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Promoting Environmental Education and developing Ecocitizenship through Moroccan Curriculum of «Life Science and Earth» Discipline

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Abstract

Morocco is integrated within an environmental approach through its various sectors. Thus, the charter of the environment and sustainable development, embodied by the royal willingness, serve as a lever to rethink our actions and contributions towards sharing natural resources overexploited. In other words, the challenge is to own a realistic awareness among future generations to meet Moroccan major natural constraints. To be clear, education remains a major impulse to enhance human values. Thanks to academic programs, the learner could own the knowledge, eco-gestures and individual social values so as to maintain an environmental education. This study subject has as a purpose making profound scrutiny of the content of manuals and discipline of Life Sciences and Earth of all grade academic levels, from primary, college to secondary. The Interest is focused primarily on concepts related to education in relation with the environment and human values that can be detected from this discipline. The two developed analytical tools as well as iconographic analysis and scientific approaches realized are two measure instruments elaborated to realize a detailed diagnostic about academic contents linked with education and environment and also uncalculating eco scientific values towards protecting nature. This chosen methodological approach will give us a range of results that will be discussed in the following study.

1- Introduction

As it is known, our environment is in continuous change. Currently, it is much influenced by the daily practices and irresponsible behavior of man. This latter has never stopped from destroying and harming nature on which he depends, he behaves negatively in order to survive and continues leading such a bad behavior. But what is worst, is that he continues to rely on nature so as to evolve. Certainly, the development of buildings and facilities made in the Wilderness is another threat that is likely to increase in the current context of urbanization. Today, the challenge is to stop the destruction and excessive degradation of our natural remarkable ecosystems and integrate them in a global and sustainable management of the environment taking into account the services they provide to the community and the values that they contain.

However, the quality of our environment is not the only responsibility of governments and international conventions, but is due to the permanent action of everyone (students, parents, authorities). Now, we are faced with a challenge in which every citizen, worker to the great decision maker, all these participants must impose a reflexive manner of thinking towards the major environmental issues that arise at the local and global sphere.

This can only be achieved only through education that plays an important role behind the thinking of good concepts in the human mind, the spread of a healthy educational consciousness, positive behavior, shaping and firming values and positive reactions towards many issues facing society, and thus consistent and effective solutions are required. All these need solutions that go hand in hand with actions that must be integrated within ethics of our educational system.

The area in which the contents of the discipline “Life Science and Earth” or “Ecology” generates inculcation of scientific knowledge rather than the acquisition of individual and social values and the encouragement of

"knowing act" is finished. Today, the Moroccan educational system holds a great responsibility which relies on creating an original and effective reform in programs and textbooks in order to achieve a humanistic education designed to protect the environment.

2- Materials and methods

The idea developed previously demonstrated to what extent is the complexity of the methodological approach to follow. Taking into consideration that a Content analysis is a descriptive approach of the methodology of scientific research, it is a measuring instrument with multiple uses. The used methods depend on the objectives of this research. The most recent definition which seems consistent with our vision for elaborating this research refers to that definition adopted by a range of authors such as Mucchielli (1988), Robert& Bouillaguet (1997), Bardin (2001), Richard (2006) and others.

It might be said that a Content analysis is "a set of techniques and text analysis used in a certain systematic procedures and objectives meant to achieve an orderly description of implicit and explicit content of texts. All this, is realized in order to classify and interpret constructive elements.

This cannot be considered as an evaluative study, this definition goes hand in hand with our field work study and this designated inference is dedicated to extract various features of education in relation with the environment. It is a good idea to note that the concepts related to the acquisition of knowledge are seen as having the first priority. At a second level, we have to detect concepts that help developing positive skills towards nature. And being at the top level, we can help finding the values that the learner can grasp from education after school programs from the discipline of Life Science and Earth.

This study has as a purpose analyzing the content of the discipline «Life Science and Earth» from textbooks accredited and approved by the Moroccan Ministry of Education. It is performed in two cases where the discipline is whether obligatory or optional in different levels, (primary, secondary and college) and in different sectors of the qualifying secondary (Experimental Sciences, Physical Sciences, Agricultural Sciences, etc.).

The approach is seen as being multidimensional and nested because the dispersion of the concepts related to Environmental Education that it reframes are overlapped. As a fact, the study proceeds on the one hand, on clarifying the development of two analytical tools, the first one called "dimension" describes all the concepts related to the acquisition of knowledge, the presence of Environmental Education in school programs and the positive behavior students must show for the preservation of nature. The second analytical called "value" will categorize concepts and their axiological meanings which are imported implicitly to the learner. These values are divided into two types: individual values related to the person and the way he behave towards nature and natural resources and social values that build the founding principle and considered as regulator of the exercise of judgments and actions carried out by members of a community (Guillot, 2000).

From another side, this study work intends to improve the quality of such content analysis based on scientific analysis and didactics of figurative images (photographs) of graphic images (drawings, diagrams, graphs, diagrams) which are considered as cognitive tools involved in conceptualizing and facilitating scientific understanding for the learner (Jacobi, 1990; Rumelhard, 1990; Clément, 1996; Mottet, 1997; Schneeberger & Ponce, 2004; Dahmani, 2008). This, drives us to think about the scientific analysis of the iconography (Pictures or diagrams) have a simple role of illustrating concepts and sometimes value model, but when trying to analyze them we find ourselves confronted with many interpretations. Hence, this analysis is based on figures related to Environmental Education. It will help us to clarify other information not detected at the grids of analysis.

The images and plans are analyzed by:

- The type of icon: (plans, photos, diagrams);
- Environment and its scale (illustration at the general scale which presents undefined natural landscapes, or national scale illustrating Moroccan territory or international scale evoking planetary issues);
- The presence or absence of Man in the figures;
- Negative impacts and / or positive impacts on the environment related directly to human's behavior.

This content analysis is realized in all scholar books of the discipline "Life Science and Earth" of all levels in the Moroccan educational system from Primary (6 years of study) to Secondary College (3 years of study), to Qualifying Secondary (3 years of study).

3- Results and Discussions

A first selection was achieved so as to classify themes and chapters related to environmental sciences. The concepts taught are fragmented into learning units. We could detect a total of 800 learning units among which 300 are related to environmental science and ecology. The first table summarizes all the chapters that contain learning units categorized into two grids "Dimension" and "Value".

Table 1: Analyzed Chapters in various academic manuals.

First year primary school	feeding in animals
	Breathing
	Animal's reproduction
	Water
Second year primary school	Movement
	Plants
Third year primary school	Breathing
Fourth year primary school	water and nature
Fifth year primary school	Nature
	Feeding
sixth year primary school	Energy
First year college	the relationship between living creatures and their reaction towards the environment
	Folder number one: The discovery of the natural environment.
	Folder N° 2: Breathing in various areas.
	Folder N° 3: catering related to Man and animal.
	Folder N° 4: Plants being fed.
	Folder N°5 : food relationships in a natural environment
	external Geological phenomena
	Folder N°1: field work study
	Folder 2: Some dynamic external phenomena related with earth
	Folder 3: Concept of geological time.
	Folder 4: Water resources
Second year college	Part 1 : internal geographical phenomena's
	Part II : mating related to living creatures and the transfer of genetic characteristics to Man
	Unit 3: multiplication of plants.
Common core scientific option	Part N° 1: Ecology
	Chapter N° 1 : ecological visits
	Chapter N° 5: Natural equilibrium.
	Part N° 2 : reproduction of plants
Common core literary option	Chapter 2: The use of water and pollution.
	Theme N°1 : water abuse and its daily use
	Theme N° 2: water pollution.
	Theme N°3: ground water exploration
	Chapter N° 3: Creation of water stocks.
	Theme N° 2: Ground-water Resources.
	Part N° 2: Man and nature.
	Chapter 1: Some phenomena that cause disturbance in natural balance
	Theme N°1 : Air pollution and the greenhouse effect
	Theme 2 : the consequences caused by the excessive use of chemical products and deforestation
	Theme 3: extinction of animals; its reasons and consequences.
	Chapter 2: conservation of natural balances.
	Theme N°1: clean technology.
	Theme N° 2: creation of reserves.
Second year baccalaureate physics and agriculture option	Chapter 1: domestic waste resulting from the use of organic material.
	Chapter 2: pollution caused by the exploitation of energy and organic products mainly in industry related to chemistry, food and mineral.

In Morocco, education is considered as being a major issue for the development of our country. Thus, it was formally established as a second national priority. The Charter of National Education has described in several of its articles the importance of Science Education. It supports the need to appropriate securities. It advocates that general education should be able to explain the basics of what is meant by "Environmental Sciences" regarded as a transversal concept, where Science, Economics, Culture, Art Teaching and Science are among these. We note that, these five dimensions are being reflected on in our working adopted methodology.

Despite the formal guidelines made by the Ministry of National Education, Higher Education, the Professional Training and Scientific Research, and also by the Commission of Education and Training and the Charter of National Education, it must be assured that the new accredited programs in Life Sciences and Earth are in full harmonization with humanity and nature, and the balance between humans and the nature (Tohmé & Tohmé, 1991). Therefore, any order curriculum reform must consider a system of values which must be emerged after the acquisition of Sciences.

This can be properly applied in the teaching of Ecology or Environmental Education in relation with the Environment. These, provide the learner with the necessary knowledge for the protection of nature so human values will be strengthened.

Following the same logic, Education and Environment allow us to transform implicitly system values of the learner with respect to the environment. This is achieved quickly by a sense of duty. The concepts related to safeguarding the environment should further strengthen the spirit of solidarity needed at the national level to solve problems related to the development.

Referring to the protection of nature, education and environment developed in the learner's mind a sense of responsibility involving all members in society to be aware of the danger that might threaten our survival.

To sum up, it must be noted that the attitude of the learner is much more important than the scientific knowledge that could acquired. They become obsolete in front of the ongoing evolution of these areas (Versailles, 2003). It is important above all to have output profiles so as to form qualified citizens who can discuss the social issues with covered minds and can formulate questions about the world and themselves.

There are many research papers and reports that have raised the issue of Environmental Education and its contribution in the development of educational system. Content analysis of the different cycles and different options are very rare. Most of them, deal specifically with disciplinary objects and targeted concepts, others are interested in issues related more to the criteria and process of developing academic programs, without taking care of our efforts devoted mainly to education related with the environment and at the same time taking into consideration the axiological approach and behavioral-related goals.

Among the research papers that have been realized, those who mentioned the ecological dimension and the presence of concepts related to Environmental Education in the discipline of «Geography» (Jamaleddine, 1984; Ftouhi, 1992; Atillah, 2005).

These studies are based on the descriptive approach, inventory, and the reclassification of the learning sequences within a certain curriculum and this is realized without causing inferences going beyond the text and information mentioned in the latter (Mucchielli, 1988).

Thus, the report prepared by the Moroccans researchers group attached to SEO Birdlife Association is the point of transition to an efficient Environmental Education. This study focused mainly on the ecotourism development and educational level at the Site of Biological and Ecological interest of Moulouya which permitted the shedding of light on the issue of integrating environmental education in the educational system (Dakki *et al*., 2006).

Furthermore, other studies have shown that the analysis of textbooks of the discipline of Life Sciences and Earth appear not to be problematized and finalized in order to educate future citizens to act with reflection on their own environment (Agorram *et al.*, 2008).

The study reports an alarming state as designers use excessively a certain informative style in chapters where Environmental Education is mentioned. This fact urges designers to ask questions of the real goals they should target in their reference book when designing programs.

This clear fact joined with the literary review presented earlier, leaves us in total mess and urges us to ask several questions at once. However, among the questions that this study attempts to shed light on whether the programs of the discipline "Life Sciences and Earth" in the Moroccan educational system allows the development of a positive attitudes towards Environmental Education, and the appropriation of human values related to eco-citizenship.

A first reading of the list shows that "WATER" as a theme verses "POLLUTION" represent together respectively the following percentage: 32.5% and 29.8% in contrast to other themes that range from 19% to 12%. The two topics mentioned express the two extremes of environmental issues. Water problems as

mentioned in schoolbooks are related to the inability to obtain fresh drinking water and its repercussions on the quality of life of people in developed countries. On the other hand, pollution is explained as negative acts caused by people towards three pillars of the ecosystem (air, water, earth).
In all cases, all the themes taught are presented as a pessimistic pretext based on the negative consequences rather than on the origin of these constraints and their meanings (table.1).

3.1- Analysis of grid N°1 "Dimension"

The first category of learning units was performed according to the fundamental aspects related to environmental education (knowledge, attitudes and values). However, this second categorization shows that the first year in primary school has a high percentage of 79% of all concepts in the academic manuals. The aim is to test the conformity between what is presented in academic manuals and as fixed objectives traced by the Ministry of Education in Morocco.
According to The ministerial charter and among the pedagogical objectives related to the teaching of « life science and earth » the student must have the capacity at the end of his career in the primary school, to acquire knowledge and must be educated and responsible to become a good citizen especially in education related with the environment and health. "
However, the percentage of concepts related to environmental education is negatively correlated with academic level. Nonetheless, the academic programs give more importance to scientific knowledge and to specialization with the exception of the common core where the percentage of literary concepts related to education and environment can reach 80% of all concepts taught in the discipline "Life Sciences and Earth." We also notice that manuals give more privilege to the concepts of the balance of nature, pollution, conservation biology, air protection (parks and reserves), and clean technologies, etc.
However, the literary review focused on five dimensional aspects; Science, Culture, Socio-Economy, Art and Didactic. The statistical treatment of the grid and the performed correlations had a result which will be shown as follows (figure 1).

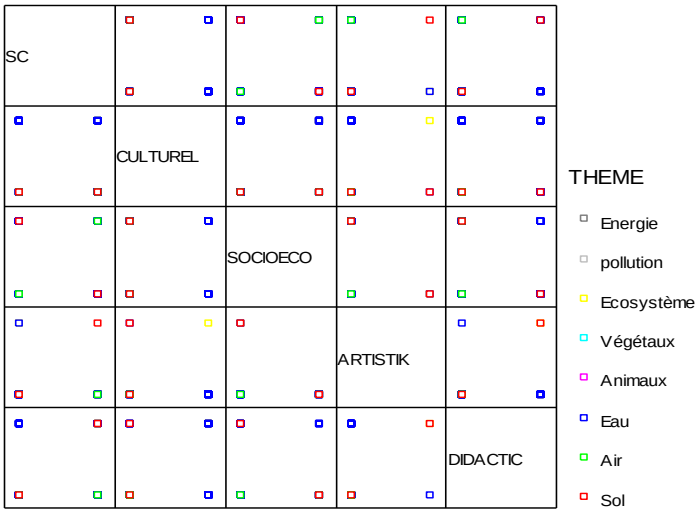


Figure1: GRID distribution of dimension according to thematic.

The obtained results are separated into five dimensions. The scientific dimension is widely spread, because the distribution of concepts related to the environment is homogeneous. This dimension is dominant to the extent that it is responsible for acquiring a new knowledge linked with ecology, environment, and biodiversity. This is an educational activity through which learners express their intrinsic motivations towards this new knowledge before developing a new concept of education.
This dimension correlates positively with the academic learning; the secondary level indicates that we have to improve our learning by considering and joining education with environment. Nonetheless, this kind of learning cannot be grasped by students, only if it goes hand in hand with learners' lifestyle. Hence, the need to analyze the cultural and socioeconomic dimension is persistent.

The cultural dimension is expressed in terms of utility and feasibility in learning and teaching situations, the use of authenticity and cultural richness within the Moroccan society is strongly needed. Whereas, socio-cultural dimension plays the role of a coin with two sides. On one hand, the learning process shows that the socio-economic practices have a negative impact on the environment and here we refer to man who is the principal criminal. On the other hand, this learning process helps develop the idea of sustainable development while adopting an optimistic approach that helps developing the idea of a better management and use of our natural resources, the implementation of values such as, sharing, solidarity, altruism are clearly needed. However, the artistic dimension is less represented.
However, the aesthetic and natural views of the Moroccan landscapes are not really taken care of. So this adopted attitude helps shedding a pessimistic view towards environment.

3.2- Analysis of grid No. 2 "Value"

The reasoning in relation to the themes mentioned before, indicates that the individual and social values to instill in students are divided heterogeneous, some themes may serve as a package of values. Results show that the value of citizenship, responsibility, altruism, sharing, equality of rights and security can be considered as prior themes in relation with the theme "Water" which is considered as a major problem in Morocco linked with the theme "Pollution". The degradation of local environmental conditions is a case point.
When dealing with this theme « water » the designer provides illustrations and examples about education in relation with citizenship, it sheds much light on democracy, learning, cooperation, and education joined with human rights. This cannot be achieved only through complementarily of other values such as the acquisition of a good management to maximize the benefit to others. Although, the value of altruism and sharing are realized. All these values mentioned above help building a concise system of governance that leads to a sustainable and efficient development.
However, other issues such as soil, plants, animals, air, Ecosystem and energy may also be valued in terms of inculcation of human values. But by failing to focus on the first two themes (Water and Pollution) the others reveal a minimal degree of presence to express the values described above. With the exception of the theme "Ecosystem" which indicates a high peak value for the "autonomy". This topic also, helps identify the national environment and clarify ecological Moroccan buildings in terms of priority, biodiversity and exploitation of natural resources. This type of knowledge helps student develop the ability to act individually without relying on others, he can behave with autonomy, while allowing him a certain freedom of act. This human autonomy can only be built through education. In fact, the first form of autonomy is achieved by the student during his childhood; he will be able to behave correctly while respecting the rules proposed by the natural and social environment. All this, is realized in a certain perspective of durability and management within natural constraints. Hence, we notice clearly the importance of this theme in dealing with academic programs especially in “life science and earth” discipline, which occupied the third position after the theme "Water" and "pollution".
From another side, the academic program of the discipline “Life Sciences and Earth” presents a consistent complementarily between education and values which are viewed as being necessary for a good environmental education despite the heterogeneous distribution of themes during each grade level.
The hierarchical tree developed from performed statistical correlations, allows us to visualize clearly the relationship between the values described in the grid "value" and the power of some of them, throughout the course of the discipline « Life Sciences and Earth ».
It is then totally taken for granted that within the Moroccan educational system, the discipline « Life Sciences and Earth » can be considered as a solid dissemination of knowledge to educated citizens about the mean importance of protecting the environment, while acquiring human values.

3.3- The iconographic analysis

In this research, results are gathered from each manual for different levels and fields, from primary to secondary year baccalaureate. We have been able to analyze 206 pictures, the equivalent of all pictures of all academic manuals examined. We notice that the level of secondary school manuals specifically those of common core subjects (scientific and literary options), designers intend to rely more on pictures and diagrams rather than the course and written texts. The content of these programs is more developed in illustrations. It describes in detail the ecological concepts and those in accordance with education and environment. Because, this common Core level is the transition point between teaching in general that lasted during primary school and college and between the choice of the option and the future fields of specialization of the student.

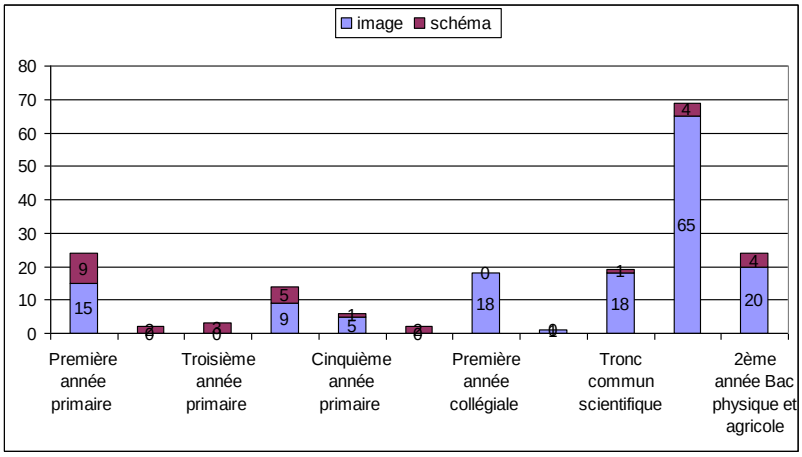


Figure 2: Distribution of icons in academic manuals of SVT.

So, Figure 2 examines the figures of textbooks by type of icon. We note that the pictures taken and images are presented in most academic manuals of a total of 206 figures, 171 are photos, which express 83% of all images presented of the whole textbooks. The choice of such a figure can be beneficial for the student as they allow him to view and analyze environmental situations as they occur in reality. The observation becomes relevant in the sense that the images designed to illustrate concepts related to education with the environment are almost absent. Believing that such simplification can help students understand the concepts taught. However, according to Piaget, children in elementary school may show much more complex intellectual abilities during adulthood, and are allowed to make connections, correlations, and valid inferences, provided that the knowledge taught is real.

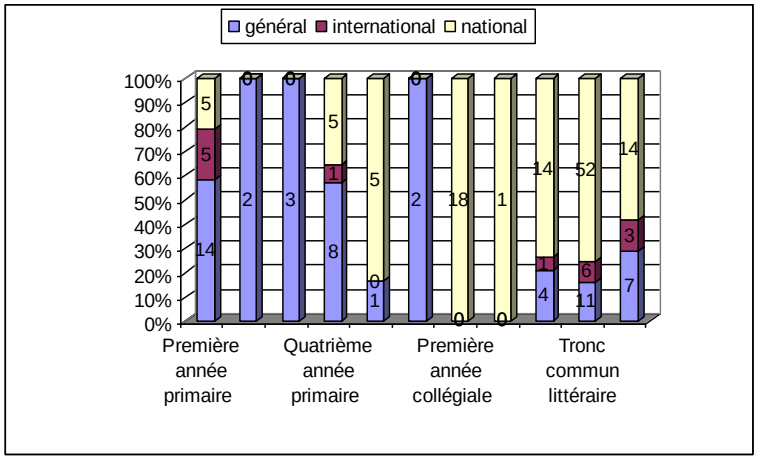


Figure 3: Distribution of figures by type of scale.

The context of figures differs according to the following scale. Knowledge teaching requires illustrations at a larger scale, giving him the role of a visual and educational support and thus, becomes a facilitator for a better understanding. Figure 3 reflects the distribution of images according to the type of scale described.

In what concerns the primary level, it is normal that the presented images are taken as a whole because it is during this period that basic knowledge is being acquired. But during the first year college ;the images of the manual are national (all 18 images are national), 14 out of 19 images are national in the manual in the Scientific common Core, 52 out of 69 images of literary manual and common core , 14 out of 24 pictures in the manual of the physical sciences and agriculture. This seems obvious to us, since the reference book responsible for designing academic manuals dictates using illustrations that belongs to the national context, which is proper to the discipline "Life Sciences and Earth". it meant to get more in touch with the Moroccan natural environment, it has as an aim meeting with the local ecosystem components (Sahara, the Atlas Mountains, watersheds, wetlands and forests) (Figure 4).

SVT Manuel first Year College, p67

SVT Manuel, common Core literature, p30

Figure 4: Illustration of the Moroccan ecological ecosystems.

After understanding the contextual framework of figures used in textbooks (type and scale), it is necessary to grasp the degree of involvement of Human in these figures. Out of 206 figures, more than 161 pictures discuss human activities that people create in nature without being shown in these photos. The images described Man's activities during its passive reformulation without mentioning the main actor responsible for these activities who is of course "Human" (titles and legends of these images are the proof of this fact) (Figure 5).

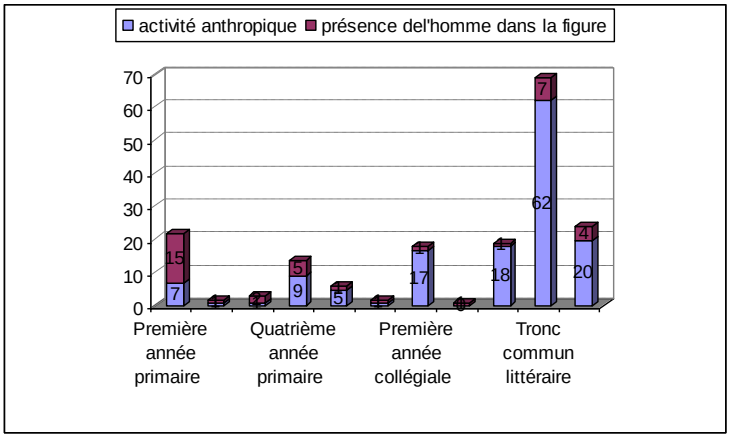
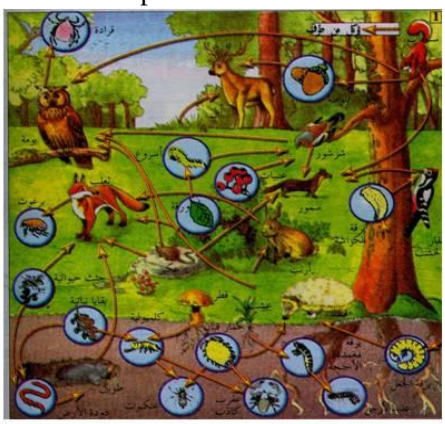


Figure 5: The absence/presence of man within these figures.

Another concrete example that is brought to show clearly the total absence of Human in the natural ecosystem, it is the concept of the food chain, a concept taught during the fifth year of primary school, it is fully explained thanks to the concept of the food network and the pyramid of biomass energy. During the scientific common level, when dealing with any type of illustration, we notice that Human is out of the ecosystem weather as an element or within the food interactions between species mentioned earlier in Figure 6.

SVT Manual, Fifth grade primary, p31 SVT



Manuel ,Common Core Science option, p76.

Figure 6: Illustration of the food chains shown in the academic manuals.

According to the analysis mentioned above, Human is seen as being an external actor and a passive observer towards environment and natural resources, of course without blaming directly Human acts. The idea is to create a situation to attract the attention of learners to own a critical taught and try to involve them in finding solutions to our future actions. What remains for designers is to know if they have chosen the right path when adopting a pessimistic approach in their illustration so as to shed an atmosphere of awareness among students and guide them to own a real vision of what happens in nature. What is relevant and according to what has been shown by the analyses, the theme "Water" will come first surpassing all other issues, this is done even in illustration. The images in academic manuals illustrates the different facets of the use of groundwater and surface resources, while describing the constraints case by case (eutrophisation, discharge of sewage in sea water, salinization of sweet waiter contamination of groundwater by chemical products) (Figure 7).

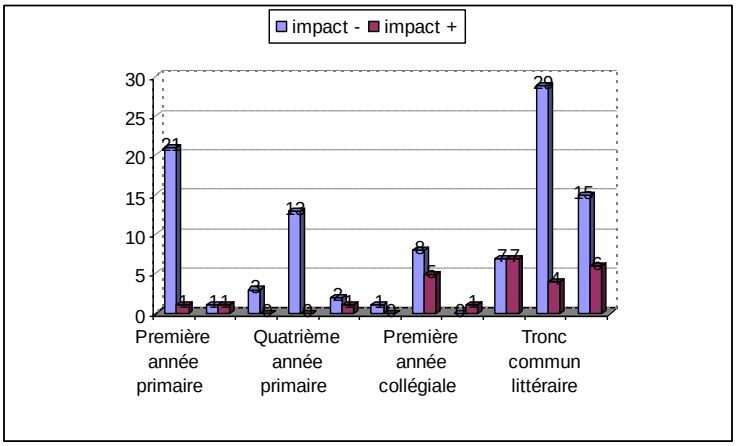


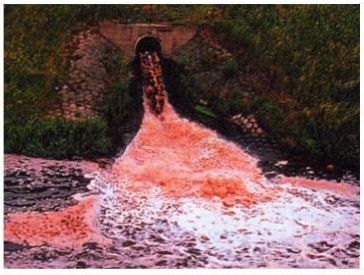
Figure 7: Distribution of figures by type of impact upon environment.

The number of images correlates positively with the theme "Water" more with the level of the manual, which correlate with previous obtained results. The water theme is always present in academic manuals while trying to increase the level, from primary to secondary (Figure 8). This interest shown for the theme "Water" is expressed by the Moroccan government when dealing with the academic programs. It declines the water scarcity that Morocco had experienced during long periods of drought. Designers consider this problem at the top of their interest and focus on it permanently and mention water issues in the academic programs without taking into consideration the conservation of natural areas and diversity of species (fisheries resources, etc). So this confirms the pessimistic approach adopted.

SVT Manuel common Core literature, p30

Svt Manuel, First year primary school, p80

SVT Manuel common Core literature, p56



SVT Manuel, fourth grade primary school, p66

Figure 8: Pessimistic approach adopted in water issues as illustrated in scholar books.

All this, urges us to evoke the issue of awareness and literacy on environmental education and sustainable development. Statistics show that only 18 photos out of 206 figures express purpose of raising awareness.
This small percentage of 8.7% is presented for each level except the third year, sixth year of primary school, the second year college and the common core scientific option (Figure 7). The absence of an objective related to environmental awareness in primary school and college is seen as lacking proves, it does not corroborate with the objectives established in the reference book while managing academic manuals. However; these objectives announce that:
- Student should be able to get involved within his environment;
- Student should be able to participate in the evolvement and preservation of his environment;
- Student should be able to develop transferable skills towards the protection of the environment;
- Student should be able to own social values that can help safeguard the eco-cultural heritage of his country.
Moreover, being unable to shed awareness among learner, this approach seems unable to meet the right goals. this failure is clearly witnessed especially with learners aged from 12 years to15 years, this bitter fact provokes a kind of stagnation, therefore we feel ourselves given time to think about the right and efficient approach to help finding future conscious agents, managers and decision makers. So the academic program has as an ultimate goal the introduction of knowledge based on Environmental Science and Ecology. The emphasis of some issues gives usually pessimist view to the Environment on which we belong. In what concerns the common core level literary option, the approach awareness is present even if it is less experienced. At this level, the discipline « life science and earth » is considered as being a precious opportunity not to be missed, the goal is to have enough ideas sufficient in environmental matters, students then will be able to acquire concepts such as nature protection, participatory management and sustainable development, before specializing in areas purely literary (Figure 9).

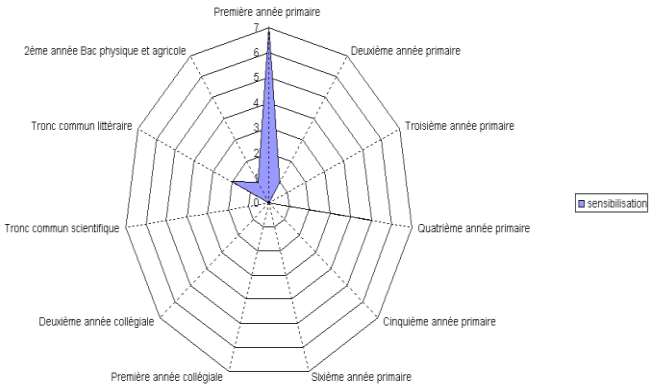


Figure 9: Awareness in scholar books, in different levels.

Figure 10: Example of aware announcement mentioned in scholar-book of primary level.

It is also relevant to mentioned that, in primary level, specifically during the first year primary school, spreading awareness as a fixed goal is illustrated by patterns of popular science, but using the negative style " do not ..." (Figure10).

1- Do not let the water flows while taking shower.
2- Do not throw trashes on the ground.
3- Do not throw stones in water.
4- Do not walk inside the lake or lagoon.
5- Do not drink backwater.
6- Do not play with water species.
7- Do not play with your friend using fresh water.

Conclusion

To sum up, environmental education is a transversal field that gathers Science and literature to other social sciences. The scientific value of this field is clearly shown in terms of knowledge and it is seen as having a clear epistemological origin. This knowledge allows the individual in general and learners in particular, to rebuild a new concept, or modify an aberrant representation towards environmental knowledge and protection of environment. The new achieved design is seen as a final stage enabling the learner to review his own value system and make his actions more practical to review his attitude towards efficient decisions.

This process of constructing the citizen's personality in its natural and anthropic context corroborates perfectly with the definition of environmental education. It incite him to profit from knowledge that he has acquired before and be able to join his contribution of lived experience by appropriating new values and principles.

In addition to this, education is a prime force for future citizens to learn basic knowledge, to specialize in environmental sciences, with respecting pedagogical and didactical approach related to knowledge and to know-how, in order to deal with it concretely.

However, the Moroccan academic manuals of the discipline "Life Sciences and Earth" remains as a teaching support that bring the learner, the teacher as well as learning methods linked with problems of the environment, in all its dimensions, scientific, cultural and economical to a common point.

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