Temporality and Emergences in Education

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Abstract

It is striking to note to what extent the time issue in education is commonly understood in terms of *chronology*. It is an institutional and linear time that is divided and then fitted back together like a Russian doll in an analytical approach. The conception of time is *reversible* and possesses the same characteristics as space.

It is a paradox that this institutional rationalization of time by reversible chronological divisions barely conceals the whole concrete and living reality of human time, which is a continuous process of change that philosophers generally call *duration*. On the contrary, far from the above reduction, its specificity lies in its *irreversibility*.

This article intends to present both the results of empirical research on cooperative pedagogy and its current theorization. *The emergence of complexity in time* is visible in the primacy given to *processes* in the educational relationship. *The way the multiple scales of complexity are superposed* is reflected in the *cooperative* organization of work, for a new educational temporality which results in an increase in joyful emergences.

Keywords

Emergence, temporality, complexity, education, philosophy, irreversibility, cooperation, affectivity

Introduction

Learning is more than simply gaining proficiency. *Learning means becoming someone else*, someone free and sovereign. The difficulty lay in transforming my desire into an experience. *My motivation remained intact but the emergence unlikely*. In order to emerge, this conjectural situation had to be forced. Since the music could not come to me, I had to find a way of going to the music. *Learning, therefore, meant composing*. At this stage, composing consisted of reconstituting a route whose destination I was unfamiliar with. *My ignorance lay at the centre of this plan*.

Pascal Dusapin, *Une musique en train de se faire*, Seuil, 2009, p. 115 (Inaugural lecture held on Thursday 1st February 2007 at the artistic creation chair of the Collège de France).

In his 1974 book entitled *L'irréversible et la nostalgie*, French philosopher Vladimir Jankélévitch uses the following words to introduce his long meditation on time: "Irreversibility is not merely another characteristic of time; it *is* the temporality of time itself; […] every temporality is irreversible and pure irreversibility is always temporal. This reciprocity is perfect" (Jankélévitch 1974, 5). As far as mankind is concerned, the irreversibility of time means the irreversibility of one's destiny: "Mankind as a whole is destiny and destiny alone", the philosopher adds, "and since destiny itself as a whole is irreversibility, then mankind as a whole is no more than irreversibility" (6). Jankélévitch believes this to be the cause of a deaf nostalgia regarding the impossibility of going back in time. For example, it is impossible to become the person one once was again. However, for those who are able to confirm what time claims, it also brings freedom. Joyful consent to what occurs is the remedy for irreversibility: "only consent to the irreversible triggers joy" (180).

I find this an excellent introduction to my remarks since the author speaks both about the nature *of time* and the conditions *of destiny*, referring to transformations over time and more specifically from the perspective of human conscience. The second aspect, namely the irreversibility of time, is what draws my attention, and I will not be going back to this premise. With reference to Julius Fraser's hierarchical theory of time, it brings us back to types of nootemporality and sociotemporality. Since I would like, here, to talk about education, I will centre my comments around the time of the soul, as we used to say, or the 'affective brain' Rémy Lestienne refers to, which is a form of socialized time.

My message will be this: expanding upon Jankélévitch's idea that consenting to the irreversible brings joy, I will question what opposes it in school educational practices. Then, according to the same philosophical tradition which says, in Bergson's footsteps, that the richer the creation, the deeper the joy, I will consider whether it is rather the inability of our school systems to foster creation that conversely results in so much grayness and so few emergences. Therefore, a new relationship between joy and creation may shed light on the link between time and emergence: joy is an affirmation of the irreversibility of time and emergence is a product of creative activity. I would add that this relates to the epistemological context of complexity.

1. The Paradox of Time: Chronology and Duration

1.1. *Institution Time: A Chronology Designed as Reversible*

It is striking to note to what extent the time issue in education is commonly understood in terms of *chronology*.[1] It is an institutional and linear time that is divided and then fitted back together like a Russian doll. For example, study time in France is divided into long periods depending on the age of the pupils (i.e. primary, secondary and higher education). These periods are split into parts (e.g. for primary school cycles 1, 2 & 3) which are then divided into years (e.g. CE2, CM1 and CM2 for primary cycle 3). These age-related divisions and subdivisions correspond to other divisions relating to educational content; teachers segment and organize national syllabuses as 'progressions' throughout the school year, allowing time for holidays and time for assessment. The words calendar, timetable, schedule, planning, testing, grid, syllabus, progress, sequence, step and period, among other commonly used words, show a conception of time which meets an analytical and linear approach by means of controlled divisions.

This conception of time is *reversible*,[2] with the same properties as space (and conveniently represented in the form of tables or charts, for example). Even though learning is logically ordered over time, its organization can be described just as well in one direction of time as the other, i.e. forwards or backwards. Repeating a year is a very good example of this reversibility because it allows a student to go back in time to study the same syllabus identically. Another example is that the programming of learning by the teacher allows, and even requires, multiple exchanges to review the progress of work both in the past (what was taught) and in the future (what must be taught), with no negative impact on educational progress over time.

Far from challenging this logic, recent work on chronobiology tends to confirm it, with experts appointed by the government only suggesting adjustments to make time divisions better adapted to physiological data.

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[1] In *La peau de chagrin*, Balzac says "If you are to judge a man, you must know his secret thoughts, sorrows, and feelings; to know merely the outward events of a man's life would only serve to make a chronological table—a fool's notion of history!"

[2] Time is *conceived as being* reversible (this is how we imagine it), whereas in actual fact it is not.

1.2. *Time Lived: The Irreversibility of Duration*

It is a paradox that this institutional rationalization of time by reversible chronological divisions barely conceals the whole concrete and living reality of human time, which is a continuous process of change that philosophers generally call *duration*.[3] On the contrary, far from the above reduction, its specificity is its *irreversibility*. Contemporary physical scientists may be torn between reversible and irreversible approaches to phenomena (e.g. heat transfer or the expansion of the universe), but it is hard to deny the irreversible nature of human phenomena, which J.T. Fraser placed at the top of the scale in his hierarchical theory of time. We may well remember the French Revolution, but obviously we will not be able to relive it or change it.

In human experience, duration takes a very specific form, i.e. *temporality* (or time lived). The divisions of official syllabuses impose static, regular and homogenous *paces* on the action whilst the future of the reality lived is played out through a series of dynamic *rhythms*, in continuous variations and in harmony with the environment as well as both exogenous and endogenous inner needs.

Whether we try to understand or trigger emergence phenomena in a human context, the substance of time, understood as duration and temporality, should be recognized in its entirety.

1.3. *The Fantasy of Deterministic Evolution in the Field of Educational Practice*

In actual fact, accepting the concept of emergence with its characteristic relationship to time represents a true epistemological break, not to say a paradigm shift, both in theoretical discussions and educational practices. The traditional school approach, which dates back to the first institutions of antiquity, whatever historical form it may have taken, is based on a linear deterministic conception of the evolution of time.

This classical approach, seen in a complex theoretical context, has the following characteristics:

– *homogenous state* in so far as the different parts of the system (class, school, etc.) are treated as being identical, possibly in the name of the republican principle of equal rights;

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[3] Long before Bergson, Spinoza (*The Ethics*, Part II, definition 5) said: "duration is an indefinite continuation of existence."

– *asymptotically stable state* in so far as the disturbances it suffers fade more or less quickly and leave very few or no traces (in other words learning goes wrong);

– *balanced system*, or almost, where hidden potential remains 'dormant'. A system that is close to balance quickly returns to its original condition when it suffers minor disruptions.

In actual fact, it comes back to organizing the environment so that every *cause* (e.g. a lecture, an exercise, an instruction, etc.) prompts the expected *effect* (e.g. specific learning, a particular answer, etc.) in a well-organized sequence of causes and effects generally referred to as 'progress' in France. This organization of the environment (the time characteristic of which is pace) partly consists of eliminating uncertainties (fluctuations, disruptions, etc.) from the activity and in more general terms any heterogeneous event from the teaching object. Very simply put, according to a logic of linear causality, we can say that any lesson *a* from the teacher has to prompt a knowledge *a'* for the pupil. The fantasy of reversibility gives the impression that in the face of a mistake, a difficulty or even academic failure, one simply needs to go back in time to the point at which something dysfunctions and start over again correctly. This fantasy mistakes space (which allows any movement and step backwards) for time (which can only move in an irreversible manner).

The notion of 'emergence', in the way that we understand it, lacks relevance in this context. We generally prefer to talk about 'result' or 'acquisition' as the expected effect of the action. Temporality, meanwhile, is simply the time lapse between *a* and *a'* with a programmed chronology in the background. In didactics, taking learning time and 'chronogenesis' (or the distribution of knowledge over time) into account does not radically change the circumstances of this issue.[4]

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[4] Educational science teacher Yves Chevallard refers to the pathology of educational time (inherent to the traditional model) which is expressed by an excessively fast sequence of successive uncontrolled knowledge and a logic of forgetfulness (for the gap between educational time and learning time) as 'cognitive disconcertation'. Educationalists endeavor to deal with the issue of memory, considering that rooting the class in the educational past historicizes the learning process, which largely determines success at school. 'Didactic memory' makes it possible to convert memories into knowledge that can be mobilized. However, this new academic discipline overlooks non-didactic elements of the educational relationship, especially affectivity and its consequences on sociability.

2. Emergence Conditions

My working hypothesis is that educational institutions mostly work or tend to work as closed homogenous systems with no exchange with the environment. Our experiences show that they would have everything to gain by behaving as open complex systems.

2.1. *Complex Approach*

The changes in temporality scale from physics and biology to human culture make it necessary to complete the model of matter and energy exchange with *desire* and *project* exchanges, sometimes referred to as intentionality. Being immersed in time is one thing but being conscious of it is different. Taking notice of it as a dimension that is specific to the human action is another matter again.

One can think that way of the transition from potentiality to topicality and of emergence phenomena in human practices (in this case educational) by taking the key role *affectivity* and *sociability* both play into account. This should be done under at least two conditions:

– firstly, the significant progress of research in neuroscience, where all functions mix, particularly perception, memory, affectivity and sociability. The complex activity of neural networks leads in particular to a correlation between cognitive intelligence and emotional and social intelligence.[5]
– secondly, the subtle successes of empirical research in the field of education over the past decades,[6] which deviate significantly from common views of affectivity (understood now in terms of a creative source of desire rather than a source of disruption) and sociability (radically reassessed within a context of cooperative practice).

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[5] Rémy Lestienne insists on the importance of neuromodulator systems, especially the system which uses dopamine in the affective processes related to the transfer of short-term memory into long-term memory. He also addresses its continuation in the field of sociability as the particular need to be recognized, understood and loved. He assumes that the finiteness of human capacities and the limitations of memory can be overtaken by "putting one's central nervous system in the society of all other human beings" (2008, 11).

[6] Within the Cooperative Institute of the Modern School (*Institut Coopératif de l'École Moderne*—ICEM), which has recently acquired a research laboratory, backed up by an international federation of practitioners.

Furthermore, the complex approach to temporality in education presupposes a switch from a reductionist conception of objects to taking *multiple entangled levels* (cognitive, affective, social, physical, etc.) into account. Even though these levels can be analyzed separately, which is most often the case, a correlated study alone seems to be able to explain, at least in part, emergence phenomena. Moreover, in terms of education, research not only consists of explaining but also contributing to outlining the necessary conditions for the action and its developments. It is not only a case of *explanation*, but also *prescription*, in search of the best educational potential. In this second case, the question can be phrased as follows: in the field of education, which conditions for temporal processes are capable of enabling emergence phenomena?

2.2. *The 'milieu'*[7]

The main condition is the creation of a *complex milieu*, where multiple temporalities are able to unfold. Prior to any conceptualization, the mere definition of the notion of emergence is enough to identify the inane belief that one can program it. As a manifestation of a phenomenon which cannot be reduced to its own causes, emergence inherently stems from unpredictability and chance. On the other hand, in the event of it being uncertain itself, it is possible to conceive certain favorable conditions.

In order to simplify the presentation, I am limiting the educational milieu to one particular case, namely that of a primary school class (and therefore children from roughly 5 to 10 years of age). What I mean when talking about the milieu is the physical space, the spatial and material organization, the techniques used, the composition of the stakeholders (pupils and teacher), the conceptions and values and all the interactions and knowledge of the class, with a history as well as an individual and collective memory. The milieu is therefore related to a *practice*. The notion of 'environment' describes what the milieu (possibly interpreted as a system) interacts with. It can be an urban or rural environment, for example.

Traditionally, the teacher interacts with the pupils (lecture). Sometimes the pupils interact, but this is decided by the teacher (group work). These interactions are essentially educational. Work is determined by will, attention and memory, under the authority of both the teacher and the institution, in an approach centered around consent and obedience. This is what I call a homogenous system, where less human temporality, due to a controlled chronology

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[7] The 'milieu' is a system which maintains exchanges with the environment.

and an environment that is sensitive to educational and institutional interests, can absorb many disruptions, keep most potentially creative fluctuations to an insignificant level and thus cause such phenomena as boredom, academic failure and incivility.

In this unity, one factor remains unthought-of: will determines work, but what determines will? Consequently, is will enough to achieve attention, which is so important for learning? What should one do when will is lacking? In this context, what makes the activity of memory easier, in particular the transfer of short-term memory to long-term memory?

3. A Creative Milieu to Trigger Emergences

3.1. *Affectivity and Desire*

The solution I am proposing is relatively simple and based on the assumption of the primacy of desire as a creative power. It should not be understood in the most common sense, as a whim or a selfish and uneven inclination, and even less as a sexual impulse. As Aristotle said in *De anima* (III.10) "there is only one driving principal: the desired capability". In *Ethics*, meanwhile, Spinoza said that "desire is man's very essence" (III, Definition of the Affects, 1.), in view of "its power to act and its strength to exist" (III, General Definition of the Affects).

It undoubtedly falls to neurobiology to convert this philosophical postulate into a scientific hypothesis, especially since it gives desire a more fundamental status than that which is commonly recognized for 'motivation' in neurosciences (see, for example, J. Ledoux, 2003, ch. 9). Some of the contemporary research carried out on the importance of emotions and affectivity in learning or on the switch to long-term memory in relation to the different neuromodulator systems, for example, could make a significant contribution.

Let us consider Spinoza's statement that joy is experienced as a result of the passage from a lesser to a greater power. Bergson supports this affirmation in *Spiritual Energy* in relation to the issue of creation when he says "we find that wherever joy is, creation has been, and that the richer the creation the deeper the joy".

Even though they belong to different theoretical registers, the notions of creation and emergence cover phenomena that are often identical, particularly in the field of education. Consequently, the association of *emergence* (or creation in a broad sense) and *jubilation* is of great interest in the resolution of

learning/education situations. If we accept the philosophical idea that joy is always "an increase of power" (of desire) and the correlation between joy and creation, there is every reason to acknowledge that the issue of emergence can be considered in terms of *joyful temporality*. We shall then say that the educational milieu that is most favorable to emergence is the one which is the most capable of producing a joyful temporality, the clear manifestation of which is a good mood and jubilation at work. In complex terms, we shall add that the more intense the desire the less stable the system, which favors the possibility of emergences.

I would like to clarify the following point, namely that justification is not moral (in the sense that a rule would order joy merely because it is reasonable) but rather epistemological[8] and ethical; epistemological because learning is better that way and ethical because it is how life deserves to be lived.

3.2. *Sociability and Cooperation*

Furthermore, desire requires various social exchanges to take place over the long term, whereby it discovers and experiences 'the brotherly soul' which loves by approving or disapproving, as Saint Augustine said. There are probably major emergence phenomena in what I philosophically referred to as 'mutual power magnification' elsewhere (Go, 2009), neither in the abhorrent competition among pupils nor their poor cohabitation, but in a fruitful and cooperative relationship. Welcome, attentiveness, mutual recognition, affection, mutual aid, consolation and criticism progressively change collective work into a *common achievement*. This is the second proposal for outlining a creative milieu, namely a cooperative social practice. Once again, this issue is neither moral nor even ideological. Joyful temporality (or complexity in time) intensifies thanks to the correlation between several *scales of complexity*; the peculiarity of individual processes[9] (individual projects) is not relevant without

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[8] "May a feeling of joy arise with the birth of a concept in our thoughts, may the joy, on this occasion, be lifted out of the undifferentiated mass of feeling and emotions and may we find there the opportunity to identify some peculiarity regarding the birth of the concept. Something that was born without being named shall find a name. This is the joy of a first meeting. […] The joy of witnessing how the strength of the concept unfolds". Pascal Nouvel, *L'art d'aimer la science*, PUF 2000, 159.

[9] These processes themselves result from superposing multiple scales of complexity; let us think about the functions of cognition, affectivity, perception, memorization, sociability, etc. correlated with neuronal networks, neurotransmitters and neuromodulators, among other systems.

the social organization of work (cooperative exchanges within the classroom), and the social organization of work benefits substantially by working as an open system which maintains regulated exchanges with its environment (school open to the world).

These multiple scales of complexity (which could be broken down into sub-levels) themselves maintain an inextricable relationship with time; individual memory reflects itself onto *collective memory* and collective memory feeds back to individual memory, thus strengthening its loyalty and quality. Collective memory gives the group *a history* in which it recognizes itself and whereby it develops new potentialities which in turn produce historicities and emergences.

The increasing complexity of the cooperative relationship and its scales of complexity does not manifest itself according to the teacher's pragmatic organization (this would be complication rather than complexity), but rather according to temporal processes that are used in uncertainty. Conversely, it is the consistent correlation of the different scales of complexity that determines the uncertain but fruitful evolution of temporal processes.

The main status of emergences, as a coincidental production of complex temporal processes, cannot be denied. This production is coincidental but a requested condition for a creative educational relationship, hence the major issue that research and action in education have to address, namely that of developing a complex (social) model of action with uncertainty which would be strict enough not to stray into the excesses of what has been referred to as 'pedagogism' which the experiences of New Education were all too often a victim of. The teacher's activity and the cooperative organization have a regulatory effect, but *emergences* themselves stem from a high level of *instability of the milieu*, caused by a new status for the pupil, namely as an author who is committed to trial and error processes.

3.3. *Authorization and Trial and Error*

The reductionist ideal at the root of the traditional scientific method has a counterpart in the field of education. Educational time could change from a mere institutional chronology manifested by programmed action aimed at achieving a series of determined objectives, to a future, the future of a complex social milieu which organizes action with uncertainty. This change can be expressed by a switch from a low-emergence time to another time filled with creative potentialities. Basically, this time can be understood in two ways, namely *as a long-term stochastic transformation process* we wish to establish

according to multiple emergences (I call it creative temporality) and *as consistent correlations between multiple functions*, e.g. intellect, affectivity, memory, imagination, corporeality, sociability, etc. which affect these processes (or integrated temporality). Now, the traditional model specifically aims to reduce the *stochastic* nature of long-term transformations (which absurdly amounts to claiming to control emergences) and the *multiplicity* of phenomena conditions (to the intellect and memory determinants only) two-fold.

It is impossible to describe here the practical solutions to this epistemological break, between both traditional and complex educational systems whereby nootemporality and sociotemporality rediscover their creative potential and their capacity to pan out according to multiple emergences. They are largely based on a new organization of work.[10] I will merely suggest two basic principles of action, namely *authorization* and *trial and error*.

Authorization, in the sense that Professor Jacques Ardoino (1990) understands it, consists of authorizing oneself, meaning both 'allowing oneself to' and 'becoming the author of'. Let us consider the notions of 'to authorize' and 'to be the author'. Pupils usually *receive* the authorization and adopt the position of *player* as best they can. On the contrary, here they are given a position of autonomy or sovereignty, from an individual (by executions of desire) as well as a collective (by cooperation or the magnification of mutual desires) perspective. The reason is that if, as Spinoza thought, desire processes (or conatus) effectively summarize the power to act or the strength to exist, they have to fall within the very principle of educational action itself. Moreover, their relentless peculiarity requires everyone to be allowed to explore its potential, and then only in a position of author.[11] Pupils progressively access knowledge thanks to a position of author rather than receiver. They do so as cooperators, not as competitors, thus producing a common heritage which foreshadows the heritage of historical knowledge in which they will then recognize themselves.

This position, which cannot be reduced to any kind of imposed programming, requires the implementation of many trial and error processes (meaning that temporality is *polyrhythmic*) by means of which instruction, training and education gradually develop. By this we mean intelligent trial and error (not a

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[10] On this matter, I am referring to the practical proposals from the historical movement of Freinet pedagogy.

[11] Therefore, for example, pupils learn to write by creating 'free texts'. They do not learn mathematics thanks to lessons but rather 'creations' or personal 'research'. They also study history through research work, and so on. Relatively speaking, pupils are in a position that is close to that of the writer, mathematician, historian, etc.

mere mechanism of trials and errors) which mobilizes the complexity of the above-mentioned functions, including reasoning, imagination, memory, affectivity, etc., in the long term and in a cooperative social relationship.

Then, based on a logic of desire and as part of a brotherly cooperative social organization, trial and error with uncertainty produces a complex temporality, within entangled temporalities, in an open milieu which is 'far from balanced', sensitive to the original conditions and carries strong emergence potential. In theory, these are basically the requirements for a joyful adherence to the irreversibility of time; as Bergson notes in *Matter and Memory*, perception, impregnated with memory, is dedicated to building reality and the future, to acting and fighting to exist. Duration is not accumulation but creation. The experience of temporality lived as a promise of emergence confirms Jankélévitch's claim that, "yes, the irreversible is indeed compatible with creative freedom" (Jankélévitch 1974, 190).

Emergences are of course the acquisition of knowledge (meaning 'living knowledge'), expertise and inter-personal skills; they are the progressive learning of the skills required to live together in a brotherly manner, of critical thinking and of sensitivity to the world and to beauty but also to injustice; they are all the resilience phenomena resulting from creative practices and free expression within a favorable and attentive social milieu and also the joyful experiences, successes and recognitions that increase our 'power to exist' and *joie de vivre*. Antonio Damasio claims that this *joie de vivre* represents a sophisticated form of homeostasis, stating that, "the state of optimal functioning, subsumed by the concept of joy, results from the successful endeavor to endure and prevail" (2003, 174).

Conclusion

In short, I will conclude by referring to the suggestions put forward in the introduction to this symposium.

– *The emergence of complexity in time* will be visible in the primacy given to *processes* rather than procedures in the educational relationship (creativity, trial and error, uncertainty, developments and problematization, long term, desires and projects, affective and social memory and jubilation).
– *the superposition of the different scales of complexity* will be visible in the *cooperative* organization of work (the peculiarity of individual processes is not

relevant without the cooperative social organization of work; individual memory reflects itself onto collective memory which gives the group a history since a class of pupils needs exchanges with the environment).

Hence, a new understanding of the notion of *emergence* is born. *Time*, without the simplistic restraints of chronology and pace, as a fully irreversible concept, is more easily understood as a temporality and becomes the way in which phenomena (most particularly emergences) are born. From the eureka moment of a pupil who finds the solution to a problem he raised himself or the therapeutic effect of reading a personal text in front of a welcoming group to the feeling of justice a pupil gets thanks to the cooperative settlement of a conflict, an emergence always has a beneficial effect on learning time and similarly the *polyrhythm* of learning—the compossibility of different paces of work depending on the processes of each pupil—favors an increase in emergences, successes and beneficial and joyful events.

The validity of this approach can be verified experimentally by the disappearance of boredom, violence at school, failure and inversely the increase in the desire to learn, friendship and cooperation and academic success, particularly for the most disadvantaged pupils, as shown by a recent university assessment carried out within a Freinet school (Reuter, 2007). All in all, this represents a new temporality in education which contributes to increasing intelligent and joyful emergences for everybody. Consent to the irreversibility of time will be all the more steady since the temporality will be creative. I believe such is the educational meaning of the relationship between time and emergence, namely the joy of continuous renewal.

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