Logic for children

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§ 1

One of the basic functions of the humans is that of processing the information that it comes from the world that surround them, from very early age they begin to be developed, among other, the capacity of infer consequences starting from certain data that it is also denominated reasoning. The school, the family nucleus and the community usually influence in a decisive way on their members to make them competent individuals, and in spite of the importance that the school attributes -in the plans and support guides to the educational one - to the development of cognitive tools, in the practice its observed just the opposite[1], that makes the situation seem something contradictory, this is, the *pensa* dedicates a lot of space to the acquisition of knowledge and development of abilities cognitivas, but little attention is paid to the processes that it help to articulate and to organize that knowledge in itself.

Thus, it becomes indispensable to start from the very beginning of the educational process, the progressive incorporation of logic notions that it will allow the student the possibility to generate inferences starting from the data that are presented in way of stimulating their capacity to argue, of analyzing, of solving problems and of making decisions that benefit him. The aim of this is to familiarize the boy with a series of basic notions of formal logic, for example some inference mechanisms, as *Modus Ponnens* or *Modus Tollens*, and this way offering him a formal tool of support in situations that they specify well of certain degree of previous analysis to solve a problem or to make a decision.

The dissection of some inference mechanisms, as the *Modus Ponnens*[2] for example, maybe its attributable to the stoic ones and, it is in fact that the time that has the Logic working with inference outlines, a topic of which they have been in charge of so much logical as historians of the Logic, however[3], of a time the psychologists have recaptured the topic here, and rescued the concern for the intuitive capacity to judge among correct and incorrect arguments. In this sense, the proposal goes directed in two addresses: the first of them outlines the capacity to optimize natural or cultural elucidatory-evaluative of arguments to help to develop from the preeschool age, its possibility so much in the production of inferences as in the evaluation of arguments. The other address postulates - by means of the use of the *traverse axes* - the adaptability of the inference mechanism *Modus Ponnens* to the different contents that it contemplates the school *curriculum*, incorporating the double function of the mechanism, the one of generating inferences and the other of evaluating arguments embracing the different areas[4] of the *curriculum*, such as Language, Development of the Thought, Values, Habits, Emotional Partner.

§2

Returning to the topic of conditional sentences , it is obvious that the daily use that is given to that structure is not completely faithful to what in Logic is usually called *material implication*, inclusive it is affirmed[5] that it is possible to schematize a series of uses of conditional declarations that we find important to reproduce:

Examples of conditional declarations

Universal contingent:	If the animal is a fish, then it is of cold blood

Temporal / causal:	If the glass is hit, it will break
Council:	If you work hard, you will go well in the life
Promise:	If you pick up your toys, I will give you an ice cream
She / he threatens:	If you make it again, I will hit you
Warning:	If you jump yourself here the limit of speed it will plunder you the police
Counterfactuals	If it had gotten some short blows it would have won easily
Not consistent with charts really:	If you want to read a good book, there is one on the table [6]

Independently of the classification of previous chart, it suits to stand out the fact that evidences that indeed, in the daily language, we use a series of expressions very similar to the conditional form before described and that they seem to show a certain handling of situations as those given to some type of relationship among the parts of the ones mentioned, and which again helps us with the direction that we are tracing ourselves in the sense of establishing relationships among, the general uses that we make of this structures of the daily language and their possible specific applications also with previously certain purposes, in the case that occupies us, with educational purposes.

In other words, The daily language evidently does offer an universe of possibilities not drained by the Logic, however, it is possible the linguistic fertility that it offers to wire some of those uses with pedagogic purposes to take advantage, and in this way use the Logic as instrument that contributes:

- to organize the experiences before making decisions,
- to organize the knowledge about some process that allows us a more appropriate understanding of the same one,
- to organize the ideas that we want to direct to a certain auditory, that which allows in turn
- to print to our arguments certain rigurousness degree.

The Logic, like a formal discipline, doesn't contribute bigger benefits to our arguments unless we are the sufficiently skillful ones -or catastrophic - to incorporate to the argumentative technique or of analysis certain dose of creativity that not only shows the handling of the most excellent trial elements but the most audacious solution. Furthermore, we are certain that the Logic is a discipline that can be taught from early age, as long as it studies and it describes the processes by means of which the western culture elaborates arguments or correct reasonings, the same thing would happen with the creativity, and although it is not a discipline but an aptitude, this is totally susceptible of being developed and stimulated, as in fact it is made in most of the preeschools.

Recently the creativity has had a developing of attention on the part of a very wide spectrum of authors and an abundant literature that, independently of the tendency and the seriousness with which they assume the task of studying the topic, they possess a common denominator: the creativity is something that can become trained, to stimulate and to develop. In other words, be not a divine faculty and exclusive of some elects, illuminated or hiperorganized managers or outpost executives that it serves as guide to reach the success, on the contrary, it is an individual disposition to attempt not very orthodox solutions, postulating audacious and imaginative exits where the imagination, as capacity potentially limitless it plays an important paper, to not put limits to the individual possibilitys of

looking for alternative! It is perfectly feasible to carry out it, it is in fact it is made, since the individual begins in his interaction with the world, be in the school, with the family or with the community that surrounds him. The humans are related with the community to which belong fundamentally to inclination of the language, and it is this powerful instrument the one that will allow us to develop and generate a series of cognitive possibilities from the same beginning of the learning process.

§3

A series of psychological investigations about acceptance of basic inference rules in individuals without previous knowledge of formal Logic points toward the fact that confirms the thesis outlined previously, the Logic it schematizes a series of instruments, rules, laws that reproduce thought structures that have been used with success for twentyfive centuries approximately. In this sense it suits to examine some of the results obtained by a series of authors that they have carried out tests around these aspects:

Percentages of acceptance of the four conditional inferences with affirmative rules (if p then q) with mature fellows in different studies [7]

Study	n	MP[8]	NA[9]	AC[10]	MT [11]
Taplin (1971)	56	92	52	57	63
Evans (1977[a])	16	100	69	75	75
Wildman and Fletcher (1977)	39	95	51	36	62
Marcus and Rips (1979)					
I experience 1-3 altern.	18	100	21	23	57
I experience 1-2 altern.	36	99	31	29	62
I experience 2	24	98	21	33	52
Kern, Mirels and Hinshaw (1983)					
Abstract material	72	89	28	27	41
Concrete material	72	100	17	28	69
Rumain and other (1983)					
I experience 1	24	98	48	54	81
I experience 2	24	100	52	42	59
Markovits (1988)	76	100	52	42	59
Average		97	42	42	62

This chart, is in itself sufficiently eloquent[12] search, it shows that there are two dissected inference rules one for the stoic ones, the *Modus Ponnens* and the other one for the scholastic ones, that of *Modus Tollens* that are appreciated intuitively still as valid without the individual to which it are presented has received formation some in formal Logic, that which points toward the fact that it is, as they had it clear the stoic ones, in the case of the Logic, of a discipline that abstracts of the daily use of the language of his members, the formal and general elements with which it organizes his ideas and knowledge about what there is. In other words, the evidence in favor of the intuitivity of the rules allows to affirm without a lot of risk that is possible to use with success hypothetical structures in children in preeschool age with the purpose of presenting him concrete or fictitious situations that outline a minimum of intellectual effort to reach the solution. The exercise consists on placing the boy before a situation the sufficiently stimulating so that this generates an answer the most spontaneous thing possible, so that the educational one, facilitator or the

program can register it without previous evaluation, that which in turn is translated in the stimulation toward imaginative solutions in some cases, effective in other, and until audacious in some other ones. The important thing in any event is not that the boy demonstrates a specific competence in certain area of the *curriculum*, but rather he goes familiarizing with the acquisition, use and development of certain natural dexterities that allow him to adapt better to a saturated world of situations and dispersed and unconnected information.

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I

1 I assume with all responsibility this statement that seems extremist.

2 The Modus Ponnens is an inference rule that outlines that of a implicative proposition and its antecedent its followed its consequent one., $[(p \rightarrow q) \bullet p] \Rightarrow q$, corresponds to its presentation like law of the Logical Proposicional, like inference Rule would be this way: $A \rightarrow B \bullet A \Rightarrow B$

3 It doesn't refuse the incessant concern and the evident bonds of the Psychology here with the Theory of the knowledge and the inference mechanisms, so alone it is to stand out the fact of the relevance that it have acquired the experimental studies in this matter. In this respect sees you: Jonhson-Laird, P.N., Byrne, R.M. and Evans, J.St.B. T.:Razonamiento y racionalidad: ¿Somos lógicos *?* Barcelona, Paidós. 1997.

4 The classification of the fundamental areas obeys conditions and considerations of cultural and political order, for what the proposed classification is susceptible of modifications. The important thing ultimately is to stand out the fact that the Traversal Axes allow the possibility to work for areas and not for subjects and to page the content of the different subjects according to the objectives that it pursues each area.

5 See you Evans, Newstead and Byrne, 1993, in Johnson-Laird, Byrne and Evans.

6 Johnson-Laird, Byrne and Evans, 1997, p.35.0

7 Jonhson-Laird, P.N., Byrne, R.M. and Evans, J.St.B. T.: *Razonamiento y raciopnalidad: ¿Somos Lógicos?* Barcelona, Paidós. 1997, p. 39.

8 Modus Ponendo Ponnens

9 This argument is known with the name of negation of the antecedent.

10 This argument is known with the name of Statement of the Consequent one, it is a formal fallacy.

11 The Modus Tollendo Tollens is a rule of derived inference that it consists on outlining that of a conditional eneucniado and the negation of the consequent one, the negation of the antecedent, p.e is continued., $\{[(p \rightarrow q) \bullet p] \Rightarrow q\}$,or also formulated as Derived Rule: $[(A \rightarrow B) \bullet \sim B] \Rightarrow \sim A$.

12 Independently of the critics that can be made to the conception of the experiments, to the control of variables, etc., the important thing is the fact that points out that there is an intuitive handling of those subject of those basic rules.