CONCEPTIONS IN THE REALM OF FEELINGS IN ECOLOGY

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SUMMARY

We recognize the importance of meaningful learning, in so far as it alters knowledge but as well, changes certain ways of doing things. We also believe that there is a knowledge "of" a subject and a knowledge "on" a subject ; there would be several levels of cognition and at each level there is the possibility to encounter pragmatic conceptions. When, at a particular level, a pragmatic conception is counter-productive, it is only with the help of a higher or a deeper (affective) level of cognition that the mind can operate "on" the inappropriate proposition.

So to provide the public with a level of discourse that could work on their knowledge (either to alter it or to change habits) we first have to know what their metalearning state is like. In our study, the subject matter is related to ecology. With an adapted form of the Q-Sort technique, we have collected data from 550 people and built a list showing the most important words that people use to express their feelings (metacognition) about the St-Lawrence River and about water in general.

INTRODUCTION

What are your feelings and impressions towards water on one hand and the St-Lawrence river on the other ? That was the question asked to more than 500 persons. The following will attempt to explain the reasoning behind this particular question ; the answers put forth and the interpretation and use of the data collected in order to better exploit exhibits pertaining to museums with respect to the topic of water.

In order to conceive more adequate exhibits for a museum, five studies have been conducted (Girault, Larose, 1992) : a study about the river's pollutants conceptions ; a study about conceptions regarding the treatment of water ; a study on Quebecer's conceptions for depollution strategies ; elaboration of conceptograms regarding the water and environment relations ; finally, feelings and impressions of a Montrealers' public about water and the St-Lawrence river. The present paper is based on the last study mentioned above.

LEARNING THE SCIENCE OF LIVING THINGS

Comprehending concepts regarding the science of living things requires taking in account not only many factors but also tracking down and setting right conjectural conceptions which are deep-rooted in unshakeable beliefs. It is difficult to ask a child, or even an adult to observe, comprehend and accept that

individual satisfactions are not always good for society at large. It is a difficult task to ask parents to understand that their lovely children who adore hamburgers can damage the environment. The challenge in terms of the change to be carried out to contain this kind of problem is enormous. There are so many factors coming into play, such as : emotions, scientific concepts, opinions, living habits, cultural backgrounds and surely many other aspects. To tackle this kind of problems, education seems to be the safest way. As most interveners in ecology say the solution to environmental problems goes through education. Here education does not necessarily refer to going to school.

AREAS OF SCIENTIFIC LITERACY

It is useless to try to attack school or to look for a scapegoat. We must simply admit that today's teachers do not have the necessary training to tackle environmental problems. The next generation of teachers can neither be effective at the beginning of their carreer even with adequate training, they feel helpless as regards the programmes often considered as imposed on them ; they are overwhelmed by administrative restraints and still are under the shock caused by the recent discovery of their students' personalities.

Other administratives levels must support schools because the matter concerns a change in society, in general, rather than in human development only. Museums and certain spots of scientific literacy can bring the support that education needs. Although these organizations can provide pedagogical objectives, the role of education keeps all its requirements : learning objectives must be stated, evaluated and attainable. The museums' task goes beyond the learning of facts ; they also want to sensitize and drive their public to action. And to achieve this program, museologues count, before anything else, on the impact of exhibits that they intend to offer visitors. To improve the practical impact of those exhibits they need a good theory.

A THEORY OF HUMAN COMMUNICATION

The theorical framework developed by Watzlawick and al. (1967) remains despite the perverse effects of the "Utopia of Communication" denounced by Breton (1992), a very productive approach for the study of human communication. Although this theory was initiated to better understand psychological phenomena the study of didactic objects seems to benefit from it as well as. This point which concerns the theory of human communication represents the levels of learning ; they should play an important role for a better understanding of the exploitation of didactic settings. In relation to Bateson's works, Watzlawick (1967) introduces a conception relative to the learning which has a direct angle of incidence on the research that we will be describing in the following paragraphs.
According to these authors and many others, there would exist two kinds of knowledge : "knowledge of things" and "knowledge on the things".

To better grasp the importance of this distinction and its implication for the communication with a learning purpose, let us hear the story of a frustrated dog told by Watzlawick. Some psychologists taught a dog how to distinguish a circle from an ellipse. A pedal bearing the effigy of a circle displays food and the other pedal doesn't. When learning was well integrated, experimenters began to modify the shapes. They rounded the ellipse and flattened the circle little by little till both shapes became identical ; to make a long story short the dog went crazy.

The perception of the circle and ellipse corresponds to the knowledge of things or first degree knowledge. This is the sensitive knowledge. The dog has learned very quickly an important fact about those shapes. They represent pleasure or pain and they give a vital force for him. This knowledge on another knowledge

is a second degree knowledge : a meta-knowledge. It is even possible to imagine that the dog can say now he knows how to get the food ; he is safe. This conclusion is located at a third level for this knowledge has been built from a second degree knowledge.

With human beings, this process would function the same way but without any doubt with more various levels. This process of inclusion consists in establishing contexts and giving meaning to the reality we are trying to grasp. This quest of meaning could be pushed forward more and more and, even be uncorked on existential problems as those characterizing ecology are.

THE EXISTENTIAL

We exist - this is sufficient to require of us to question our past, and the direction we are heading. To escape the pressure of that relentless questioning, we construct an answer which we believe in.
Everyone creates a personal 'reality', on the basis of their own inner structures, and from the ideas of past generations.

Within this dynamics arises our belief system, which allows us to differentiate the truth of what is real, from what is false or illusory : here one ordinarily articulates the purpose or meaning of life, with few ideas and much emotion. This type of knowledge occupies the highest levels of human thinking.

Humans act in relation to premises constructed from their first perceptions of phenomena, and these premises then determine one's interaction with the real world. When this interaction results in a conflict, it seems individuals are very capable of changing these premises, as long as they do not contradict higher level beliefs.

When an individual must change his premises, for example of the third order, he must elaborate a higher level of beliefs.

"*Nothing obliges us to propose only three orders of abstraction for man's experience of reality. In theory at least, these orders rise in infinite progression. As well, when man wants to change his third order premisses, he can only accomplish this in placing himself at a forth level*" (Watzlawichk, p. 270).

When premises at the existential belief level are flouted a resulting distress takes hold of the individual ; this dictates that it is the level at which we must now operate.

THE AFFECTIVE LEVEL AND THE ACTION LEVEL

Most recent didactic literature investigates the relation between what is now called the three knowledges: scientific knowledge, taught knowledge, and learned knowledge. To facilitate the acquisition of conceptions, it is proposed to investigate the structure of the concepts which make up these conceptions, and to address those which are either inadequate or incomplete. The techniques proposed to address misconceptions are successful in most areas of knowledge, however, when dealing with learning directly

tied to ways of life, the results seem much less meaningful. Because one's personality is involved, one reaches high levels in the hierarchy of learning knowledge, which contain fundamental elements of motivation, beliefs, ideology, impressions and feelings as well as logic. The network of concepts at this level is governed by rules which are most often not clear. But it seems that if one desires to change one's concepts, one must first identify them. The concepts at this 'meta-level' belong to the 'affective level', and seem to closely determine action. They are intimately linked to our existence.

WORDS TO INDUCE ACTION

We enter into an area scarcely covered by didactic research, but where intervention psychology is successful. Here, the first postulates of our study are grounded.

Words direct and transform our existence. To begin with, take known sensations, with which we test our relation to our five senses. To clarify our experience, we compartmentalize our feelings of pleasure or sadness, and we give that 'box' a name. Like a Jack-in-the-box, the trigger of a future experience releases memories of this box, and we remember the sadness or pleasure we feel, by calling it by its emotional category, All of these names constitute our 'emotional' vocabulary. It is this vocabulary which motivates our actions, which motivates us, and which gives meaning to our actions.

An inherent duality exists within the process of this vocabulary formulation. On one hand, an economy of words, and on the other, because we have too many words, emotions that are disproportionate to our experience - we feel nothing or too much. Here, a vocabulary which has more shades of meaning is important to deal with the range of emotions our environment produces.

Of the 500,000 words of the French or English language, daily vocabulary uses only 1,500 to 10,000 words. To describe emotions, there are only about 3,000 words, with 2,000 describing negative emotions and 1,000 describing positive emotions.

These figures have perhaps to be verified, and even if most of the ideas on the importance of words are in the realm of opinion, psychoanalysis or motivation promoters, it is however still possible to state that words have a real biochemical effect : galvanometers or lie detectors show this well when dealing with taboo or shameful words.

Beliefs exist in words, and can be transformed through words. Words can multiply the force of an emotion, and given their great power, they should be well chosen, especially when we realize they enable us to communicate with ourselves ; words allow our emotions to live. In giving more attention to what we feel, will we be able to change our feelings themselves, as well as our actions ? The idea might seem absurd, but we believe that by changing one's emotional vocabulary with respect to one's environment, one's actions will also be altered.

THESIS

The thesis proposed in the present study holds that a didactic treatment, which uses ecology as its subject, should structure a discourse which would allow individuals to influence their emotional vocabulary. If this vocabulary includes inadequate concepts in the sense that they trigger either very weak or too strong emotions, or if concepts which allow one to appreciate important nuances are absent, we find ourselves in a misconception situation of an emotional nature .

The solution is concisely put : change words to change emotions to change actions.
Methodologically, we believe that one of the first tasks is to investigate the emotional vocabulary used by the public with respect to ecological material. Taking advantage of an opportunity offered by the Montreal Biosphere, solely in relation to water and the St-Lawrence river, we began a study to collect the major elements of an emotional vocabulary.

THE QUESTION

Rather than question subjects orally or through questionnaires, the study invited people to write down on a piece of paper, their feelings and impressions from their experiences with water and the St-Lawrence river. Subjects were asked to write ten words which best represented their emotions in the right order from most important to least. The wording of the question was as follows : "Give ten words which best express your impressions or your feelings with respect to water. Number them in importance from most to least." A second question on another sheet asked for the same response but with respect to the St-Lawrence river.

THE RESPONDENTS

The group of respondents started with two classes of future teachers for elementary school. These two classes totalled 70 people altogether. We asked each individual to solicit the participation of 5 friends.
In this way, we received almost 350 responses to our initial study. In a subsequent moment other students were approached with the same methodology. The respondents are living in the territory of the Montreal Urban community.

The complete study totalled 550 respondents. One sixth of these individuals were composed of future elementary school teachers who are likely to visit the Biosphere with a class of students. We did not attempt to precisely define a population or a representative sample of people, this is rather a first sample of words we hope to arrange.

Besides, table 1 indicates that respondents are primarily female students under the age of twenty-four.
(Individuals answered two questions and if the totals are different it is the result of erroneous questionnaires).

		Water		River	
	Respondents	532	%	476	%
Sex	Women	339	0.64	310	0.65
	Men	193	0.36	166	0.35
Age	- 18	136	0.26	90	0.19
	18 to 24	185	0.35	175	0.37

	25 to 40	115	0.22	113	0.24
	+ 40	96	0.18	98	0.21
Activity	Student	280	0.53	223	0.47
	Laborer	46	0.09	45	0.09
	Technician	27	0.05	23	0.05
	Sales-Clerk	41	0.08	36	0.08
	Prof-Adm.	96	0.18	102	0.21
	Misc.	15	0.03	16	0.03
	Words entered	5316		4732	
	Words diff.	1009		1127	

Table 1 : Data collected

USING THE DATA

Data from the questionnaire were subjected to the Q-sort technique. Q-sort is a process of grouping data to mark preferential responses, that is, those with greatest importance. It is both a methodology of a specific paradigm in human sciences research, and a technique which resembles psychometery and statistics processes.

Q-Sort, as structured by Stephenson (1953), unites a group of subjects with the same ideas or propositions. For example in ten divisions, from the most important element to the least important. One subject orders elements (a,b,c,d), as (c,ab,d), while a second subject orders them as (b,d,c,a). Specifically, the weighting of each element is proportional to the level it occupies : 10 points for the first level and 1 for the tenth. The following table orders 10 elements from most important to least, and represents the first treatment of base data. Rather than limit the choice of answers to a predetermined list, we allowed unlimited possibilities, to avoid introducing a bias in the investigation.

THE ANSWER

Rangs-Mots	1	2	3	4	5	6	7	8	9	10	n/532	total
life	65	17	11	15	7	6	6	5	5	7	0,27	1124

pollution	18	9	15	13	10	9	14	17	16	19	0,26	733
to drink	37	9	13	7	6	3	7	3	6	3	0,18	707
refreshed	14	17	18	9	9	11	11	9	3	6	0,20	692
cleanliness	7	16	16	9	16	10	14	9	9	6	0,21	658
fish	7	11	12	12	12	14	14	9	6	10	0,20	596
purity	16	17	14	9	8	6	3	3	2	3	0,21	594
rain	2	6	13	10	13	13	15	18	16	8	0,21	545
calm	8	10	11	8	11	9	4	6	3	8	0,15	473
to wash	6	18	11	4	6	7	4	6	10	8	0,15	471
thirst	12	9	8	9	6	4	6	0	2	3	0,10	411
freshness	7	8	8	11	7	4	7	5	4	3	0,12	391
relaxation	6	8	9	12	5	4	1	1	7	4	0,10	363
electricity	3	4	11	2	10	6	7	2	4	7	0,12	307
sea	5	1	3	6	10	7	10	7	11	3	0,12	306

Table 2 : List of the first 15 words with the highest score on water

Rangs-Mots	1	2	3	4	5	6	7	8	9	10	n/476	total

pollution	177	49	37	25	17	17	13	10	12	11	77 %	2986
boats	13	22	28	23	18	29	21	17	20	9	42 %	1150
fish	4	21	22	23	8	14	7	12	13	2	26 %	776
dirtiness	21	20	4	6	8	3	3	4	8	3	16 %	570
transport	12	9	15	14	9	7	8	4	3	3	17 %	561
greatness	15	18	9	8	6	5	6	6	3	6	17 %	555
bridges	3	5	8	7	9	9	17	13	7	12	18 %	420
fishing	2	9	5	13	6	8	13	9	7	7	16 %	408
beauty	6	9	5	6	11	10	5	5	6	4	14 %	390
navigation	4	8	10	7	3	5	6	2	2	1	10 %	319
waste	4	3	9	9	4	6	6	4	6	3	11 %	307
water	13	4	1	5	5	5	2	3	5	6	10 %	297
water-way	8	6	5	3	6	3	5	1	2	4	9 %	277
ports	2	4	6	4	6	5	2	13	11	6	12 %	268
majesty	11	10	1	2	4	1	1	1	4	1	7 %	267

Table 3 : List of the first 15 words with the highest score on the St-Lawrence Rvier

INTERPRETATION

The results of a study such as ours are difficult to interpret. If we limit ourselves to the given data, we are forced to conclude that majority of respondents have, in a predominating manner, impressions and feelings of "life, pollution, boats, drinking and fish". With less importance they also give impressions of freshness, cleanliness, dirtiness, majesty, purity, calmness and beauty.

Interestingly, despite the importance given by the media to issues dealing with water, respondents were not worried, disapointed nor suspicious. They did not have an impression of wastefulness nor of imminent disaster. In the same way, with respect to the St-Lawrence river, respondents were not deceived, disgusted, bored, unhappy nor sad.

In fact, it was not the result expected... Perhaps people do not really have words to describe how they feel. Or perhaps they do not feel anything, as they do not have words which would make them aware of such feelings. When we do have impressions or sentiments of boats, fish, or electricity, things are really going bad ! But we cannot jump to conclusions. Most people hesitate to show their emotional side, and when they do so, it is often behind several layers which protect them and hide the truth. They do not easily divulge what they love or hate, but when they do it is usually in three phases (Gordon, 1961) : (1) the individual relates a description of facts, (2) then of impressions, and finally (3) the individual expresses their deep emotions. The current study can take this process into account.

DISCUSSION

This study raises doubts as to the effectiveness of the question asked to respondents, and the data collecting. Perhaps we should have begun with interviews, which would have had the effect of gaining the respondents' confidence. Perhaps the students doing the field work were not trained enough in data collecting. However, the current results suggest further studies, with clearer limits. For example, as our premise investigated the large role of beliefs, ideology, and opinion to determine fundamental values, we should have noted the importance of these limits.

Many authors, including Ferrey (1992), propose the advent of a new ecological realm. This movement shows several of its own tendences. There are those who place humans at the center of their theories, and consider the environment with respect to the well-being of humankind : this is an 'environmentalist' notion. Others believe animals and humans are equal with respect to their capacity for suffering. Finally, there are those who believe the eco-system or 'biosphere' itself is at the center, and at a higher position than mankind, which should disappear if it continues its destructive actions (Lovelock, 1989).

Individuals are, in various degrees, involved in these tendences. For many people, it does not make sense to consider mountains, trees, or animals as people with feelings. Descartes taught us there is no soul in nature ; it has been a long time since it last spoke. Now, why have feelings for a machine ? For some individuals our question on their sentiments for water, or a river, had as much sense as asking them how they felt about their radio or the vacuum cleaner.

Our western culture, religion, democracy, economics and intelligentsia pull us away from nature, and here we consider it as a person ! In fact, there exists an ecological movement whose leaders do not find it strange to give trees and rivers 'rights' as per their natural contract (Serres 1990), as mankind has its social contract.

All these beliefs have both advantages and disadvantages. Instead of taking a position on these beliefs, we follow Maurice (1987), whose work urges us to change lifestyles but within the limits of an active democracy. One can make one's choice from the continuing evolution of contemporary sensitivity.

This evolution of sensibility coincides with the objectives of our study, and our initial intuition was reinforced by the results we obtained, even if they do seem insignificant.

In the applications of our study, with these first impressions 'of' things people feel, the museum designer can devise strategies 'on' simple words such as life, pollution, or boats, and help to construct a meta-language of happiness, vigilance and liberty.

CONCLUSION

The goal of this paper is to seek information so as to conceive the museum means which will influence the behavior of individuals, specifically behavior considered as a threat to nature. Religion, politics and the media also deal with these issues but this study stand on the side of educational research so as to offer solutions.

Following the same trend of previous studies on education, this investigation also deals with the "didactic's triangle", that is : content, education and learning. First, we shall begin with calling attention to the paradoxical quality of ecological concepts, and their direct relation to ideology and beliefs. Secondly, in dealing with education, we underline the importance of an analytical filter to better exploit the property of didactic displays. Thirdly, with respect to learning, we are interested in conceptual levels or hierarchies. Here, we borrow a major concept from human communication theory, in suggesting that in order to change one level of learning, one must place themselves at a higher level. A modification of those structures is needed when a limited or inappropriate propositional hierarchy is discovered. In rising on the "ladder" of the knowledge system, we arrive at "misty" levels of emotions and sentiments. Here, we assume that to change actions related to the health of nature there is also something to be changed on the affective level of individuals. What must be changed are the words to express feelings and emotions. Therefore, the composition or the state of that former level must be known to show what is missing or not wanted. Consequently, the present study undertakes the gathering of emotional vocabulary of a specific group of individuals, with respect to water and the St-Laurence river. The results of the inquiry show an ambiguous set of components for an emotional vocabulary, The first 15 important words of the emotional vocabulary do not reflect raisonnable responses. In terms of sensations, this list of word is rather cold. If words help to feel things then water is not so evocative for our population which consequently does not pay attention to it...

It is too soon to conclude that we have a theory supported by experience. We believe it is necessary to repeat this study, in order to confirm our results or to further other and relevant information.
Practically however, we believe that the results of this study have justified and enriched the emotional guidelines established by the project leaders of the Biosphere. Numerous tangents in the exploration of these guidelines have been offered by this study. Finally, we should mention that results from European respondents still remain to be analyzed. The comparative study of emotional vocabularies from various cultures would perhaps allow one to distinguish distinctive modes with respect to ecology, and thereby give clues as to teaching strategies.

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