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How to quote this text: Martin Iglesias, R. and Robles, M., 2017. Topoheterocronies: analogical models for time visualization. VIRUS, 15. [e-journal] [online] Available at: <http://www.nomads.usp.br/virus/_virus15/?sec=4&item=2&lang=en>. [Accessed: 12 December 2017].

Abstract

We present the foundations of a research project which is currently in development. This project aims to explore new dimensions and configurations of a traditionally one-dimensional Time. Initially we have systematized the material produced since 2005 with students of History of Architecture in relation to analogical (multidimensional) Timemaps, while we sought for theoretical tools that allows its interpretation. We have characterized different times and durations, from phenomenological aspects of temporal construction and perception, to historical and natural phenomena of long duration. Finally, we explored analogical and digital visualization tools to understand the intrinsic complexity of Time and its models.

Keywords: Visualization, Time, Timemaps, Analogical models, Topoheterochronies

Introduction

We present here the bases and partial results of a research project that is currently under development. The aforementioned project aims to explore new dimensions and configurations of a traditionally one-dimensional and linear time. In the initial stage it has been tried to systematize the material produced during more than eight years with the History of Architecture students in relation to the multidimensional Time Maps and to find or to design theoretical instruments to interpret them. To this end, it has been proposed, on the one hand, the research and characterization of the different Times and Durations, from the phenomenal aspects of perception and temporal construction, to the long-term historical and natural phenomena. On the other hand, it has been sought to find and design representation and visualization tools that help the understanding of the aforementioned phenomena in their intrinsic complexity. Likewise, the work is framed in a line of exploration of new pedagogical instruments in teaching within the framework of constructivist didactics, as well as an intrinsic critical reflection on traditional tools and their conceptualizations, a subject on which we have already spoken in scientific events previous (Martin Iglesias, 2008, 2010, 2012, Robles, 2014, 2016). It is worth mentioning as an illustrative example the initial problems that arise in the moment of facing the practice of the class: the evaluation and the adequate use of the previous knowledge of the student, crucial moment of the educational process, to which is not given due attention. We say crucial because it is situated as an instance prior to the practice itself from the point of view of the diagnosis of the state in which the students are with respect to such knowledge. The awareness in the use of these precepts and previous learning, by the teacher, is what makes learning a significant activity, particularly when it comes to the relationship between new knowledge and the one that the student already has as a precondition of understanding.

2 *Topoheterocronies*

The starting point is the critical transgression of the classic timeline, as a graphic representation of a sequence of events, which obviously contains in it an idea / concept of chronology directly related to a cultural paradigm that leads us to associate the antecedent to the causality and that conceals a teleological metaphysics of historical time. This obviously appears both in our agendas or calendars, and in the most elaborate discourses on historical phenomena and the stories that are generally constructed around them. At the same time, traditional representations do not include all events, but only those that are considered relevant from a certain point of view, in general in relation to the changes or repercussions that these supposedly generate a posteriori. This confirms the existence of causalist logic and shows to what extent these types of constructions are the product of a cultural and ideological subjectivity that finally establishes the connections of events and consequences in a tautological way.

Beyond the fact that the existence of this conception of time also belongs to history and an archeology of its constitution can be realized as a cultural device, it is also interesting to note that within the paradigm there have been multiple alternative explorations that range from the representation of narrative digressions as non-linear paths in the *Tristram Shandy* by Laurence Sterne around 1760, going through the counterfactual *Ucronies* of Charles Renouvier, to the arguments of Henri Bergson in the late nineteenth century for a distinction between the mathematical and homogeneous conception of time and heterogeneous experience of duration, which obviously is impossible to represent in the linear model.

3 **Temporalities: Hegemonic and Alternative Times**

"What, then, is the time?" If no one asks me, I know; if I want to explain it to whoever asks me, I do not know. However, I certainly affirm that if nothing happened, there would be no past time, and if nothing happened, there would be no future time, and if there was nothing, there would be no present time". This phrase, taken from the Confessions of St. Augustine (2010, our translation), shows us how time is something double, intensely ambiguous, something that we cannot explain, but that nevertheless exists as a certainty for our conscience.

There are multiple mental representations of time, deeply related to the perceptions we have of him and the conceptualizations we make from them, these representations are imbricated with cultural patterns that configure and configure us. Since we are born our experiences with time are mediated by a series of social conventions, cultural patterns and patterns of action, whose function is to regulate their use and which is common to a given group. In the words of Jeremy Rifkin: "Each culture has its own unique set of temporary fingerprints. Knowing a town is equivalent to knowing the values of the time they have adopted to live. In order to know ourselves, the reason why we influence one another and the world in the way we do, we must first understand the temporal dynamics that govern human transit in history" (Rifkin, 2004, our translation). These practices, devices and procedures, which culturally regulate our temporalities, are not innate, normal, nor consubstantial of human nature as some would have us believe. There have always been a series of conflicts and power disputes over imposing a cultural vision over others, a temporal space paradigm over others, struggles that establish hierarchies, dominions, predominance of some ways of feeling and thinking about time. As a consequence of this, there are "hegemonic" times and "counterhegemonic" or alternative times, times that are proposed as universal and times that pose opposite or simply different models for our temporalities. Says Roger Caillois in *Temps circulaire, temps rectiligne* (1975, our translation): "... since his birth, one is so accustomed to the conception of time accepted by those around him, that he would not be able to imagine that there is another that others think is so natural and logic as he thinks of his own. He does not suspect that he has unconsciously accepted his inexorable implications. He ignores that each culture has a particular representation of the historical succession and that its own conception of the world, its moral universe, perhaps even the practical norms of its daily behavior appear insidiously modified in it".

Our conception of time, the hegemonic conception in the West of Jew-Christian and Greek-Roman roots, is that of a uniform, univocal, universal time, one. One time, *El Tiempo*, which appears strongly linked to the classical Greek worldview and above all to the explanations of the movement. Already Aristotle in his *Physics* (1995 [350a.C.], our translation) advances us: "The time is, then, the same, since the number is equal and simultaneous for the alteration and the dislocation. And for this reason, although the movements are distinct and separate, time is everywhere the same, because the number of equal and simultaneous movements is everywhere one and the same". A time that is everywhere (and for all) the same, equal, simultaneous, and not coincidentally taken by science from its formative stages to impose a paradigm on others, the only True time. A time that has direction, but that is reversible, because in theory all physical phenomena are reversible. In *The Mathematical Principles of Natural Philosophy*, Isaac Newton (1993, our translation) confirms our insights: "Absolute, true and mathematical time, by itself, and by its very nature flows uniformly, without regard to anything external. Otherwise the duration is named: the relative, apparent and current time, is a measure of the sensible and external duration (either exact or irregular) by means of movement, which is commonly used instead of true time". It is very interesting to note that in this appointment there is another time, duration, the Bergsonian time, but it appears reviled in front of a "real" time, it is that other "apparent" and "ordinary" time, it is based on perception, in experience, that of the common citizen, which clearly does not serve science because it is subjective, fundamentally when pursuing the "absolute".

Then philosophy will be responsible for doubting, rethinking, putting the paradigm in crisis, which is worth clarifying, it continues to regulate our behavior and our social practices, despite the fact that science itself has already tried to show that it is not absolute not true. "The time I try to determine is always 'time for', time to do this or that, the time I can afford for, the time I can take to accomplish this or that, the time that I have to take to carry term this or that. The watch-the-clock is based on a taking-time and emerges from it. In order to take time, I have to have it somewhere", this quote from *The Fundamental Problems of Phenomenology*, by Martin Heidegger (2000 [1975], our translation), puts us in front of a very relevant vision of the time of modernity, a time that we have, that is owned and that therefore, it can be sold or rented, a time of the factory clock, of the productivity of the industry, a good of the capitalist market. Simultaneously, it is placed intrinsically as a time of use; a time based on something, functional, "time for" in Heidegger's words. A perspective that for architects is clearly

consistent with the same concept applied to space and forms, which aims to regulate the ways of inhabiting, predetermine, standardize, and thus escape to a utopia of the common good, which paradoxically confuses the good with the goods. On the other hand, the empiricists make the idea of absolute time, outside ourselves, hesitate, and will look at the successions, the series, the processes, the rhythms, the continuities and the discontinuities. A more human, but also more relative time, that appears from the observation and that returns to the origins of the birth of the paradigm in the movement and the change, we could say that rescues the legacy of Heraclitus against the triumph of the followers of Parmenides: "Whenever we do not have successive perceptions, we do not have the notion of time, although there is a real succession in the objects. Of this phenomenon, as well as of many others, we can conclude that time cannot appear in the spirit alone or accompanied by a fixed and immutable object, but is always discovered by some perceptible succession of changeable objects" (Hume, 2002, our translation). It would be interesting to think what consequences architecture might have had from the notion that opposes the appearance of the experience of the temporal to fixed and immutable objects. To an architecture that even today is conceived as objectual and finished, material metaphor of transcendence.

One of the most suggestive discussions is that which, from our experience of the succession, of what is no longer and of what was not yet, raises the different versions of the subdivision of the past, the present and the future. In his *Logic of meaning* (1989), Gilles Deleuze presents us initially with a continuous present, although later he will deal with relativizing this conception, and even contradicting it: "only the past and the future insist or subsist in time. Instead of a present that reabsorbs the past and the future, a future and a past that divide the present in each instant, which subdivide it to infinity in past and future, in both senses at the same time" (our translation). An infinitesimal present in front of an eternal present. A philosophical discussion that sinks into the night of time. Perhaps as an obverse of this dialectic those other times appear, those alternative times of other cultures, one of which undoubtedly enriches us just by thinking about it, the time of Chinese culture, a way of conceiving the most complex and dynamic temporality, a time woven into space and the event, a series of eventualities imbricated in times and places: "Chinese time is a time of its own, internal to things, or better, to processes and situations. More than time, there are times. So intertwined is the time with the event that it is not only the time of the event (a time created by that concrete happening) but also knots with the space; a space that, equally, is not the space but its space, the place that the own event determines and loads with its properties" (Lizcano, 1992, our translation). And it is significant to draw here the difference that we mentioned before, these other times are different, simply incommensurable, they cannot be compared with ours, they are not counterhegemonic, they do not come to put anything in crisis, nor to oppose anything, they are other times.

Finally, the historical time, that which attracts us particularly for our teaching experiences. History is in itself a form of temporality, a form connected with absolute or relative times, universal or human, of which we spoke earlier. For example, in the following text of Benjamin we see again this dialectic of the absolute time of science, of the infinitesimal present, in front of the continuous present of simultaneity: "History is the object of a construction whose place is not constituted by time homogeneous and empty, but for a full time, 'time-now'. Thus, ancient Rome was for Robespierre a past loaded with 'time-now' that he made jump out of the continuum of history" (Benjamin, 1982, our translation). However, the fundamental point of this quote is the idea of history as a construction, it is what gives continuity meaning, everything happens simultaneously in the mind of the historian, or in other words, everything exists at the same time. However, the narrative condition of history as we know it is accompanied by a linear temporality, of reading, of story, which obviously admits complexities, ramifications, loops and parallels, but as Paul Ricoeur says in *The Time Related* (1992, our translation): "Is correlative of the time involved in the narration of the facts. Reporting, in effect, takes time, and above all, organizes time. The story is a configuring act that, from a simple succession, obtains temporal forms organized in closed totalities. This configured time is structured in frames that combine intentions, causes and hazards". Anyway, here we come to a point where new discussions and polemics are simply opened, the role of intentions in history, as well as the concept of causality, are just some of the pending issues, not to mention the problem of the narrative itself and the structural characteristics that translates the narrative to the historical construction.

4 Visualizations: Representation and Cognition

We can say that all the previous reflections on time make sense for our work in terms of an objective, establishing alternatives to the historicist story from alternative spatial models. The representations of events, their logical and topological relationships, allow us to investigate new cognitive tools to think about history. The graphic and spatial representations of time open new perspectives on temporality through analogies and visual metaphors. The way in which our mind constructs notions of time through analogies and the importance that this has in the rest of our thought already appears clearly in Immanuel Kant's *Critique of Pure Reason* (1978, our translation): "Time cannot be a determination of external phenomena; neither belongs to a figure or a position, etc., and instead, determines the relationship of the representations in our internal state. And, precisely, because that internal intuition does not give any figure, we try to supply this defect by means of analogies and we represent the succession of time by a line that goes to infinity, in which the multiple constitutes a series, which is only one dimension; and from the properties of that line we conclude the properties all of the time, with the exception of one, which is that the parts of that line are at the same time, while those of time are always one after the other". Here observing the restrictions imposed by the spatial analogy of linear time, but which is evidently transferable to any mental or bodily representation of time. A question on which psychology has also worked since its inception: "Our abstract representation of time seems rather to be entirely taken from the working mode of the P-Cc system [Perception-Consciousness], and correspond to a self-perception of it" (Freud, 1997). We are convinced that these restrictions intrinsic to any model, to every metaphor, to any representation, should not prevent us from taking advantage of the wealth they offer us as tools of thought, as a kind of cognitive assistants, and of the power they have in research, teaching and learning, as opposed to established, institutionalized or hegemonic.

There are many examples of these alternative models (see Rosenberg, 2010), from the genealogical lines (Maximilian I genealogical line, Albrecht Dürer, 1516) or the representations of history (Universal History, Johannes Bruno, 1672), to the explorations by Ward Shelley (Who invented the Avant Garde? or Frank Zappa), going through the hybrid, radial models (Spiegazione della Carta Istorica dell'Italia, Girolamo Andrea Martignoni, 1721), cyclical (The wheel of fashion, JJ Grandville, 1844), of flows (Strom der Zeiten, Friedrich Strass, 1849 or The Histomap, John Sparks, 1931), or even variations of linear representations such as the famous Dubourg Timeline. Anyway, these examples are only used as background in the research or

triggers in learning, within a larger proposal that points to individual explorations of possible cartographies of time and history that encourage new narrative constructions or even new types of historicity.

5 Practices: Criticism and Exploration

The work, which comes from the material and its summation (the cases or sample to be analyzed), then consists of taking as a starting point the "critical transgression" of the classic timeline (as mentioned above), as a graphic representation, which contains in itself an idea / concept of chronology related to a paradigm that leads us to associate antecedence with causality and conceals a teleological metaphysics of historical time (event-succession-happens = reality = truth). This appears even in any classic book of basic history, the reading of it becomes intensely ambiguous, something that we cannot explain, but that nevertheless exists as a certainty for our conscience. This little question is what we use as a trigger for the beginning of the construction work of the Time Map; sometimes the possible answer we try to associate with the concept of analogy; more than anything because, well we know, it serves as an explanatory support for a phenomenon that is a little less complex to explain than that of time, since the error is regularly incurred in explaining the phenomena from the phenomenon itself, as the common sense of including part of the definition we want to give of some issue that we try to define, and therefore we fall into a falsehood (tautological) to define from the definition itself not yet explained; that for our case is not to interpret the time from the linear representation.

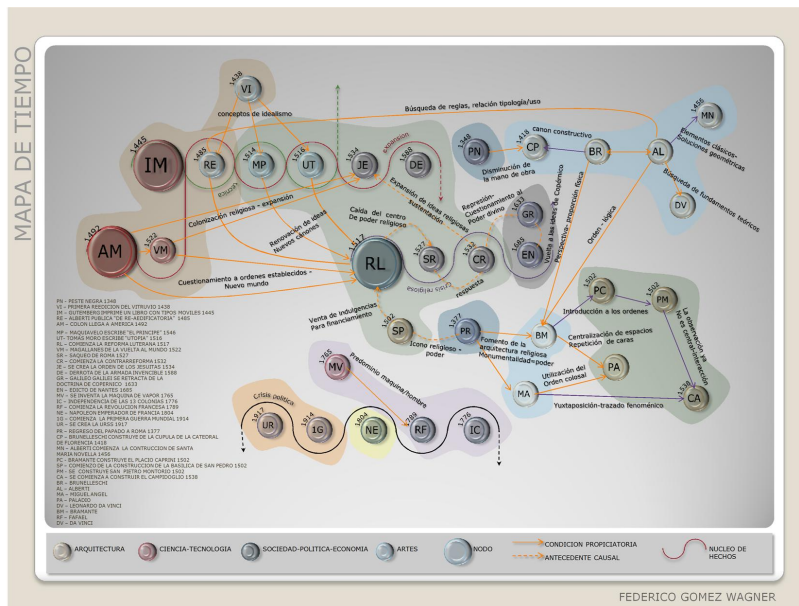


Fig. 1: Dinamic Hibrid Timemap. Source: Marcelo Robles.

What happens if we start from the following hypothesis? Time can be seen as a physical quantity that allows us to sequence facts and determine moments. It is necessary to know the processes of construction of the representations, because the "mental representations" (state prior to the intended visual representation) are organized in and under conceptual structures, following procedures, overturning certain attitudes that give meaning, which are not static and that do not have a unique way of being addressed, but are anchored in an explanatory cognitive psychology. In the observation of the conjunctures it is known that there have always been a whole series of conflicts and power disputes over imposing a cultural vision over others, a temporal space paradigm over others, struggles that establish hierarchies, dominions, predominance of some modes of feel and think the time. The ways to access the knowledge of these is to go beyond the immediate increasing dimensions in space and time in the field of adaptation, or evoke what exceeds the perceptual and motor field, therefore speaking of representation is to speak of "meeting of a significator that allows the evocation of a meaning procured by thought" (Piaget cited in Carretero, 2006, our translation).

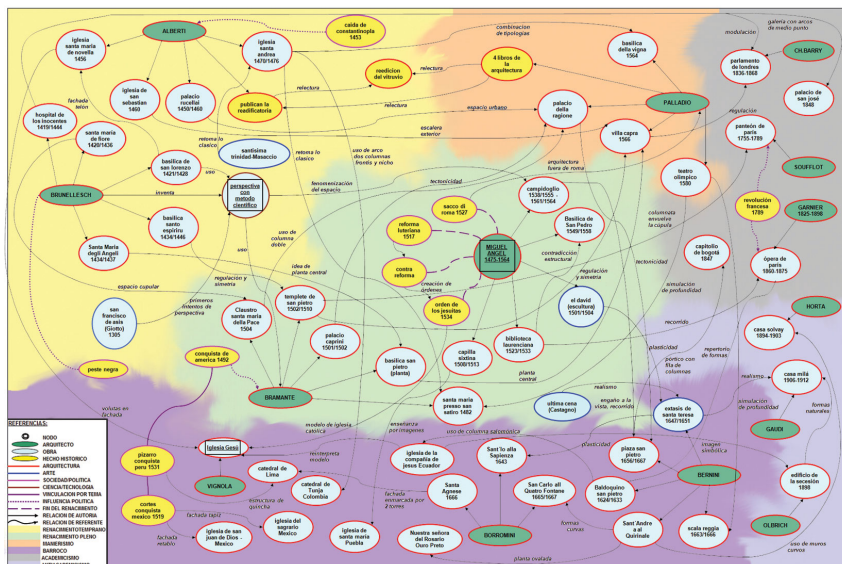


Fig. 2: Cartographic Topological Timemap. Source: Marcelo Robles.

As a consequence of this, there are times that are proposed as universal and times that pose opposite or simply different models for our temporalities. So far we have not stopped talking about representation, time and in a certain way what symbolizes time; and how one arrives or arrives at a result of possible representation of the thought of it. And although a possibility of interpretation of time is physics (think that a line is a physical manifestation of a sequence of points), what is interesting for this study is the symbolic aspect of the interpretation (paraphrasing would be the intention of the meaning of each point). Cassirer points out that more than in a physical world, man lives wrapped in a symbolic world, in a network constructed by language, art, myth and religion; all these phenomena linked to symbolic abstraction, all these capable of generating a manipulation of abstract symbols linked to objective reality. Hence the possibility of being able to understand why human beings could construct different representations about the same phenomenon: time.

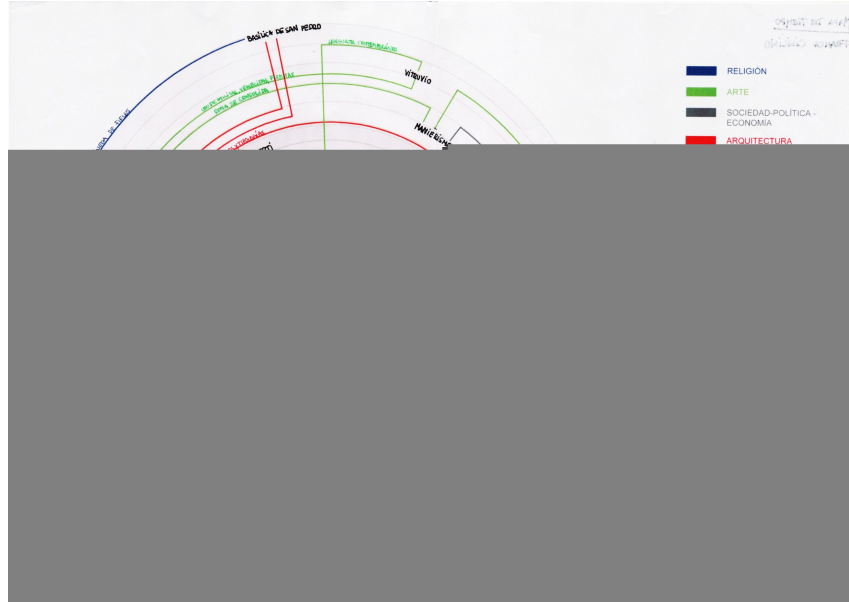


Fig. 3: Circular or Conical Timemap. Source: Marcelo Robles.

We will then show the representational images of the possible interpretations of time according to the students' versions (Fig.1, 2, 3 and 4), where it will be possible to identify from the classic sequence of events (of formal similarities, of similarities in the connective conformations, in the guidelines of the alternative accounts, in the choice of absolute circumstantial facts, etc.) to the interpretative alternatives (of formal similarities, but of variation in the connective conformations), and even to the particular identities of the general relationship (with graphic assessments of connectivity with the types of connective conformations, alternative stories and choice of absolute facts), and comment on the results in the observation of these cases; that are based on the verification of the results of methodologies applied to disseminate the events, meaning in what order of importance and under what conjunctural association they were given; (dissemination of knowledge) and how they were translated to be included in the graphic models; In addition to realizing how it is ratified in itself, the tools of association exemplified by the work of analogous issues to the proposals (schizophrenics, theoretical, previous works, debates, as searches of the type and of others with characteristics of interpretation) have been effective. Subsequent analysis, from which the elements to be associated to the conformations of the representations of time must be extracted through the synthesis. This last aspect is anchored in the particularity already mentioned, that the work is annual and that its most outstanding characteristic is that increasing its density, in terms of its elements and relationships, as more data is recorded.



Fig. 4: Relational Categorical Timemap. Source: Marcelo Robles.

The hybrid dynamic time map (Fig.1) starts from a deconstructing of a traditional timeline based on a logic of flows. From certain categories, it finds sequences or causal links that generate discontinuities in the line and clusters of facts. The process started with an analog approach and CorelDraw then used for the final configurations. In the case of the topological cartographic time map (Fig.2), the metaphor of the territory is used to generate regions, sectors and connections, as well as to establish distance and proximity relationships. In this case we started working with VUE (Visual Understanding Environment) to then move on to other graphic editing programs. The circular or conical time map (Fig. 3) is particularly interesting for its structural proposal, which directly impacts the logic of its historical discourse, and which is located as the second great spatial-temporal analogy, just after the line. In this case we worked exclusively by hand with traditional drawing methods. In another sense, the categorial relational map (Fig. 4) seeks to weave the networks of events from certain types of relationships that construct units of meaning where the factual appears subordinated to the conceptual. Here digitality appeared from the first drafts, using Illustrator primarily as a tool. Finally, in the cybernetic diagrammatic time map (Fig.5), the use of software (AutoCAD) and its configuration are complemented in a coherent way, highlighting the metaphor of the electronic circuit and the creation of reading levels from the systematization type of the nodes and their interconnection from an infrastructure of narrative paths.



Fig. 5: Cybernetic Diagrammatic Timemap. Source: Marcelo Robles.

We can say that all the previous reflections on time have meaning for our work in terms of an objective, to establish alternatives to the historicist story from alternative graphic-spatial models. The representations of events, their logical and topological relationships, allow us to investigate new cognitive tools to think about history. The graphic and spatial representations of time open new perspectives on temporality through analogies and visual metaphors. The way in which our mind constructs notions of time through analogies imposes restrictions, but we are convinced that these restrictions intrinsic to every model, to every metaphor, to every representation, should not prevent us from taking advantage of the wealth they offer us as tools of the thinking, lack of cognitive assistants, and the power they have in research, teaching and learning, compared to the established, institutionalized or hegemonic.

One of the most powerful manifestations of the role that history can play in education is the reflection on the construction of the individual identity in front of the collective identity in a culturally globalized world. We have verified that this point generates a positive response from the students and collaborates in the always difficult motivational task. The crisis in the models imposed in the construction of identities, the surprising uniformity that hides the apparent diversity of individual identities in front of the identity collective as a place of refuge and resistance of the local in the current context of cultural globalization (Brünner, 1989). On the other hand, Memory appears to be essential when presenting History and making it dialogue with stories and memories (Middelton and Edwards, 1992). The conservation and the record of what happened, who registers what and how, who has been left out of the registry and how it is possible to trace their tracks. And again the importance of memory in the construction of individual identity, tell one's own history and inscribe it in major historical processes, contributing to give meaning to what seemed distant, abstract and impersonal, and at the same time building networks of increasing complexity of one's own individuality. Here History acts as a fundamental element in the articulation of a collective memory (Halbwachs, 2004) and a personal history, thus favoring the feeling of belonging to the autonomy of the inoperative individualism, as well as the acquisition of a historical dimension of the acts themselves (Le Goff, 1991). Transcendence versus immanence.

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