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Qualitative research methods to analyze Learning 2.0 processes *Categorization, recurrence, saturation and multimedia triangulation*

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The developments of the Web have generated new modalities and contexts of learning, shaping what is nowadays called "Learning 2.0". Within this new phenomenon it arises a trend of moving out from the linearity of written word toward new multimedia complexities, that lead to a parallel semiotic complexity lying behind them. Understanding the above mentioned complexities implies to preserve and make explicit the collaborative construction of knowledge through the identification of events, instruments, signs. This identification is in fact an analytic process, where the researcher divides the raw data into units of meaning making that must be read both in the specific contribution made by every mode (text, images, audio) as well

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as a whole. This is possible through an inverse process of analysis and interpretation that depends on specific instruments regarding the qualitative methodological approach. These last must be, in fact, appropriated to the new environments and phenomena. In this work the authors introduce several examples of educational research practice where categorization and triangulation were implemented on data collected from interactive processes in online learning environments, to further obtain recurrences and saturation of data. In second place, going a step further on the discussion of appropriated methods to Learning 2.0 analysis, the so called "multimedia triangulation" is presented, on the basis of analysis of data collected inside the same case study.

1 Introduction: Making qualitative research on the Web 2.0. Approaches to analyze processes of learners sense-making

As the web evolves in new spaces and communicational processes, networked learning show new combinations and socio-cognitive operations, derived not only from written communication (Constantino, 2007), represented in those texts, but also from other representational systems underlying communicational processes, like sounds and images. The study of those learning processes relies on, beyond traditional instruments of educational research, some elements to understand communicational and semiotic processes like for example, the knowledge of specific characteristics of Web pages and the electronic environment within which the learning has place (van der Geest, 2001; Baldry & Thibault, 2006; Gros Salvat, 2000; Kress, 2004). In this sense, one of the hypothesis that lead the authors in their rationale is that qualitative educational research in online learning environments must adopt new instruments coherent with the qualitative epistemological and methodological background to explore, understand and interpret new learning processes in the enlarged Web, being those both formal and informal.

The participation to online learning environments –compared sometimes with Face-to-Face learning environments- embed processes of flexible and dynamic communications that leads to collaborative learning (Jonassen, 1993; Banzato, 2002). The clearest example of this last statement are online forum and chat, where the free interactions trigger reflection on the basis of conversational activity, that in time take to knowledge construction (Gunawardena *et al.*, 1997). The analysis of communicational interactions facilitates in fact the interpretation of pedagogical approach, underlying the processes of *scaffolding*, *peer learning*, *reflection*, *independent learning* and *social inclusion* as forms of educational quality and impact. The overall process of learning is to be interpreted and the possibility of generating forms of pedagogical conceptualizations is open with benefits for education.

Therefore, the identification of the several components inside an interactive, participatory and collaborative dynamic is an analytical process where the

several units of discourse are separated; but hence the process leads to interpretations that open to “universes of meaning” behind the learning experience. Without entering in the specificities implied in this interpretive processes from the point of view of the researcher, the selection of the data (bracketing) to be analyzed can be made on the basis of two important instruments that have impact on the trustworthiness of the study, namely: the exposition to the data that lead to convergences in the interpretive process (triangulation) and the categorization of data that emerge from such a interpretive reflection generating the opportunity to conceptualize phenomenon taking into account educational problems and values (inductive, grounded processes). In fact, the continuing examination of data allows the researcher to find the recurrences as well as the singularities underlying the interpretive process.

The above mentioned criteria are fundamental on qualitative research (Wolcott, 1994; Costantino, 2002) and they are given high importance in qualitative educational research. And, as we contend in this article, the processes of exploration, analysis, interpretation of networked learning, require to go beyond the analysis of text and oral productions, moving towards the incorporation of instruments that allow the researcher to account the semiotics complexities of this expanding universes of sense on the Web. We will move from the basics of qualitative methods applied to online learning environments to more innovative proposals.

2 Categorizing, finding recurrences and obtaining the saturation of data

The categorization is a process of analysis and interpretation of data that can be collected through several strategies, where the attempt of the researcher is to generate some categories arising from this original data. It is a method that imply constant confrontation of data, in an attempt to make sense of what the participants in a research are expressing and wish to express, and it has been generated from the studies of *Grounded Theory*, from which we will focus the qualitative perspective (Corbin & Strauss, 2008). The method is developed in several phases, namely, open codification and axial codification, where “micro” segments of the universe of elements to be analyzed (often, words, phrases, paragraphs), obtained from interviews, documents, observations, online forum are grouped into units of interpretation (for example a course or a specific educational experience, or even a discussion forum) As far as the process of codification moves on, the categories become more and more conceptual, regarding the phenomenon studied, giving birth to “provisory categories”, superior from a semantic point of view –because they group a number of basic codes-. This is the process that leads from open to axial codification. When the diverse units of information do not “feed” the developed categories with new conceptualization,

we can consider that “saturation” of categories have happened.

If traditionally the method was applied to verbal/textual analysis, the composition of hybrid spaces on the web opens to the incorporation of multimedia content. The process of codification becomes hence more complex; and the interpretive effort regards mainly the search of categories that feed a whole meaning making process, as a semiotic unity, even when having completely different entity (word/image)

Finally, it is clearly important to highlight that the process of conceptualization that supports the codification and categorization is pushed by the values, willing, motivation of the researcher and the participants engaged in learning activities. In fact, the researcher makes her own interpretations aiming to understand the dynamics of the educational intervention in a meaning making process that can be seen as a “learning culture”.

2.1 From Triangulation to Multimedia Triangulation

Denzin’s proposal of recognizing the need of understanding the recurrences and tensions of meaning between data emerging from different methods, theories, researchers (1970) it is already to be considered a “classic” of qualitative research. In fact, the interpretations of a researcher can be reinforced or abandoned after comparing results obtained through several qualitative methods, or by sharing data with other researchers, or even by making data collected in several moments to dialogue. For example, a particular communication style inside an online forum can be reinforced or abandoned after checking other online forum, or through the results of an interview with eTutors where they account their own approach to design and pedagogy as well as their own professional values. The importance attributed to triangulation comes out the concern on avoiding data collecting through only one technique or source. Nevertheless, taking into consideration the multimedia nature of the Web, we advance a proposal regarding the triangulation of different information channels of “modes”. We would call this “multimedia triangulation”.

The multimedia triangulation requires to take into account, as simultaneous, progressive, or recurrent process, the several elements arising from virtual learning environments as units of analysis. This means, for example, to consider not only texts of messages or posts in a forum, but also the production of images, the hypermedia connections made to give sense to a message, the use of pictures, diagrammes, etc, as elements that can comply a function in the communicational process, both emotional, cognitive, social or even of power and domination in a class.

Recent tentative in the multimedia analysis (Baldry & Thibault, 2006; O’Halloran, 2004; 2009; Jewitt, 2009), even if not fully consolidated due to

the ongoing development of research technologies, are stimulating to go ahead in a line of continuing improvement of strategies for the analysis of the complex Web 2.0 environments and its multimodal objects. This is hence a perspective “under construction”, that we will deepen in our following case studies.

3 Experiences of educational research on the web: a methodological focus

3.1 Recurrence and saturation

Costantino (2002; 2006) analyzed several online forum regarding networked learning environments aiming to understand communicational and discursive issues, common as well as specific, on online learning interactions. The online forum have been considered as a “meso-level” analysis and every intervention as “micro-level” unit (Constantino, 2010). The process has been recurrent and went ahead in several loops of analysis in two complementary senses: firstly, regarding the theoretical background (theory driven analysis) and the secondly, the analysis of discourses in search for the absence or presence of the criteria as well as their context of production. This approach triggered classifications and grouping of messages within what was identified as a dialogical interaction.

This way the types of interventions in an online, learning conversation were characterized through functional elements. For example, the so called “interactive intervention” were characterized as “(*interventions*) that follow a discursive path, in an attempt to contribute/contrast a previous idea, or uses these last to reflect and create the own position” (Constantino, 2006, our translation) Other five categories emerged: *additional*, *interactive*, *directive*, *disruptive*, *anomalous*. The successive analysis of forum led to the saturation of data and no other categories were hence created. Only a new study, realized on a new educational situation where the categories were applied, took the same researcher to find two new categories: *summarizing* and *creative* interventions (Constantino, 2006; 2007).

3.2 Triangulation: Corpus of contrast

In Constantino’s study the triangulation of data is undertaken at micro-level (messages) meso-level (forum) and was begun through the analysis of the educational programme and syllabus (macro-level) as context. It was hence integrated by means of the inclusion of a contrastive analysis through a new corpus, in order to analyze and determinate if the categorization undertaken at micro and meso level could further apply to new contexts (macro-level) as open fora on the Web. Constantino studied a free forum called “*Mateando con*

*los Poetas*¹ of almost three years of life, a clear “cyberculture” phenomenon. Differently from which was attended, the form of participation found showed often “directive” forms of participation, as it was the case of formal learning environments. Instead, also formal learning environments showed creative and interactive interventions. Seemingly Raffaghelli (2010), applying the categories created by Constantino, analyzed two online forum from diversified cultural contexts. The results arising from four contexts of discussion (culturally homogeneous and intercultural) showed having proposed the same learning activities, interactions are diversified and use more or less metaphors (visual and textual) to represent key concepts integrating the types of interventions, mostly regarding the effort to solve conflicts due to cultural distance (more interactive and creative interventions as part of a *learning culture*).

3.3 Categorization

Within the own PhD research Morán (2010) and Raffaghelli (2010) have assumed a methodological perspective that was based on grounded theory and discourse analysis approach in virtual learning environments. The two researchers took into consideration not only interactions as part of the learning process, but they attempted to understand the learning cultures and educational impacts coming out networked learning approaches². While the issue tackled by Moran was the identification of teaching models inside networked learning, compared to FTF models, the second was interested on the dynamics of internationalization in higher education and their impact on professional identities in “glocal” learning communities. To collect data, several techniques were used: (a) participant observation on the networked learning activities, (b) participatory evaluation in specific periods of the course programme, as a mean to deepen, enlarge and re-interpret meanings, motivations, feelings of learners and teachers; (c) a record of reflections on the own learning experiences in the form of an online diary (students’ log). Successively, space for the FTF interactions was given: (d) interviews to teachers, eTutor and learners (e) documental analysis of the online resources offered in the virtual learning environment as part of the “corpus” under analysis. To all this material, it was applied both discourse analysis as well as grounded theory principles. Discourse analysis

¹ This has no translation in English, since it is local cultural jargon. “Mateando” could be accepted as “a tea” with poets (“con los poetas”). But “mateando” is a very popular tea in Argentina and Uruguay from the participants to this forum came, and it refers to popular infusion (Mate) that is taken as a sign of friendship, relaxedness, which seems to be the case of the forum analyzed.

² In fact, they have both worked as learning designers, education coordinators and eTutors in *learning communities* generated from the *Master Interateneo para la Formación de Profesorado de Calidad*, (Interuniversity Master for Teachers’ Quality Education), promoted by University Ca’ Foscari of Venice in collaboration with Universities from Spain, Portugal, Brasil, Paraguay and Argentina.

was done aiming to understand the pragmatics of communication, that attempts to identify the *topoi* or semantic units more relevant regarding a specific social and cultural process, like in our case the learning process (Costantino, 2002).

In the case of Morán's research several categories were consolidated, allowing the researcher to describe and interpret the learning experience on virtual learning environments, as for example: the reconfiguration of time and space, profiles of didactic-cognitive and didactic-discursive skills required to the eTutor, curriculum flexibility and openness, diversification of activities regarding the several learners motivations (Morán 2010; Costantino, 2010).

In the case of Raffaghelli's work, the categorization led to explore and interpret the characteristics of processes of construction of "hybrid learning cultures" as the result of heterogeneous, intercultural meaning making negotiations; the researcher took particularly into account the discursive creative processes inside the above mentioned learning experiences, finding high intertextuality, the adoption of metaphors, images and audio connected to the meaning making process regarding the efforts of diverse learners to grasp other's ideas, and, most important, to build new, hybrid knowledge (Raffaghelli, 2010c).

Open codification and axial codification guided a path of categorization where both researchers have explored specific learning moments (incidents during the normal life of the online course), that led to significant pedagogical conceptualizations.

To that regard, we will take into account two illustrative examples. One of the concepts coming out of Morán's work was "*teacher's interventions*" Initially the teachers' interventions were coded during the networked learning activities, characterizing them as just presence-absence of the teacher, without paying attention to the nature of them. Some of them were in fact: to motivate students, to open debates, to point out critical issues, to stimulate reflection. Moving on her analysis, the researcher received important insights from the data, having all these interventions emerged from specific discourse elements that could be integrated in more general codes like "moderating communications", "treating contents", "improving relationships with students". The further exposition to the data permitted the researcher to understand the sense of a general way of behaving inside the networked learning activities. Therefore, all the interventions could be grouped under the more general category of "eTeaching skills" that are expected on virtual environments. Going ahead, Morán connected these skills as "didactic-cognitive skills" and "didactic-discursive skills" (Morán, 2010). The theory emerged allowed her to make online and FTF learning environments to dialogue, in an attempt to find commonalities and differences, and to express which are the specificities of networked learning with regard to traditional teaching.

In the case of Raffaghelli, the concept "enlarged cultural context of le-

arning” was explored on the basis of graphic-iconic and textual data arising from the interactions (online forum, students’ logs, interviews) among culturally diverse teachers and learners.) Some of these elements were codified as “culturally diversified educational tools” and “cultural and pedagogical mediation”, and referred to texts, images, ways of interactions to lead the learners taking into account their cultural differences. It was explored how the lack of these strategies generated “*cultural clash*”, and the presence “metaphors of belonging and changing”, “creative intertextuality” as part of a unity of sense, a learning community across frontier. These elements were linked the axial code denominated “expansive transitions” towards discourses on identity and professionalism which regarded culture was “hybrid” and extremely contextualized as “place” on the net (the *glocal learning culture*). The presence of more “expansive transitions” allowed the researcher to think about the presence of a process of “enlargement” regarding the own cultural context of reference as “learning device” at the bottom of processes of participation on international and intercultural learning communities. The construct would allow later the analysis of this type of learning processes on the net, more and more frequent. Furthermore, Raffaghelli observed that the processes of meaning making (particularly metaphors connected to images) are used to “go out” from the formal learning environment, moving towards informal networks on the Web 2.0. Indeed, some learners develop blogs connected among them as “glocal” network, that adopt metaphors supporting values entrenched in the own pedagogical practices, as part of semiotic universes. According to the research, this last activity shows clearly the impacts on the professional identity and its constellations of discourses and practices as personal (but not fully independent) meaning making process.

3.4 Multimedia triangulation

In her work “Which relationships can be established between the teaching subject and the way in which eTeachers open their learning Forum?”³, Alvarez starting point is a similar observation to the other works previously presented: in networked learning experiences and contexts it must be considered the way in which different resources of different materialities are integrated (for example, the design on the screen and the position of the text). In this sense, the researcher undertakes the analysis of some learning experiences⁴, on the basis of social semiotics and multimodal analysis (Baldry & Thibault, 2006; Kress, 2004; Lemke, 1997; O’Halloran, 2004; 2009). Her analysis is focused

³ This work was presented in Spanish in April 2010, XII Congreso de la Sociedad Argentina de Linguística.

⁴ In this case 9 learning units and relating networked learning activities are explored, under a course on Human and Social Sciences inside the above mentioned *Master universitario in formazione docente di qualità per la docenza preuniversitaria*.

on online forum, particularly the interventions of initial opening of the online conversation, in the context of learning design and the way a learning environment is physically edited.

Alvarez observes that the design and the communications vary significantly in terms of their length in an inverse relationship. In most of the online forum, the initial interventions are long, covering three or four paragraphs of ten lines approximately. Moreover, in some situations the tutor uses more than one intervention to initiate the online conversation. Less frequently is the case of short interventions, that Alvarez finds to be connected to more visual and hypertextual materials introduced in the whole virtual learning environment. Short interventions generally regard an only specific action: to propose the task or discussion to be started. Instead, long interventions, must introduce all the issues that are not present outside the message, and it is hence rich of informal elements (the personal presentation) and instructions.

On these basis, the researcher poses some important questions for further exploring semiotic complexity: what would happen if the tutor decided to intervene with only one action during the initial opening post? What happens to the rest of interventions/activities? The attempt of answer to these research questions offered by Alvarez is connected to her attention to learning design and the resources used to edit the virtual learning environment with regard to a course. She concludes hence that the operation of opening an online forum as “online conversation” is to be related to resources like the divisions used in a single learning unit, images representing topics, hyperlinks with instructions or worksheets, labels to address attention, etc. On the contraire, the online forum with long initial interventions are presented in virtual learning spaces where design have not taken into consideration further resources. Regarding these observations, the researcher draw some conclusion: in the case of short interventions, the “screen logics” would govern the process; whereas in long interventions, the “paper page logics” would underlie the process, even if the learning activity is implemented in an online learning space. The researcher emphasizes the importance of textual resources, but it also emphasize the differences between those (hybrid discourse) and visual elements (icons, pictures, emoticons, diagrams) that are to be considered together as part of a process of *multimedia triangulation* to understand fundamental learning processes.

Conclusions

Our methodological reflection attempts to consider basic procedures of qualitative research applied to educational research, with particular emphasis on networked learning processes on the Web. This reflections has been illustrated across four different studies which common point was the methodological

reflection on specific methods and techniques that can cover the complexities of new learning environments and communicational processes as educational research problem. As it has been underlined, a common paradigm of multimodal analysis, arising from discourse analysis applied to education, semiotic analysis and pragmatics of communication; that consider, hence, the nature of interactions within a communication as a phenomenon that goes far beyond the verbal interaction, has been explored. The authors contends the need of progressively develop and adopt *multimedia triangulation* inside other qualitative methods, that would be the only way to grasp the new complexities of networking learning. Methods that in fact are able to explore and account for the multimedia structure and at the same time adhere clearly to the principles of qualitative research, are still a project, in spite of proposal that can be considered *prima facie* as partial or too guided from theories. This motivated the authors to return to the roots of the practice of qualitative research as a mean to explore and understand the multimodal nature and to compose strategically techniques of analysis in line with an interdisciplinary approach which result is, above all, the reconstruction of meaning making processes linked to the Learning 2.0

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