
HISTORICAL AND CHRONOLOGICAL TIME IN EDUCATION

A NEW THEORETICAL FRAMEWORK

José Gómez Galán*

*Metropolitan University (AGMUS), College of Education, 1399 Ave. Ana G Mendez (Carr. 176),
Cupey, Puerto Rico, United States*

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Abstract

Chronological and historical time must be present in the instructive processes for its comprehension is fundamental to the education of human beings. Otherwise, the teaching of Social sciences and Humanities at all its academic levels would be impossible. This article has as its principal objective the establishment of a new theoretical framework about the characteristics of the study of time in education. It is defended that the appearance of the social digital offers new mediums and resources that are taking us towards the creation of innovative didactic models in which teaching and the construction of the sense of historical time can be improved considerably. This fact requires an important revision of the current educative theories related to the teaching of time. As the main conclusion, it was established the need for deepening the study of this important problematic in the light of the methodologies used today in the field of digital technologies and in the context of the media education. The development of the understanding of historical and chronological time, independent of cognitive development of the person, must be understood above all as an educative process in which strategies and mediums employed are fundamental.

Keywords: historical time, chronological time, history, ICT, educational theories

1. Introduction and problem context

The understanding of time, in all its dimensions, is a problem that encompasses many disciplines (Philosophy, Physics, Mathematics, Psychology, etc.). Throughout history the determination of the nature of the time has been one of the central themes of philosophical thought, from Heraclitus to Heidegger, through Plato, Aristotle, Plotinus, Augustine of Hippo, Leibniz, Kant, Hegel, Bergson, Husserl, Kierkegaard and Wittgenstein, we could cite dozens of thinkers who have approached in one way or another (properties, characteristics, possibilities of knowing its essence, ontology, etc.) the meaning of time. Since the scientific revolution, and especially due to the advances that have occurred in the field of Physics, time is also one of the main problems of

* E-mail: jogomez@suagm.edu, phone: +1787 766-1717 Ext. 6939

the pure sciences. The revolution that originated with Einstein's vision of the Universe, the foundation of contemporary Cosmology, reveals to us that space and time are manifestations, apparently distinct, of one and the same physical dimension.

In this work we will focus on teaching about time in the field of the Social sciences and Humanities, and especially, History. Therefore, the object of our interest is what we are able to understand as *historical time*, in other words, the evolving of humans and society over time. Naturally we will not enter into the philosophical problem of historical time posed from a Hegelian perspective, i.e. the *Geschichtliche Zeit* subsequently developed by thinkers as, among many others, Kierkegaard, Jasper or Heidegger. It would be entering a discussion focused on the nature of time, irrespective of its importance as a fundamental element in history. As, in short, history is nothing more than time, the succession of economic, social, political, events etc., that have been experienced by humans over the centuries. As was recently shown by Strauss [1], there are many ways to tackle the sense of time, or our understanding of it, because our awareness exceeds the limits of physical time: we could even talk about emotional time, because depending on our activity an hour may seem like five minutes and vice versa. Time, therefore, is multidimensional in nature and cannot be studied from a single dimension.

Historical time, therefore, seems to us to be fundamental in the development of the Social sciences as a whole and so if students, from their first years of education, would be capable of placing historical events within a *temporary scale* it would contribute decisively to their understanding of history and social processes. Situating ourselves, of course, in what could be described as the *arrow of time*, if we want to use the cosmological terminology of Hawking [2], Penrose [3], Carroll [4], and Hawking & Penrose [5], or the chaos physics of Prigogine [6, 7] and Nicolis & Prigogine [8], which is based on the idea of time as a linear and irreversible process (on a human scale at least, in the macroscopic world). Naturally this concept of time is modern, and through the direct influence of contemporary Physics, since in human societies it was not always thus. On the contrary, ancient cultures believed, as was already demonstrated by Eliade [9, 10] in time as cyclical and reversible, precisely because of the direct observation of phenomena (the evolution of the day, seasons, the solstices, lunar phases, etc.), which were repeated with accuracy and precision. If this happened in natural phenomena it could also happen in history, in human life, etc., all this could be cyclical and be repeated eternally.

Parallel to this, we will also keep in mind what we can call *chronological time*, i.e. the concept of physical time that allows the measuring of time (counting seconds, minutes, hours, days, weeks, months, years, decades, etc.), based on the astronomical cycles, fundamentally on the rotation and movement of the Earth, and both solar and lunar visual motion, although we could also include in this temporal dimension, for example, the life cycle (birth, growth, maturation, aging), which together allows us to perceive the passage of time. Chronological time can be considered as a foundation for the understanding of

historical time, which is more complex since it contemplates many other elements of a historical and social nature. From a didactic perspective, which interests us, we require a different but at the same time complementary work, therefore in this article we take into account both temporal dimensions for a correct work about teaching-learning processes.

The development of our study, obviously, lies basically in the field of the teaching of History, but we must not forget the need for a permanent dialogue between this discipline and all of the Social sciences and Humanities. Gillis [11] speaks of plural historical time, to establish, in fact, that many items or concepts are beyond the scope of the solely historical or historiographical. Of course, it is impossible to understand the economic, political, social processes, etc., without a temporal perspective. They are permanently in connection with historical processes or, said another way, are part of history.

2. Educational development of historical and chronological time

In this context, the development of the temporal notion in children is a line of research that particularly interests us because of the importance that it has in the process of a full formation of a person. Therein we focus first of all on the stage which comprises the second cycle of early childhood education and the first cycle of elementary education, i.e. children between three and eight years of age (depending on the educational system of each country). In this age range it is essential to take into account the notion of chronological time, i.e., the overall development of temporality in the children, but, as we are arguing, a parallel problem derived from the previous one seems more important to us: the possibility of initiating them into the understanding of the sense of historical time [12]. Reasons justifying this are not lacking. The stimuli and influx of information that a child receives in today's society requires a change of perspective. In the dizzying contemporaneity in which we live, dominated by the audio-visual culture, the power of the media and the Internet, all related to time, and especially historical time, has taken on a role that it has never had before. The temporary sequences children face today from the beginning of their lives requires the establishing of immediate strategies that allow them to be aware of them, and their, at the least, elemental assimilation. We are not referring, obviously, to temporality as traditionally considered (biological rhythms, routines, etc.) which the majority of studies have been centred, but to that derived from *reality* creating instruments that have a decisive influence, in today's world, on children, especially the audiovisual technologies that exploded at the end of the 20th century. Children face *new* temporal sequences, derived from the different languages of the image which this media employs. Our interest is focused on identifying them and knowing them in order to empower children against their great influence.

There is, therefore, a need for a comprehensive revision of the studies carried out so far in order to include the new characteristics of our society. On another different level, we want to keep in the foreground, television, film,

video, computers, etc., creators of a parallel *reality* (in many cases the *virtual* world is used to distinguish it from the *real* world) which produces information that belongs to the historical area. Never before have had children received such a barrage of images which do not correspond to their *own* world, their environment, (family, home, school, neighbourhood, etc.). Fundamentally, films (real images or animation), computer software and video games (which go further than traditional comic books, stickers, etc.) offer elements that do not belong to the reality in which they live day by day. Musketeers, Samurais, Templar knights, Spartans, etc., are things which children know through these means, but which, however, are not part of *today's* world. Of course, in order to avoid moving away from our objectives, we will not focus directly on the very important question that the influential power of audiovisual media can have on children ability to distinguish between reality and fiction, which of course needs specific and much more complex research. Nor, in a general way, of the relevance that training in technology and media has nowadays, even from a very early age. This area we have elaborated widely and it continues to be of great interest for us nowadays, and concerns: to enabling children to establish that those elements (of course fictitious and created by this media) are *representations* of the past, from other times [13].

3. Teaching time in the context of media pedagogy

These circumstances, and the predominance of the image in all the communicative processes of the 21st century, with all that this implies, is why we suggest that there is a need, due to the special circumstances of today's world, to educate children so that they have a better understanding and are able to critically analyse the visual information they receive. Images, moreover, generated by technological and digital media, greatly facilitates manipulation. It is true that the 20th century has also been dominated by the iconic, but the true explosion occurred with the digital revolution. It is impossible to compare, for example, the influence that television had in the 20th century with the presence that it has today in society thanks to the digital paradigm, developed in hundreds of general or thematic channels diversified in multiple media. As we argued in another moment [14] we are in a process of techno-mediatic convergence in which all media is image: television, computers and mobile phones (with the concept of smart phones), Internet and social networks, e-readers, tablets, etc. The important thing is not the medium, because this can include multiple media. It is the message, and an essentially iconic message. The children and youth of today live in the era of the image, an image that can offer a representation, a (virtual) *reality* of everything you can wish for.

Among other many items to consider we want to delve here into the virtual representations that these generate, frequently featuring scenes from other historical periods. Precisely for this reason it is necessary to go one step further than the traditional objectives in the early educational stages to begin to develop in the child not only a temporality in a chronological sense, that nowadays is

pursued, but also to initiate them (of course with great care and attention, and in a very general way) in the notion of historical time. This is due to the fact that “the sense of time is one of the fundamental parameters of the human personality” [15], and should be addressed as soon as possible. We would thus get a double benefit: an effective development of the sense of time, with the great importance that this would have for the attainment of educational objectives in subsequent stages, on the one hand, and it would contribute, on the other hand, to their critical skills when faced with the influx of iconic messages they receive daily. The ideal moment for this (before that moment it is not feasible or viable) is in the last part of the second cycle of early childhood education, i.e. from age five, and it should be developed during the remainder of elementary school education and even in high school [12]. The main psychological studies conducted in this area confirm it, as we will see.

4. The overcoming of classic postulates

The development of the sense of historical time is, above all, a psychopedagogical problem. One of the areas to explore in this field, and which is based, in particular in Cognitive psychology, is the study of the development of abilities in children. Among them we can include the sense of time, temporality, which affects, especially, the diverse curriculums of early childhood and elementary education, common to all educational systems in the international ambit, as happens, of course, throughout Europe, United States and the whole of Latin America.

However, the problem is most definitely not new. Piaget, possibly the most famous developmental psychologist in history, and advised by Einstein, studied profoundly the notion of time in children [16]. The essence of time dominates the greatest scientific achievement of Einstein: the theory of general relativity. This theory is essentially a reformulation of the theory of gravitation of Newton. For Einstein [17, 18], gravitational fields have as their main characteristic the curvature of space-time (as we already indicated above, they constitute the same dimension in the Universe). There is an expansion of time in the theory of restricted relativity (which deals with the problems associated with the speed of light as a constant, time is relative), the temporal interval between two events is lower in an inertial system in which the same thing happens in one spot while in another system that is in rectilinear and uniform motion in relation to the former. It should not surprise us, therefore, that Einstein raised the problem of the sense of time in human beings, and especially children, to Piaget, since one of his objectives was to unravel, in Physics, the nature of time.

The conclusions reached by the child psychologist determined that only children from seven or eight years of age are able to understand, from a temporal perspective, a narration. This is because at earlier ages they cannot coordinate properly the movement of different speeds (object for *physical* time and subject for *psychological* time), understanding as movement the succession of events, and thus differentiating it from spatial displacement, whose notion develops

earlier in children. From seven years old children can *reconstruct* accounts/stories in their correct order, due to their ability to remake temporary constructions: both in psychological as well as in physical time they will be able to effect an operative reconstruction, when, until the age of seven it would only have been an intuitive reconstitution [16].

The contributions of Piaget were a very important advance in relation to what until then had been achieved. However not all the specialists were in agreement with these results. From this foundation, Calvani [19, 20], and based on previous research, such as Fraisse [21], Jahoda [22], Brown [23], Poster [24], Friedman [25], Richards [26], Stein & Glenn [27] and Blyth [28], among others, determined that Piagets theories could be revised. For example, he was able to establish that children of four and five years old are able to reproduce the order of a story (which Piaget denied), provided that this is clearly structured or uses non-linguistic means, such as images for its construction. For this author, likewise, children can establish causal relationships in very early stages, even in pre-operative stages. Other researchers have shown later similar results, such as Thornton & Vukelich [29], Vukelich & Thornton [30], Levstik [31], Harnett [32], Pluckrose [33], Barton & Levstik [34], Stow [35], Hodgkinson [36], Gomez-Galan & Mateos [12], Downey & Levstik [37], Barton [38-40], Stow & Haydn [41], and Levstik & Barton [42].

Of course we are talking about, and in this sense we are in agreement with Calvani, a beginning of the development of the sense of historical time, but in no way a dominion of this notion (in all its aspects and in what it implies for the understanding of history) that can only be obtained, and on this we agree with Carretero & Limon [43] and Bueno [44], at adolescence. We are situated, clearly, at the beginning of the teaching of historical time.

Within, therefore, time as *meta-concept*, according to Asensio, Carretero & Pozo [45], Lee, Dickinson & Ashby [46], Denos & Case [47], Seixas & Morton [48], and from a Calvani's perspective, we consider that the development of the notion of time, both chronological and historical is necessary – children build it in parallel, with the first as the cognitive basis of the second [49-51] – as early as early childhood education. If five year old children can form temporal sequences, like eight year old children, when for example , they use images as a means of construction (precisely the main vehicle of transmitting information in today's technological society) it will be relevant (and even essential and determinant for later training) to use it for early development of the temporal sense. What is more, even though at this stage to carry out an intuitive reconstitution (which Calvani would esteem in many cases as operational), to acquire a basic notion of temporality in its historical aspect would be required as an essential element of a first approximation to the nature of the messages of the audiovisual media (which offer, occasionally, unique experiences). Children should know and discover that images and/or scenes that show the past (whether real things - like documentaries - or fictional representations of the same - like movies, software, stories, comics, drama, etc.) do not reflect today's world, they are not the *now*. And it can and should be used

to establish the foundation, of a subsequent process of categorization and codifying of historical time, in elementary education.

Of course for this whole process a correct training of teaching staff would be appropriate, which is essential in any process of educational development about historical time, such as have shown Sole [52], Santisteban [53], Burny, Valcke & Desoete [54], Kitson [55], Lorenc et al [56], Harris et al [57] and De Groot-Reuvekamp et al [58]. We must bear in mind that we are confronted with a problem that is very complex from an educational point of view, but which must be faced due to the benefits inherent to it.

5. Discussion and conclusions

The presence of ICT in modern society is transforming the processes of learning as much in the formal education field as it is in the non-formal and informal [59]. It is necessary, therefore, to revise many of the educative theories that were prevalent during the 20th century and that were applied with success at a time when social characteristics were considerably different. Within the framework of this necessity of adaptation to the new parameters special importance must be afforded to the instruction of chronological and historical time which constitutes one of the pillars of education in the field of Social sciences and the Humanities [12]. The stimulus that children and teenagers receive today through multiple media sources, beyond those that are specifically scholastic, is introducing them to new processes of knowledge and learning and to a different concept of what *reality* is understood to be. An enormous variety of educative sources, especially in audio-visual and multi-media fields are introducing them to highly impressive experiences that were unknown only a few decades ago [60-63].

The case of the learning of historic time is paradigmatic in this sense. In this manner, the viewing of 3D films, video games, the next virtual and augmented reality, or from there, future technologies that are still unknown, will permit children and adolescents to engage in *virtual time travel*, moving back to historic epochs which will present a level of realism and quality almost indistinguishable from that of authentic *reality* itself and the *present* that the child is actually living [64, 65].

This will have important advantages but also present problems that will need to be addressed. Today it is completely necessary that digital technologies are, themselves, an object of study, in such a way that students of different educational levels can be trained to use them and their products correctly and critically. Only by a critical and analytical usage of the new multi-media, will it be possible to develop an integral education in answer to the new society [61].

Historical and chronological time concepts should be taught in this context. As has already been seen there are many authors [12, 20, 25, 28, 33], among those we have met, who defend the revision of Piaget's thesis [16]. In our case we don't believe that this has come about due to a modification of the educative theories related to evolving childhood psychology, but rather that

social changes and the emergence of the new media and technologies have led inevitably in that direction. It is clear from all developed research during the 20th and 21st centuries, that the concept of time is complex and very difficult to teach to children [54, 55], but likewise it has been demonstrated that even at the early ages an understanding of temporal order of history's events exists and that through the capacity of thought it is possible to explain the continuity and the change in time [12, 20, 32, 38, 66]. There exists, therefore, consensus in the scientific community that an approach should be initiated in this field as soon as possible, although important differences exist regarding its execution and implementation [56].

The digital paradigm, nevertheless, can help us with this. We are working in a field in which very few studies exist about the subject, whereas research undertaken in the didactic context, and with different results, leads us to defend the necessity of combining the traditional media with the virtual. As well, it is very important to make an impact in the collaborative and multi-modal dimension [13, 66, 67], where some specific tools, such as *timelines*, have shown themselves to be efficient [12]. We consider this to be the best way of confronting the problematic. It is open, and therefore a line of fundamental research in which collaboration and diversity of studies is demanded, one that goes beyond those undertaken in elementary and secondary education. It is important to go deeper into the field of childhood education, an area in which there is much to explore.

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