

The anchoring of environmental education in the Moroccan education system

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ABSTRACT: This article aims to show how to integrate the environmental dimension in the Moroccan education system. Through the disciplinary content, that must ensure the construction of solid theoretical skills, and knowledge about the environment. Among learners by providing them with the necessary knowledge and practical and extracurricular activities, provided by the environmental clubs, which allows a multidimensional teaching linked to the concerns of society. Several pedagogical practices can be carried out within environmental clubs: fieldwork by visits and ecological outings, activities by projects, partnership. These practices are considered important educational structures capable of ensuring the development of environmental culture in schools. However, several constraints to the activation of these clubs can be reported with school rhythms that are expressed both by a busy program for students and the hourly load for teachers. This does not favour learning contexts that put the student in various situations, including those outside the classroom. Hence the need to reduce school curricula and capitalize on good practices and initiatives in environmental education.

KEYWORDS: Environmental clubs, environmental education, anchorage, schools, Morocco.

1 INTRODUCTION

Morocco, like other countries in the world, has been addressing environmental challenges for several decades now through a process of developing and protecting its resources to ensure sustainable development. It is since the Stockholm Conference in 1972 that Morocco has been engaged in the environmental issue by establishing the foundations for the preservation, conservation and prevention of natural and environmental resources [1].

A number of legal and legislative initiatives, culminating in the launch of Charter on the Environment and Sustainable Development in 2009, has reinforced these. The institutionalization of the environment for the first time in the new constitution of 2011 [2] and the adoption in January 2014 of framework law n° 99-12 [3] for the operationalization of the national charter of the environment and sustainable development. This requires the integration of the culture of environmental protection into the curricula of knowledge, knowledge and knowledge to be imparted in education and training systems and programmes [3].

However, all these emblematic figures of activities shown by Morocco towards the environment, can in no case ensure environmentally friendly actions in a sustainable development framework without the establishment of an integrated education policy that is parallel and capable of influencing the behaviour and attitudes of members of society. In this regard, environmental education becomes a palpable necessity and constitutes a true response to contemporary environmental and societal issues. Because of joining citizens in their daily lives, Morocco declared during the educational reform linked to the national charter of education and training [4].

The systematic integration of the environmental dimension into the education system while redefining the missions of the school and ensuring its openness to its surroundings. This basic integration of the environmental dimension in the training courses is designed on two parallel tracks: the disciplinary content, which must ensure the construction of solid theoretical skills and knowledge on the environment among learners, providing them with the necessary knowledge and practical and extracurricular activities as a crucial and mandatory area [4].

These are essentially the environmental education and sustainable development programme. The partnership agreements signed with the Ministry of Environment, the Ministry of Youth and Sport, the Mohamed VI Foundation for the Protection of the Environment and the Association of Teachers of Life and Earth Sciences «AESVT» which is spread over a period from 2009 to 2017, to strengthen the existing environmental clubs in terms of equipment, teaching materials and tools.

Anchoring environmental education in schools is a necessary step to sustainably defend the interests of society, and its objectives are not limited to passive transmission of learning, but that they try to change the attitudes and behaviors of students, to make them responsible as future citizens [2]. The purpose of this process is to allow the learner to understand and behave positively in their environment.

2 THEORETICAL FRAMEWORK

The desire to integrate the environmental dimension into the Moroccan education system is part of an international perspective that was adopted since 1972 at the Stockholm United Nations Conference on the Human Environment [5,6]. To achieve this objective, several initiatives have been taken by the Ministry of National Education since the 1999 educational reform. These measures, designed not only to ensure the introduction of this dimension in disciplinary programmes, but also its institutionalization in schools through extracurricular activities held in environmental educational clubs, which must be created within schools.

To this end, the Ministry of Education has paid particular attention to the establishment of these educational structures in schools by:

- The Ministerial Circular [7], which encouraged the principals to create environmental clubs within their schools. A number of other steps have been taken by the Ministry of Education to ensure the success of environmental actions in schools.
- The fourth axis of the strategic vision [8], which refers to communicative skills and self-development, and which considers extracurricular activities as a vital and compulsory educational component in the various stages of intellectual education;
- The tenth framework bill [9], entitled Improving School Life, aims to support and diversify extracurricular activities in order to establish an inclusive citizenship school.

3 PROBLEM OF THE STUDY

After more than twenty years on the implementation of the National Charter of Education and Training, we consider it necessary to integrate environmental education in schools, through school curricula and the establishment and activation of environmental clubs, such as educational structures, which can provide and guarantee to learners a multidimensional and transdisciplinary education.

4 OBJECTIVES

4.1 INTEGRATING THE ENVIRONMENTAL DIMENSION INTO MOROCCAN SCHOOL CURRICULA

The adoption of this dimension in school curricula followed the guidelines of the National Charter of Education and Training in 1999. Indeed, several themes and concepts of the environment need to be addressed in the curricula of different disciplines, at different school levels and primarily through the life sciences and the earth [10, 11].

Research carried out over the past decade by Moroccan researchers concerned with the environmental issue [12-14] has revealed that there are trends towards integrating this dimension into school curricula. It is a question, in reality, of the existence of many environmental learnings, but which remain efforts to theorize environmental education in textbooks and which remain concepts so difficult and so complicated to implement. They are in the order of accumulating knowledge without being able to develop eco-responsible skills and behaviours and attitudes.

Other research based on the analysis of textbooks has shown that this environmental education, supposedly integrated into the curriculum of Life Sciences and Earth of secondary education, is an education about the environment, but based on the passive transmission of knowledge about the ethical realities of the environment [6, 15].

After analyzing the current situation of the 2nd year baccalaureate program, option physical Sciences and more specifically on the third unit concerning the use of organic and inorganic matter, there are some gaps in the first part of household waste,

which a great deal of emphasis has been placed on the solid fraction of household waste. Concerning disposal treatment methods and reuse techniques, the liquid fraction filtered by waste percolation, also known as "leachate", is not discussed and of equal importance. These leachates are a major problem in landfills, and a source of contamination of surface and groundwater if not treated properly.

4.1.1 POSSIBLE SKILLS

COMPETENCY 1: ACQUIRE KNOWLEDGE

- **Leachate from controlled landfills**

- a) Operation of a landfill;
- b) Leachate genesis: a complex medium;
- c) Leachate evolution phases;
- d) Types of leachate;
- e) Leachate formation mechanisms;
- f) Quantification of leachates;
- g) Leachate compositions;
- h) Types of pollutants present in leachates;
- i) Impact of leachate on the environment and human health.

COMPETENCY 2: PROPOSE PRACTICAL AND FEASIBLE SOLUTIONS FOR LEACHATE TREATMENT PRIOR TO RELEASE TO THE NATURAL ENVIRONMENT

- **Membrane Methods**

- a) Nanofiltration;
- b) Reverse osmosis;
- c) Biological Methods;
- d) Aerobic treatment;
- a) Anaerobic treatment;
- b) Batch sequential reactor.

- **Physico-chemical methods**

- a) Coagulation-Flocculation;
- b) Adsorption;
- c) Flotation;
- d) Chemical precipitation;
- e) The Filters.

4.2 INTEGRATING ENVIRONMENTAL EDUCATION THROUGH EXTRACURRICULAR ACTIVITIES

Extracurricular activities are an important part of school life. They are linked to teaching and are carried out by schools in order to promote and develop the knowledge and skills of pupils. They bring together various activities that touch on cognitive, emotional and psychomotor aspects. These are operationalized in educational structures set up within schools forming educational clubs, whose purpose is to ensure the conduct and supervision of extracurricular activities. These clubs constitute a methodological framework and a way of activating school life by voluntary commitment of different operators: students, educational and administrative frameworks and the various partners making these spaces places for the development of psychological and social skills, organizational skills, communication, collective work, values, citizenship and civic behaviour.

Work in educational clubs is a pedagogical necessity in order to encourage students to transmit and apply the various school learnings in the processes of daily life and to put them at the heart of pedagogical reflection and action. Environmental education takes place within these extracurricular activities, at the level of environmental clubs. The latter are educational clubs with extracurricular activities related to the environment and managed by volunteer teachers, motivated and having convictions on the importance of the environment and the need to contribute to its protection and preservation. These environmental clubs play an important role in instilling environmental values and empowering learners with their environment. They help to institutionalize their activities, in concrete and practical actions, which promote large-scale cooperation between the different actors and partners of schools to build them, in learners, contextualized knowledge about the environment.

4.2.1 METHODOLOGY

The adoption of a new transdisciplinary approach around the theme of the environment in schools is undoubtedly capable of ensuring a multidimensional teaching linked to the concerns of society, while considering the links with education for development, health, peace, risks.

4.2.1.1 FIELD WORK BY GREEN TOURS AND OUTINGS

Several educational activities can be carried out for the benefit of the environment in a rather close environment: in a water treatment or treatment plant, in waste recovery sites and even in the departments of the institutions concerned with the environmental issue (water and forests, water basin agencies, boards and water distribution companies,...) [15].

4.2.1.1.1 FIELD WORK BY VISITING WATER TREATMENT AND TREATMENT PLANTS

Visiting these stations and direct observation allows learners to estimate and become aware of the efforts made to feed on such a resource or to dispose of its waste, which will help them to build knowledge and actions that respect the environment.

4.2.1.1.2 FIELD WORK BY ECOLOGICAL EXIT

The ecological exit allows to observe and study the natural environments directly on the ground, in order to discover the components of these environments and to understand the relationships that exist between living beings on the one hand, and with their living environments on the other hand. The ecological exit also allows to understand how the natural environments evolve and the effect of the negative impacts of Man on these environments

4.2.1.2 ACTIVITIES BY PROJECT

Working through the pedagogical project approach applied to environmental education offers learners a privileged context for building cooperative learning. Working with students through projects in an "eco journal of the school". On topics related to the recycling of plastic, cardboard and glass materials, renewable energy, peaceful use of the sea, the preparation of a guide on environmental concepts, the beautification of the spaces of the school with the installation of garbage bins to accustom students to preserve the environment, environmental law, climate change, etc. These are all projects developed by personal actions of teachers and which show a wealth of varied and diverse practices that must be supported and enriched by motivating the actors.

The pedagogical project approach consists in designing, innovating, creating and realizing a production based on a need to satisfy. It always leads the pupils to a real production, that is to say having meaning in relation to its usefulness either for the pupil or for a third person. This approach has several characteristics:

- It therefore requires a strong emotional involvement since it is useful.
- She develops behaviours justified by necessity: to document, to plan, to communicate to organize.
- It is often multidisciplinary and involves different types of knowledge.
- It involves just-in-time learning, as opposed to school functioning, where you learn and use it later if you need to.

The approach is divided into these 6 steps for convenience. The student is led to go back and forth between these different steps:

1. Emergence of the idea;
2. Analysis of the situation;
3. Choosing a strategy;
4. Assembly and planning;
5. Implementation;
6. Evaluation, assessment and possible adjustments.

Students are not isolated in their work. Teacher coaches students in all stages of a project approach, using different postures depending on student level, project, stage (Figure 1).

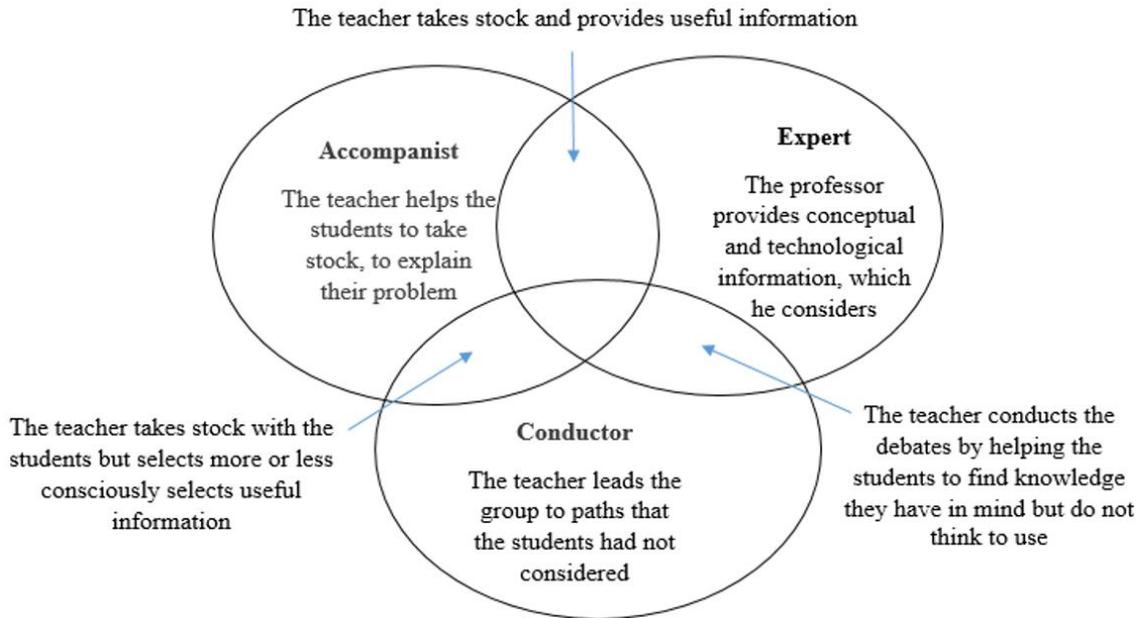


Fig. 1. The project approach

The project is not an end in itself, it is a detour to confront students with obstacles and provoke learning situations. At the same time, if it becomes a real project, its success becomes a strong stake, and all actors, teachers and students, are tempted to aim for efficiency at the expense of learning opportunities [16].

For the management of household waste, and despite several advances, only 8% of household waste is recovered in Morocco [17]. The production of waste per inhabitant per day varies greatly from one region to another, averaging 0.75 kg/ha/d (more than 5 million tonnes per year for the entire national territory) [17]. Household waste in Morocco is perfectly suitable for composting thanks to the large proportion (65 to 80%) of fermentable materials. Organic matter accounts for 64% on average but can reach 80% in rural and peri-urban communes [18]. For this reason, and as part of the projects carried out by the members of the Environment Club, we have carried out two processes for the recovery of household waste within the establishment: the application of the two techniques of composting (Conventional composting and earthworm composting) and recycling of recyclable materials (Figure 2).

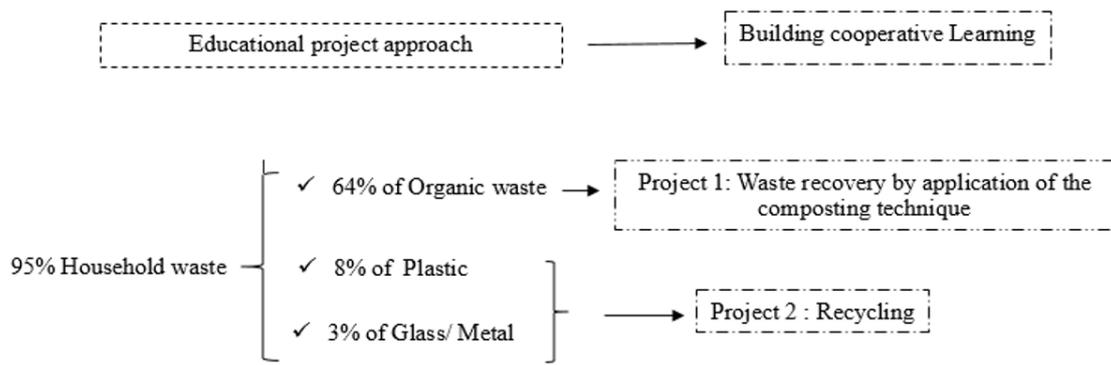


Fig. 2. Applied techniques in project pedagogy

4.2.1.2.1 RECYCLING PLASTIC, PAPER, GLASS AND METAL MATERIALS

Recycling is a process of treating the waste (industrial or household) of products that have reached the end of their life, which allows some of their materials to be reintroduced into the production of new products.

The recyclable materials include certain metals, plastics and cardboard, glass, rubble. The recycling has two major environmental consequences:

- Reducing the volume of waste, thus the pollution it would cause (some materials take decades or even centuries to degrade);
- Preservation of natural resources, as the recycled material is used instead of the one that should have been extracted.

4.2.1.2.2 RECOVERY OF ORGANIC WASTE BY APPLICATION OF THE COMPOSTING TECHNIQUE

The theme of composting allows students to maintain a dynamic relationship with their living environment and to keep a critical distance from the exploitation of the environment, technological development and consumer goods. This offers great educational potential (biology, chemistry, ecology courses).

In this context, the students set up a composting system within the school according to the following steps:

1. Evaluate the feasibility of the composting program by:

- The determination of the main employees in the implementation of the project;
- Target environmental groups or committees in our community, seek the support of stakeholders (management, support staff, teachers, students, etc.) to contribute to the implementation and success of the project;
- Appoint a person or group responsible for the “composting” project.
- Obtain cooperation from cafeteria and kitchen staff to recover organics provided by kitchen staff following meal preparation.

2. Choose a composting technique suitable for our facility:

For this reason, we have:

- Conventional composting in a compost plot, in direct contact with the soil;
- Earthworm composting (composting done by earthworms, in a container that can be put in the classes inside). This allows only a small amount of material to be composted.

3. Implementation of the recovery program

All the operations are carried out by the recovery team, which after the preparation of the lunch, will have to recover the kitchen waste from the composting site and put it in the composter, warning the following: recovery schedule, recovery methods and equipment, storage location, follow-up during summer and vacation periods, maintenance of composting site.

5 CONCLUSION

The integration of the environmental dimension into the Moroccan education system is a major concern imposed by environmental constraints that have become increasingly serious and worrying. Its institutionalization is not limited to its incorporation into disciplinary programs, but also to its reliance on extracurricular activities held in environmental clubs, created within schools.

The results of our work show the importance given to environmental clubs in anchoring environmental education. In fact, environmental education is carried out with a symbio-synergic vision and essentially calls for innovative pedagogical practices based on the involvement of pupils in projects they set up, in which they participate, reflect, confront and question. It also involves the active participation of other actors, whether internal (teachers and management) or external (professionals, associations, etc.), by pooling resources and know-how to achieve the desired objectives. These are achieved through the implementation of various projects, ranging from the organization of conferences, debates or exhibitions on environmental topics. As well as the adoption of different approaches and methods (work by project, ecological outputs, field work by visit, partnership).

For this, environmental education must necessarily be based on the pooling of various approaches and approaches in order to ensure a complementarity between the contributions of school curricula and extracurricular educational activities within the environment.

With a view to improving the integration of the environmental dimension by schools in its educational activities, we present the following recommendations:

- Lighten school curricula and free up pupils by diversifying learning modes and places and setting aside a time slot in the learning schedules for the activities of environmental clubs by integrating their actions into the processes learning;
- Capitalize on good practices and initiatives in environmental education and work for their sustainability in schools, through innovation, local solutions for financing and pedagogical supervision of activities initiated by environmental clubs as educational structures of common and collective interests of all the actors concerned in education.

REFERENCES

- [1] Vantir, Z. (2014). The question of the environment within the Moroccan educational system (Summary of thesis). RADISMA, Number 10, 27 January. <http://www.radisma.info/document.php?id=1426>. ISSN 1990-3219.
- [2] Kingdom of Morocco. Constitution, 2011 edition. Dahir n° 1-11-91 of 27 chaabane 1432 (July 29, 2011) Promulgating the text of the Constitution. Official bulletin n° 5964 bis of 28 chaabane 1432 (30/07/2011), 62p.
- [3] Kingdom of Morocco. Dahir n°1-14-09 of 4 Jumada I 1435 (6 March 2014) promulgating framework law no. 99-12 on the «charter National Environment and Sustainable Development, Official bulletin n° 6240-18 jomada I 1435 (20-3-2014).
- [4] Kingdom of Morocco. Ministry of National Education, charter National Education and Training, Rabat, (1999), 73p.
- [5] Khzami, S.E, and Ben-Fares, S. (2009). The environment and environmental education. RADISMA, Number 4, 15 December. <http://www.radisma.info/document.php?id=748>. ISSN 1990-3219.
- [6] Hamouchi, A. (2011). Integration of the environment and environmental education in the Moroccan education system: Case of the teaching of life and earth sciences. National Doctorate Thesis, Sidi Mohamed Ben Abdellah University, Faculty of Sciences Dhar El Mahraz-Fez. 225p.
- [7] Ministerial circular 109-1999 on the creation of environmental clubs within schools.
- [8] Projects of the Strategic Vision of the 2015-2030 reform of the Moroccan education system for a school of equity, quality and promotion. <https://www.csefrs.ma/publications/vision-strategique-de-la-reforme/?lang=fr>.
- [9] Framework Law No. 51-17 on the education, training and scientific research system. <https://www.csefrs.ma/wp-content/uploads/2022/12/la-loi-cadre-17-51-fr-juillet-2022.pdf>entifique.
- [10] Agorram B., Mohati A., Selmaoui S., Khzami S.E. (2009). Environmental education in primary and secondary education in the light of skills-based education: Analysis of programs and textbooks. Journal of Educational Sciences, N° 41, 21p. (Text in Arabic).
- [11] Hamouchi, A., Essafi KH., and El Hajjami A. (2010). Integration of environmental education in the Moroccan education system. RADISMA, Number 5 (2010), 28 September <http://www.radisma.info/document.php?id=893>. ISSN 1990-3219.
- [12] Slali H. (2016). Environmental education (EE) in Morocco: analytical and pedagogical contributions for the improvement of teaching practices and the development of the school curriculum (Thesis summary). RADISMA, Number 12, 2p. <http://www.radisma.info/document.php?id=1600>. ISSN 1990-3219.
- [13] Agorram, B., Khzami, S.E, Abrougui, M. and Elaboudi, T. (2010). Man and the Environment. RADISMA, Number 6 (2010), 26 December. <http://www.radisma.info/document.php?id=1012>. ISSN 1990-3219.
- [14] Hamouchi, A. (2016). The environmental education of Moroccan textbooks: Conceptions and ethics environmental«. RADISMA, Number 12, 14p. <http://www.radisma.info/document.php?id=1565>. ISSN 1990-3219.
- [15] Laamarti, L., Ben-Bouziiane, A., Akrim, H., and Talbi, M. (2009). «The field trip: what place and what role in a scientific approach?». RADISMA, Number 4, 15 December.
- [16] Sauve L., (1997). The critical approach in education relating to the environment: theoretical origins and applications to training teachers. Review of Educational Sciences, Vol. 23, no. 1, p. 169-187.
- [17] Solid waste sector, current situation and development prospects. Kingdom of Morocco, Ministry of Spatial Planning, Water and Environment, State Secretariat for the Environment. Risk Prevention and Surveillance Directorate. January 2021.
- [18] Composting and recycling of compost; Sustainable farming practices. Agrimaroc.net-2023. <https://www.agrimaroc.net/2018/07/15/compostage-et-valorisation-du-compost-pratiques-dune-agriculture-durable/2/>.