

## THE LEADING PART OF SCIENTIFIC KNOWLEDGE IN THE FORMATION OF THE PRE-SCHOLARS TEACHERS AND EDUCATORS

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### Abstract

The long-life learning for everyone is the most important educational challenge for this century. Education for the future must prioritarily goes up to people unable to accede to a basic knowledge. The new discoveries in branches like neuropsychology, psychology of cognition, neurobiology of the brain open better prospects to understand how the humans organize themselves to develop their abilities to learn.

A democratic government has now to furnish ways to spread useful information to help parents and educational staffs to adjust their practices. On another way, the recent researches in linguistics help to understand the verbal's interactions and the misunderstandings coming from the socio-cultural context. With the approach of the communication by the process, it is not yet an utopia to be able to explain complex scientific knowledge and the impacts of the new technologies in the day-to-day's life of the citizens. With the advances of the sciences, we can communicate rightly to the culture of our audience, avoiding problems and lack of understanding.

Therefore, it is essential to a democratic government to provide reliable founts of scientific data. To achieve efficient results, the organizations in charge of the degree for the educational staff and educators have to deploy new strategies to offer permanent opportunity to the students to actualize their competencies, during the studies and after them.

Keywords: Education, spreading scientific knowledge, citizens

### Introduction

We are now plunged in the movement of the 21e century. Since the end of the 20th century, considerable intellectuals<sup>[1]</sup> warned to us against the deliquescence of the European education system. After the agreements of Bologna<sup>[2]</sup>, we met in April 2004, in Liege, under the aegis of European commissioner Busquin, in order to reflect, with the whole of the European partners, with the broad outline to profile for "the European space of knowledge by 2020<sup>[3]</sup>". The declaration of the millenium<sup>[4]</sup> pursues similar goals as regards education. It is not useless to wonder when the whole planet will manage to reach them.

European civilization and the culture run the risk to break into pieces if we are not able to reduce, particularly in the sector of education, the gap between opulence and misery, to create worthy living conditions for the individuals who share our space of life. The training throughout the life, permanent, formal or not formal, is the most important of the stakes, for the degree course as well for the information. This one constitutes the whole collection of essential data in what is, today, the world of the communication. That each individual reaches this training is a vector of democracy: to defend this right and to deal with its implementation fall on the authorities.

Let us see initially which scientific information proves that education requires a handing-over in question of the programs. Let us examine then how to establish a programme of studies for the teachers in load of the young children and the teachers specialized in psycho-educational accompaniment. To integrate, from their initial formation, the base to follow progress in the field of sciences is an option of first urgency. To be able to inform the families of their impact and advances in knowledge especially on the everyday life belongs to their missions. Without module of training thorough with the techniques of communication, the approach will fail. As for the methods of transmission of formation to the educational personnel already in place, the universities and the authorities develop them, little by little. The Organization of Spanish-Americans States for education, science and the culture showed its know-how, while joining, in particular, with university of Oviedo, for remote training schemes of the teachers as regards sciences, of technologies, society and values (program: To educate for a society of knowledge).

## The knowledge in progress

On certain continents <sup>[5]</sup>, the factors of poverty, pandemia, exploitation of wretchedness (women, children) prevent the majority of the population from reaching basic knowledge likely to accelerate their emancipation. Who more are, on the European continent, the growing phenomenon of impoverishment in the cities <sup>[6]</sup> and the precarisation of employment affect negatively on the quality of the schooling.

The phenomenon is especially unacceptable as all the “normal” children <sup>[7]</sup> have the necessary aptitudes to develop intellectually <sup>[8]</sup>: “After 20 weeks of gestation only, the hearing system of the fetus is sufficiently developed to enable him to treat some of the sounds which filter through the amniotic liquid. [...] From the sixth month, the fetus devotes most of its time of awakening [...] to familiarize himself with priceless qualities of the voice of his/her mother and the language (or the languages) she speaks.” A preventive education as regards public health proves to be essential so that all mothers can live their time of pregnancy, armed with adequate scientific information. The auteures add a new information, not less invaluable: “This stage, the future baby distinguishes the prosody structuring from the word and, lasting the last three months when it remains in the uterus, the fetus puts the conversations of his/her mother on listening, thus preparing with its life in the external world <sup>[9]</sup>. The studies undertaken by the neuropsychiatrists and the psycholinguists show the essential role of the early prattle for the adaptation of the articulatory system of the infant to his mother tongue. The importance of an early not-verbal communication between the mom and her baby is absolutely justified. The quantities of exchanges of this nature as well as the contents vary from one culture to another. They are the prosodies used there, even of gestural and mimicry. The research undertaken in linguistic anthropology, since this discipline turned to fields of investigation less restricted than at its beginnings <sup>[10]</sup>, makes it possible to determine the aspects of ground that, in a determined culture, appear essential with the acquisition of a language.

The availability of such knowledge brings astonishment face to the deficiencies in the prevention policy followed near the mothers-to-be. Our Canadian friends developed relevant actions to inform the future parents of the decisive character of the happy course of a pregnancy and a benevolent stimulation of the aptitudes of a small child, as of his first years. Thanks to this proactive policy, they created new dies of higher studies leading to new employment in the field of the early childhood <sup>[11]</sup>. Each country could develop similar services of greater comfort on a day-to-day basis, creative uses and generators of a social justice of higher quality.

The interest of cognitive sciences in the field of education lies in a multidisciplinary that brings scientific richness and decompartmentalization. Their interdisciplinarity makes it possible to exceed the questions of membership of a laboratory or a current of research to lean, with the sensitivity of its discipline, on the field of education. It tries to describe and understand the cognitive processes brought into play, as well by the pupils as by the teachers, in activities such as the reading, counting, the resolution of the problems, etc. It is possible to use three different approaches: the descriptive approach of the general processes, the descriptive approach of the growing processes and the third approach to evaluate the effects of the processes described by the two preceding ones.

First approach: one will answer questions such as, “knowing a behavior of pupil (or teacher) in an activity of training (or of teaching), which can be the cognitive processes likely to make them start? How to make them clarify, observe them?” <sup>[12]</sup>

Second approach: there it is a question of answering the question concerning the growing processes; “are the cognitive processes implied in an activity of training (or teaching) identical whatever the age (or appraises it) learning (or of the teacher)? So not, which are they and why?”

Third approach: one is confronted here with the effects of the processes and the need for proposing a scientifically valid reading of it; “knowing the cognitive processes associated to an activity of training (or teaching), which method of teaching (or of design of teaching) does it allow the best results? Why?”

In order to give an outline of it, we reproduce here the table proposed in the work that we have just quoted:

To observe these elements, the experimental method and the functional cerebral imagery are used. An experiment undertaken by the docteur Marieke Longchamps, in Institut of cognitive neurosciences of the Mediterranean <sup>[13]</sup> gives interesting results. In a nursery school, the investigation consisted in comparing at the time of the training of the read-write a traditional teaching action and an action with a keyboard of computer. After the experiment, the researchers could put forth the assumption that it is easier for a child to recognize the letters if it wrote with the hand. Of course, the assumption rests on an almost validated data “the movements of writing seem well to take part in the representation and the memorizing of the characters (visual recognition). Another data, too recent still, emits that it is possible that the way in which the children learn how to write interferes on their aptitude of reading. This centration does not take account of the social and cultural aspect of the writing.

Moreover, in cognitive sciences, the studies undertaken on the psychology of the memory are doubly interesting. It should however be noted that, in the field of the linguistic and phonological awareness, there remains ground to be cleared. In the field of the conscious and unconscious acts, the discoveries accumulate: unit ECA-Inserm, with Docteur Claire

Sergent comes to record successes; the team partially penetrated the cerebral process that makes it possible the man to be conscious of what it sees. We should nevertheless note that, thanks to the laboratories of recherche of the Faculty of psychology and sciences of the education of the “Université libre” of Brussels, the students could follow a seminar of cognitive sciences tackling this subject; Doctor Axel Cleereman gives this seminar. As for research on the neurobiology of the brain, whose cyclotron of University of Liege is a spearhead, they advance in the recognition of the architecture of the structures of various proteins implied in our emotions or our various affects. The confrontation of work of the linguists and the psychologists makes it possible to highlight the importance of the referents, i.e. the fundamental character of the situations in which the meaning emerged; the docteur C. Kerbrat-Orecchioni largely showed this aspect and continues its research on “Interactions Communicatives” in the team of the CRS that she directs.<sup>[14]</sup> The bond with psychology makes it possible to understand that the meaning associated with a lexeme is not reducible to a denotation but comprises reference frame and the connotative ones. Consequently, one will hardly show surprise in front of the linguistic misunderstandings that can occur between individuals, resulting from the same linguistic cradle, but educated in different contexts. On this subject, research<sup>[15]</sup> which conforms from now on to this pattern are extremely relevant and likely to help the professors with better understanding why certain children are rebellious with the orthography or French grammar. It could be well besides the same for other languages. My knowledge of the Romance languages enables me to affirm that, in Spanish and Italian where the conceptualization is not different and where the structures morphological are rather similar, the problems seem equal.

Mrs V. Traverso<sup>[16]</sup> which investigate a close sector progressed besides in the knowledge of these problems at the origin of many misunderstandings; one can notice with interest how much the habits differ, for simple linguistic actions such as those which aim to the greetings and the thanks. Other researchers also showed the influence of a mother tongue, such as the language Arab Kabyle on the training of the French language.

### Better formation for better practice

The knowledge of the scientific data is likely to reassure the professional of education: some practice teaching that it implemented empirically is perfectible. The teacher can reach a level ideal performance (to adopt the most effective strategy that will enable him to be tired less). How can we communicate such information apart from the university coteries? Can one let the teacher-researchers of the higher education function without research loans? It seems to be the case: if you have an understanding head of department, financial means that you manage for research with the detriment of certain leisure, you will, may be, maintain the potential. It is an unfair system. The teachers of ground need to get very good informations about these innovations to readjust their practices. It is necessary to re-examine the basic programs of the initial training of the professors in load of pre-school teaching and the teachers specialized in psycho-educational accompaniment. The first stage would consist in introducing there, as soon as possible, the modules of formation which enable them to decode scientific knowledge in a true spirit of educating for the society of knowledge. Informations must be objective and independent of the leading policy of their source. It is indeed rare that the population received the formation allowing him to understand and decode media handling of which it is the unconscious victim. One of the missions of the teachers consists to accompany it in this work. One of the missions of the teachers is to make it possible to the children to marvel at the scientific discoveries thanks to a participation increased in all the activities provided therefore. The professor who did not receive formation in this field will avoid such activities. The scientific modules should include the courses of biology, physics, chemistry in relation to the problems of society and scientific research in which these matters affect. Moreover, the future teachers' will need training with the texts of scientific popularization, the specific vocabulary and the terms that make it possible to transpose the concepts without distorting the contents of it. The repeated exercises make it possible to obtain excellent results for this matter.

In addition, the techniques of communication, if the students master them, provide excellent teaching aids to transmit scientific information, by the means of stories attractive and challenging: produce such tools, in quality and quantity, is a new source of employment, as well in the field of the artistic creativity as in that of the edition. Knowledge in the field of the communication makes it possible to create tools adapted to the sociocultural context of the children and to accompany their training by nourishing them more and not in providing them an intellectual mode like famine. In the French Community of Belgium, tools are in place like the decree mission, the bases of competences, final competences, the contract for the school and the return in strength of the textbooks, the web sites for information to public, students and professionals.

If nothing seems to move, a certain number of questions occur: do the parents imply themselves sufficiently in the support of the studies of their children? The Ministress of obligatory education and formation starts actions to give again this essential place to them. Some changes in our societies make their function difficult; we have mono-parental families, minors fighting against drugaddictions. We are not born to be parent by nature: we have to experiment and learn for such difficult job. In our societies, we need to let our children on hands we do not always very well know. It is very important to

establish a dialogue between the parents and all the professionals from education and childhood functions. If we do so, we can learn from each other and get together a better practice for the welfare of our children. It is a way to understand why some people act in such a way: may be they know more about the behavior of the babies or about the nutrition, about the learning strategies. For the children, such a dialogue will regain confidence on the collaboration between the world of the house and the world of the others. It is a way to discover the life of the other so similar that we can avoid problems between citizens.

Are the teachers ready to modify their practices? We should moderate the answer.

The motivation of the teachers is obvious: the quality of the teaching is strongly dependant of the capacities of the teacher but also depends of his relationships with the student and his family. We all know that we can count with the natural and marvellous inquisitiveness of human mind. If the teachers do not resent a very strong vocation for that job, they do not resist the pressure and the difficulties of the teaching conditions: they leave for other laboural opportunities. If we are honest people, we will recognize that a study seems harder if it does not offer the possibility to dream of the idea of the professional's practice induced by the degree. An education for a sustainable world has to intensify the notions of quality, passion and pleasure: it is the human nature to search pleasure and we do not reject that ability. It is a strong incitement for seeking higher quality in our pedagogical skills. In the media we often hear about globalisation or mundialisation but for education, it is better to speak about universality of the knowledge to allow the future generations to form a community on various degrees. With the new technologies, we must be practical and use them to prevent a bigger division between us. To avoid that, it is important to spread the technologies all over the world to reduce the gap opened some years ago. With the new technologies, it becomes a real pleasure to explain sciences to everyone and it is not so problematic if the child does not live near a town where he would see "in vivo" scientific experimentations because the teacher can use various networks providing high quality materials therefore. Even if the child lives in a very isolated country, even if the child suffers a terrible illness, he will be participant of the discoveries of the mysteries of the earth.

It seems to be a lot of good news but there are also problematical aspects. The mutualisation of knowledge is not a reality. Sometimes, teachers are short of time to prepare some lessons and if we can explain them that, it is better to use the lesson from a colleague but with the adequate strategy to interest the group they have to teach. It is strange to discover that something taken from the web does not present for the students or the teachers the same characteristics: on the web, a publication seems to be anonymous or ready to consume. It is also the education paper to explain to the children or to some adults that the intellectual work needs respect. It is an obligation to quote the print version we have made.

The system of the plane career became inadequate; the person must be able to evolve in the course of of acquired experience but the structures do not guarantee the employment to which launches out in this experiment. Perhaps the system owes, for the future, re-examined the situation. It is possible to consider a permanent appointed situation for a limited number of years. During these years, the teacher must follow further trainings and recyclings. It is necessary that, in this field, the directors of establishments accept all the need for formation: too many colleagues cannot develop their right to the annual four days of formation, under pretext of organisation. The teachers do not have to undergo the deficiencies in this field. It would be judicious, san doubt, to propose modules of remote formation, validated by an authorized public institution. Lastly, the teachers would find a real motivation to innovate if their wages were adjusted with contemporary reality: in Belgium, the wages of the teachers correspond to the amount of the wages of a civil servant of row 1, durant 10 months, but one distributes it to them over twelve months. Is this the best mean of encouraging them to make profitable part of their vacation to continue their formation? The answer belongs to the authorities.

[1] E. Morin, Les seven knowledge necessary to the education of the future, Seuil, Paris, 2000.

[2] <http://www.enic-naric.net/>

[3] [http://europa.eu.int/comm/research/conferences/2004/univ/results\\_en.html](http://europa.eu.int/comm/research/conferences/2004/univ/results_en.html)

[4] <http://www.un.org/french/millenaire/ares552f.htm>

[5] We think especially of the African continent, sources of the [www.unicef.org](http://www.unicef.org) graphs

[6] "10 years of general report/ratio on poverty", King Baudouin Fondation [www.kbs-frb.be](http://www.kbs-frb.be)

[7] Certain children suffer from handicaps or pathologies that influence their school results. We will not treat here a this category of children but many children who, according to medical or psychological models, are regarded as "standard" children...!

[8] K. Karmiloff and A. Karmiloff-Smith, Comment the children enter the language, Editions Retz, Paris, 2003.

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The colleagues of various universities in particular, Arnaud Destrebecqz, Philippe Peigneux, Steven Laureys, Christian Degueldre, Guy Del Fiore, Joel Aerts, André Luxen, Martial Van Der Linden, Axel Cleeremans, and Pierre Maquet are ready with: Interacting networks revealed by the process dissociation procedure, gone to press.

<sup>[9]</sup> B. Cyrulnik also mentioned such results, <http://www.migrosmagazine.ch/pdfdata/pdfarchiv/co/Co-2001/01/CO01p45.pdf>.

B. Cyrulnik, *Les nourritures affectives*, Paris, Odile Jacob, 1996.

Benedicte De Boysson-Bardies, *Comment le langage vient aux enfants*, Odile Jacob, Paris, 1996.

<sup>[10]</sup> The first researchers studied more specifically of the corpora restricted around stripped or imprisoned populations; the first statements carried out by missionaries, came at the request of professor Halkin, university of Liege, in 1911, in particular quoted by A. Wilkin, *Anthropologie de la communication, De la théorie à la pratique*, De Boeck Université, Brussels, 2001.

<sup>[11]</sup> One will lean in particular on the practices applied by the government of Quebec <http://www.cfe.gouv.qc.ca/>

<sup>[12]</sup> These elements and the following came, after modification of a work written in collaboration.

E. Gentaz and P. Dessus, *Comprendre les apprentissages*, Sciences cognitives et éducation, Dunod, Paris, 2004.

J. - P. Rossi, *Psychologie de la mémoire*, De Boeck, Brussels, 2005.

<sup>[13]</sup> The experiment comes from the department of the CNRS-UMR 6193 in Marseilles.

<sup>[14]</sup> See in particular: C. Kerbrat-Orecchioni, *Les Interactions verbales*, three volumes, Armand Colin, Paris, 1990-1998.

<sup>[15]</sup> Mr. Makhlouf, D. Legros and B. Marin also mentioned, "L'influence de la langue maternelle arabe et kabyle dans l'apprentissage de l'orthographe française", *Cahier spédagogiques*, Vol. 440, 7pp., 2005.

C. Kerbrat-Orecchioni, *Présentation*, in *Actes of VIIIe Congrès of Association for Recherche Intercultural (ARIC)*, Université of Geneva - September 24-28, 2001

<sup>[16]</sup> C. Kerbrat-Orecchioni and V. Traverso, "Variations culturelles dans les comportements de conversation", (ARIC), Geneva 24-28/09/2001 <http://www.unige.ch/fapse/SSE/groups/aric>. The author assumes the responsibility for the text and keeps the rights of them. Other texts are available on this site.