uy/files/Manual-XO-2.2.pdf" Referring student 1

"Good contribution, the next meeting will deepen more on this topic. Bless you!" Referring student 2

"People I found the manuals we used last year to learn a little more about activity turtle! I uploaded so if any one likes the activity can watch it (before lost again heh). Salutes and see you on Saturday! Referring Student 3

Meanwhile the teacher, which from the analysis of values of the network occurs with less prominence than the referent students, plays a fundamental role in guiding the evolution of the students in the relations of knowledge and communication flow with the knowledge.

[8]- Word reference. Diccionario de Lengua Española. http://www.wordreference.com/definicion/etnograf%C3%ADa Access 4.11.2013

This is manifested in a work proposal:

The proposal I made to you is: try a first visit to the school, late May, in order to understand the situation of the school, talk with you and with the children and adults, concerning the area. Since it does not have internet it will be attempted off line activities that will contribute to the playful and creative axes.(The professor) The professor connects to all students and plays an important role in the dissemination of information, but the referent student contributes significantly in relation to knowledge. This matches with the pedagogical approach of FDC where students assume an important role, especially referent students. In this methodological convergence it is outlined the emergence of events, the possibility of capturing the existence where are combined, dialogued and stressed the forms established with the inventive and creative forces. In that movement between knowledge and action new realities are co-produced and revealed, and arise new horizons of questions and new processes of subjectivation. The traditional educational communication responds to a pedagogical purpose established between someone where the institution recognizes the role of education and someone who is assigned with the role of educating. The conventional model of pedagogical formalization of the communication is embodied in school and then is imprinted in the minds of each subject. In the network, participants are permanently in a state of transmission and reception, exercised either successively or simultaneously. Thus, considering that the aim of the thesis is to build an assemblage of cognitive analysis, the purpose of the methodological confluence is advancing on the analysis of the discourse object. The discourse refers to a cognitive process in construction, dissemination of knowledge and relationship with knowledge in the communicative flows of the network. The speech is a social practice; Van Dijk (1997) considers it "a phenomenon of social and cultural practice; people use language for social events and participate in social interaction in different social and cultural contexts" . During the experience in the multireferential environment of learning appear various discursive possibilities as can be verified in the messages of the group. The report of a referent from a group reaffirms this situation:

Coordination meeting: Beginning the meeting our coordinator proposed the subdivision into groups by disciplinary orientation (as far as possible, since there were groups with different degrees), in combination with one or two referents, with the objective that the new students of the group reflect on what from their discipline can contribute to fieldwork, and what means and/or resources needed to carry it out. The role of the referent student is, in this instance, to invigorate subgroups, somewhat, guiding or directing them based on the proposed set point.(Referring Student 2) The student, describing the event, is meant and means everyday situation; the cognitive inter discourse (memory, discursive knowledge) also produces learning when she relates the experience of praxis, between the place of enunciation and her position as subject of learning. Orlandi (2008) defines the inter discourse as: "set of expressions already spoken and forgotten that determine what we say, supporting the possibility of expression. In order that our words have meaning they must have a prior meaning. This effect results from the relationship with the inter discourse, discursive memory, something refers earlier, independently elsewhere". In the network, the student is revealed as a social being that manifests the links between knowledge necessarily passing through processes of intra and inters construction. To report the results of the coordination meeting she appeals to her own references, to those of her peers who belong to other university degrees and the teacher, considering them actors in the same practical situation. The student, to give meaning to the event, interprets and when interpreting occupies a position in the network of meanings that can be observed in Figure 66. Also examining the molecular development of the network of group 8 is perceived a play of identities between teachers and students, with leaderships that are noticed and quantified by analyzing networks. Another aspect to consider in the molecular study of the AMA, with respect to discourse, is the form of language of the actors in the network, which some authors call "el internetés" (Rajagopolan, K., 2013).

In the following mail some examples are noted:

"Profe're on fire"

jejeje you're getting crazy; well then that's the attitudes Two niggles:

1- could do what told us the partner of Mikaela Engineering??? hope not wrong (forgiveness if so) je; so that Eva send me an email per day jejeje now one with many links wwwiiiiiii!!!!!
2- guys remember to answer the cordi the mails, if not he gets sad and thinks we do not pay attention!!!!ok regards to @ll and we are seeing.

P/d: I you too are on fire with minutes jejeje bsts" (kisses) (Referring student 1)

This form of language is a way of transmitting messages quickly and expressive, using a limited and truncated writing, like the way you talk daily. The structure and the language used manage to transmit quickly, instantly and uninhibited the enthusiasm and desire of participation of the student as well as a trusting relationship with the teacher group who calls "cordi". What is desired to point by showing the ability to transmit messages in "internetés", is the idea that these new expressions written/spoken of subjects are creative and far from being a grotesque abbreviation of Spanish. The actors, in AMAS, shape expressions of language according to their needs and interests enriched by its wit and creativity discarding what they consider superfluous for understanding the message they want to transmit. This situation is the result of the impact of telematics on the written/spoken language. Rajagopalan (2013) says that "changes are always producing bottom-up", i.e. from the empirical to the theoretical field. Innovation "sprout" in messages by frequent and daily use adapted to the circumstances and conveniences in the communication exchange. The limit to the creativity of the issuer is the ability to understand who receives the message, but with the use and familiarity with the "internetés" and telematics this frontier expands more and more. In sum telematics stimulates the desire to challenge the rigidity of established norms and willingness to communicate quickly and efficiently, thus achieving overlay the naturalness of the conversation to the "artificiality" of writing. Somehow the "internetés" is recognized in this research as a form of mixed language written/conversational that helps actors of the AMA to express their own subjectivity processes that try to be mapped in this work. The original thing that emerges here is the appreciation of everyday insert in an educational environment but away from a formal communicative weapon. By revealing discourse that passes in the groups is evident the knowledge and relationships with knowledge that occur in the AMA of FDC, applying various discursive forms. In these virtual dialogues are verified the imaginative production and the creative actions of the group.

3. Conclusions of Methodological Confluence

Through the analysis it is checked the existence of a network conditioned to behaviors, essentially the teacher and the referent students, manifested in the spatial configuration. The properties of the centralities result from characteristics of the actors and the global consistency of their interrelations that contribute especially to determine the structure of the network, in particular. Network appears as a model of cooperation that contributes to relations with the knowledge and exchange of knowledge, and often stops being dependent on the centrality of the teacher and his teaching functions. Flows, in relation with the knowledge of the members, define the degree of interaction between actors in the network, directly interfering in the relations with knowledge. Exchange on learning, provided by the bonds of network connections, establishes and conditions the process and activities telematically mediated, and result in innovative forms of knowledge management. The symbolic-analytic possibility of network analysis helps to identify aspects of mediation and communication in contemporary educational environments as FDC. Observing the behavior of referent students in most networks it can be affirmed that, in the FDC project, they reveal a new context: a communication form of maximum plurality and unquestionable singularity where are developed communicative learning events. The referent student is an innovation of FDC, in order to keep students in the project and contribute to its formation investigating various issues where telematics mediation and knowledge are involved. Network analysis done confirms that, since the beginning of the school year, these students contribute, fundamentally, to organize and consolidate the group. Ars, as a methodological tool, can demonstrate that learning and relationship with the knowledge is an activity that does not have a particular place and still is a powerful process.

In complex systems such as FDC, it must simultaneously be detected the determining features and emerging issues, recognizing their interrelationships and their complementarities. Interested in this case cognitive activity: cognition and the result of those activities, which is knowledge. Cognitive skills of individuals are developed in a cultural environment that produces, preserves and transmits a language, logic of knowledge and certain criteria of truth. Cognitive event results of a meeting of processes that complement with each other. Therefore the accumulation of data[9], analysis and theory proposed maintain a close relationship with each other.

[9]- Data in the form of words or texts are referred to the understanding of the action and its effects. These data are hardly measurable, non translatable into mathematical terms and not subject to statistical inference. A qualitative data is defined as a "non quantitative", i.e. which cannot be expressed as a number. Qualitative data are presented as elaborations carried out in their natural contexts where occur the phenomena studied, by procedures recorded in words or pictures, the descriptive information about places, objects, people, conversations, behaviors. Qualitative data can be defined as a primary elaboration which reports on the existence of a reality, its properties or the extent to which this occurs (Hernández Pina, F.; García-Sanz, M.P. y Maquilón, J.J., 2014)

The theory derived from the data gathered, resembles reality and finally tends to provide a guide for action that builds the concepts with data. Fieldwork means to observe subjects in their environment and includes both behavioral observation and description, which enables the understanding of every day constructions in FDC. Fieldwork involves a personal confrontation with the unknown, the confusing, the obscure, the contradictory, and the asynchronous. In fact, the fieldwork of qualitative inspiration is some adventure designed always as a project and demands constant reconsiderations. In anthrop social science is not possible to investigate if you do not take into account the principle of contextual interpretation because the fieldwork involves a search of expressions, senses of the experiences of the subjects. To identify and record the mediated interactions of the actors of FDC it is searched the detail relevance that builds and distinguishes the relationships with the knowledge and knowing. This is complemented by the concrete vision that provides network analysis.

The network structure collaborates with the dissemination of information, encourages the participation of teachers and improves the communication channels between students and teachers. It can be highlighted the importance of this tool for analysis once the cooperation and exchange of experiences contributes to an integrative action, in particular (re)means teaching praxis. It is also confirmed that teachers, in these multireferential learning environments, need to use other skills that go beyond the pedagogical and didactic requirements: computerization, document imaging and manipulation of structures are incorporated into teaching tasks. The study of the network shows a processuality characterized by information flows which in turn is responsible for the continuous transformations which undergoes a project electronically mediated. In the relationships, evidenced in the network studied, are perceived people who have a common goal which in turn develops and grows with them: educational praxis performed within a connective language where knowledge acts as a thread and where subjects influence each other. Educational praxis, mediated by telematics, reaffirms favors and promotes interdependent behaviors and from relationships collectively created, the university pedagogical innovation is potentiated while a new form of institutionality arises.

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