ENVIRONMENTAL EDUCATION PRAXIS TOWARD A NATURAL CONSERVATION AREA

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(With 6 figures)

ABSTRACT

A non-formal Environmental Education (EE) Program has been implemented in the natural conservation area (Ecological Station of Jataí, Luiz Antônio, São Paulo State), through (EE) paradigms, which consider the objectives of education *about*, *in* and *for* the environment within cultural and natural perspectives. The aim of this Program is to support information and scientific knowledge to provide opportunities to the local population to be aware of environmental impacts and risks resulting from the soil use that threaten the environmental quality and the biodiversity of the Ecological Station of Jataí. The Program understands that the promotion of community empowerment could bring the sense of participation and the directives to management for decision-making for local sustainability. The model was projected on local reality, but considering the global issues of environmental paradigms. The environmental characterization (biophysical components) through a Geographical Information Systems was related to the hydrographic basin analysis. The environmental perception was utilized as a main tool to analyse population understanding of local environment, and (EE) pedagogical tools were produced to promote environmental awareness. Since the ecological dimension of (EE) was the main approach, the programme intends to assemble the cultural perspective, achieving the global view of (EE).

Key words: environmental education, natural conservation area, local sustainability.

RESUMO

A práxis da Educação Ambiental aplicada a uma unidade de conservação

Um Programa de Educação Ambiental em sua categorização não-formal está sendo implementado para uma unidade de conservação (Estação Ecológica de Jataí, Luiz Antônio, SP), com base em um modelo fundamentado na perspectiva natural, utilizando uma concepção paradigmática direcionada aos aspectos *sobre*, *no* e *para* o ambiente. Os objetivos desta abordagem compreendem a divulgação de informações e conhecimento científico, na perspectiva de conscientizar a comunidade local a respeito dos problemas ambientais que comprometem a qualidade ambiental da unidade de conservação, possibilitando a participação dos diferentes grupos sociais no processo de manejo e tomada de decisão direcionados à sustentabilidade ambiental. O modelo foi projetado sobre a realidade local, envolvendo a caracterização do sistema ambiental (componentes biofísicos) com o uso de Sistemas de Informações Geográficas, tendo a bacia hidrográfica como unidade da paisagem. A percepção ambiental foi utilizada como a ferramenta principal para a análise da compreensão do sistema ambiental pela comunidade local. Materiais técnico-pedagógicos foram elaborados para a sensibilização dos grupos sociais em relação aos problemas ambientais. Desde que a perspectiva natural em Educação Ambiental foi a abordagem principal, o Programa de Educação Ambiental pretende a incorporação da perspectiva cultural, atendendo a reorientação global da Educação Ambiental.

Palavras-chave: educação ambiental, unidade de conservação, grupos sociais de interação, desenvolvimento sustentado.

INTRODUCTION

The approaches and perspectives of Environmental Education have accompanied the historical concept of the terms "development" and "environment". Environmental Education was initially utilized in 1965 by the Royal Society of London, with a definition associated to the preservation of life systems (Gayford & Dorion, 1994). In 1970 the International Union for the Conservation of Nature (IUCN, 1971) restricted the conception of Environmental Education to the conservation of biodiversity (Sato, 1994). The incorporation of new concepts allied to the rise of countless environmental institutions endowed Environmental Education with a wider conception, highlighting the human being as the principal protagonist in the maintenance of the planet (Stockholm Conference, 1970), associated with the requirement of interdisciplinarity (Belgrade Conference, 1977), in the context of not being claimed by only one area of knowledge, culminating with the most used and known concept (Tbilisi Conference, 1977), *"as a process of recognition of values and classification of concepts, towards the development of skills and modification of attitudes in relation to the environment, to understand and appreciate the interrelations between human beings, their cultures and their biophysical environment; and further with the practice of making decisions and the ethics that lead to a change in quality of life"*. By its nature, Environmental Education came to represent a tool to be employed by the diverse socio-cultural groups of community, according to its needs and interests, in order to move the perception of the social actors through the modification of attitudes, of new knowledge and criteria in relation to environmental problems (Unesco, 1977).

This concept amplitude enabled that the activities related to the implementation of Environmental Education were directed at *sustainable development*, in the view of improving the quality of life through economic growth, without damage the natural environment (WECD, 1987). In this context, the guidance of Unesco (1997), of the substitution of the term Environmental Education for "Education for Sustainable Development", clearly demonstrates the economic emphasis given to environmentalism, withdrawing its educative and ecological functions, of maximum importance to answer to the challenges demanded in this era of globalisation.

These considerations determined a clear orientation of Environmental Education to *ecological sustainability* (Sterling, 1990; IUCN/WWF/UNESCO & PNUMA, 1992; Tilbury, 1995). More recently, Environmental Education has been associated to a process of reflection and consciousness of environmental problems, leading the participation and the recovery of citizenship in decision-making, aiming at intervention through autonomous methodologies in the use of development strategies and a consequent improvement in quality of life (Leff, 1997).

The highlight in the valuation of nature enabled three paradigmatic perspectives in the Environmental Education praxis. The first one, (Fig. 1.a), considering that this must be *about* the environment, establishing the ecological subject as fundamental (Hungerford & Volk, 1990); the second (Fig. 1.b), considering the immediate environment in the building of knowledge, prioritising education *in* the environment (Van Matre, 1979); the third (Fig. 1.c), that Environmental Education must be critical, purposeful and must permit participation *for* the environment (Fien, 1993). In some way, these paradigmatic perspectives in Environmental Education seem to be, consecutively, related to positivism (knowledge about the environment), constructivism (activities in the environment) and the critical theory (actions for the environment) of education (Robottom & Hart, 1993). At the same time, these perspectives are also identified in the paradigmatic concepts of the term *environment* (Table 1), whose influence is reflected in the scope and strategies used in Environmental Education theory and practice (Sauvé, 1996).

The forms, ideologies and methodologies considered within these approaches demonstrate difficulties in unification through being epistemologically distinct, suggesting that the praxis in Environmental Education should not be restricted only to construction of the ecological knowledge, but also to awake mechanisms to support the participation of the community, turning possible a reconstructivist dialogue in the educative process for the environment.

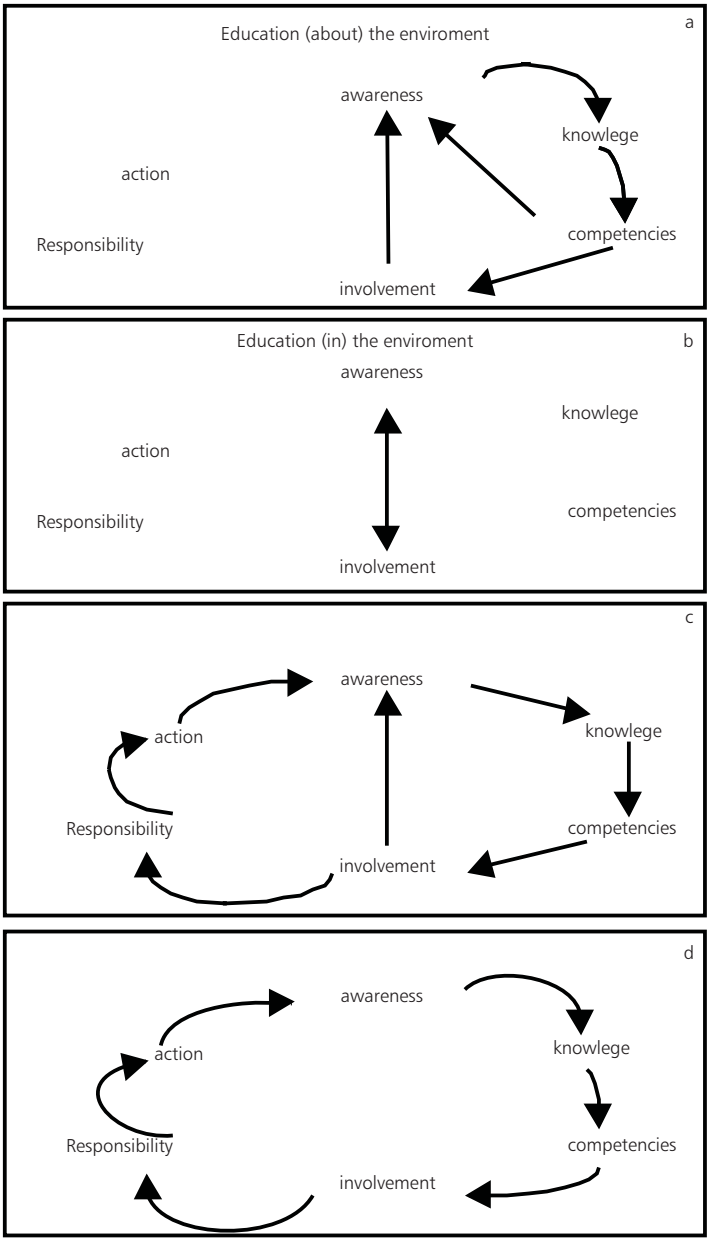

Fig. 1 — The focus of the Environmental Education (modified from Tilbury, 1995).

In this context, Tilbury (1995) discusses the opportunities of effective involvement of the community in the construction of a more responsible society, in considering the implementation of Environmental Education *about*, *in* and *for* the environment, incorporating the cognitive, affective and technical (participative) domains, through the proposition of six basic stages (Fig. 1.d). That is, the *awareness* for obtaining ecological *knowledge* inserted in the process of educative *competencies*, interacting with the *involvement* of social actors, who, through *responsibilities*, will look for *action* and participation for the effective exercising of citizenship.

TABLE 1
The typology of paradigmatic concepts related to the term "environment" in Environmental Education (EE) (modified from Sauvé, 1996).

Environment	Relation	Characteristics	Methodology
As nature	To be appreciated and preserved.	Nature as a cathedral, pure and original.	Immersion in nature.
As a natural resource	To be managed.	Collective biophysical inheritance.	Campaign of the 3 "Rs". Case studies.
As a problem.	To be resolved.	Emphasis on pollution, deterioration and environmental threats.	Problems resolution. Case studies.
As a place to live	EE , *about*, *in* and *for* taking care of the environment.	Nature with its social and technological components.	Gardening projects. Places or legends about nature.
As a biosphere	As a place to be shared.	Spaceship Earth, "Gaia", the interdependence of live beings with inanimate objects.	Case studies of global problems. Stories with different cosmologies.
As a community project	To be involved.	Nature with a focus on critical analysis, in the political participation of the community.	Research and participation for community transformation. Discussion forum.

However, the prioritisation of the valuation of nature has enabled the devaluation of knowledge, due to the difficulties in demonstrating the real value of ecological resources and environmental functions (Leff, 1997; Santos *et al*., 1998) permitting criticisms of the orientation of Environmental Education via economical perspectives (Sauvé, 1996).

Based on the recovery of the concepts and orientations defined for Environmental Education, this paper presents the proposition of a new perspective for its approach and implementation, in its "non formal" categorization, directed toward a natural conservation area (Ecological Station of Jataí, Luiz Antônio, SP). The approach is associated to an educative process whose complexity does not finish with this proposal, and based on an activity program to make known the scientific information and knowledge, to enable the awareness of the local community regarding the environmental impacts and risks that threaten the environmental quality and the biodiversity of the Ecological Station of Jataí, in the perspective of its participation in the proposals of management and decision-making guidelines directed to local sustainability.

MATERIAL AND METHODS

Location of the study area

The Ecological Station of Jataí (Fig. 2) is located in the city of Luiz Antônio, São Paulo State, and was created by the Decree of Law 18,997 (June 15, 1982, SP), with the concern of preserving remainings of "Cerrado" vegetation and Riparian Forest, which has been long degraded by the agricultural development associated to economical cycles of coffee monoculture in the beginning of the century, and more recently, the sugar-cane monoculture.

This conservation area has 4,532.18 ha., bordered to the immediate east and mediate north with the Experimental Station of Luiz Antônio (Fig. 2), with an area of 6,240 ha. Inside its limits the Ecological Station of Jataí includes three types of ecosystems: 1. the aquatics, represented by the Mogi-Guaçu river, the streams, the reservoir, the swamps and marginal lagoons; 2. the flooded terrestrial ecosystems that separate the lakes from the river, and 3.

The terrestrial ecosystems represented by the native vegetation and the semi-deciduous latifoliated forest (Santos *et al*., 1995).

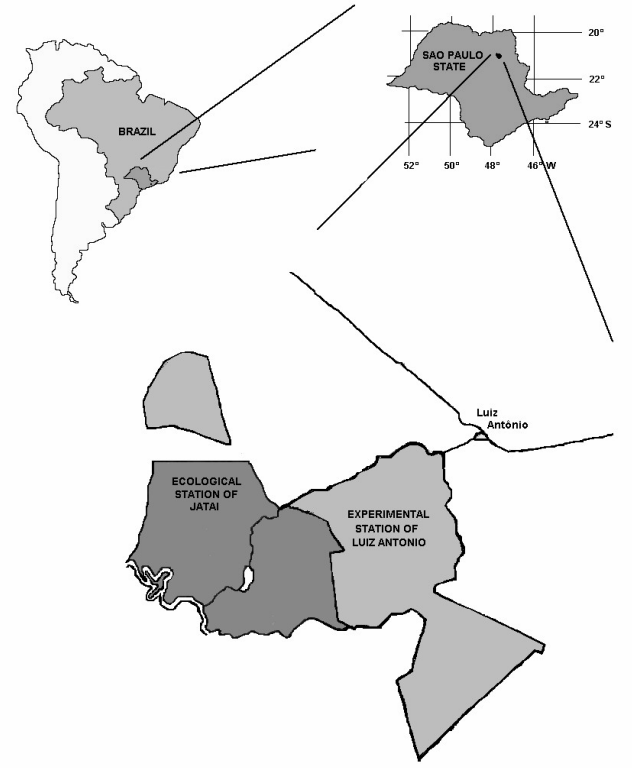

Fig. 2 — Localization of the study area.

The category of an Ecological Station conservation area is one of the most restricted and also the one which guarantees better protection for the biodiversity and integrity of ecosystems included in it.

The Experimental Station of Luiz Antônio is an area of public domain, categorized as a Permanent Preservation Area and considered as a Unit of Production (vegetal production). The Experimental Station includes plantations of *Pinus* and *Eucaliptus*, which provide wood for the manufacture of stretchers and posts for agricultural use and resin extraction.

Approximately 40,763.30 ha (63.37%) of the surrounding area of the Ecological Station of Jataí is occupied by agroecosystems, including sugar cane monoculture, reforestation by *Pinus* and *Eucaliptus*, citriculture, cattle raising and other cultures. The natural areas represented by the riparian forest, marshes and overflow areas, hillside and hilltops vegetation areas and cerrado vegetation, besides the marginal lagoons, constitute an area of 18,900.82 ha (31.71%) with relation of the city of Luiz Antônio total area (Pires *et al*., 1998a).

Experimental Delineation

The Environmental Education praxis is being implemented through an adequate and consistent model, under a paradigmatic conception within the *natural perspective* (Fig. 3), nevertheless directed at the aspects *about*, *in* and *for* the environment (Fig. 1.d), with a pedagogical reflection, bringing the genuine sense of participation to environmentalism. The concepts *as a resource and as a problem* adopted for the term *environment* complement this theoretical bases, identified in the paradigmatic concepts of Sauvé (1996), utilised in theory and in practice of this approach, as well as in the perspective to obtain an integrated view of the natural-cultural environment, through the concepts: *as a place to live, as a biosphere and as a community project* (Table 1). In this context, not only the aspects related to the environmental quality and biodiversity of the Ecological Station

of Jataí, but above all, the use of an approach that allows the manifestation of the natural and cultural diversity through an educative process, are objects of study.

Within its holistic perspective the model has the purpose of generating new links with the natural environment (Ecological Station of Jataí) through a particular ethic.

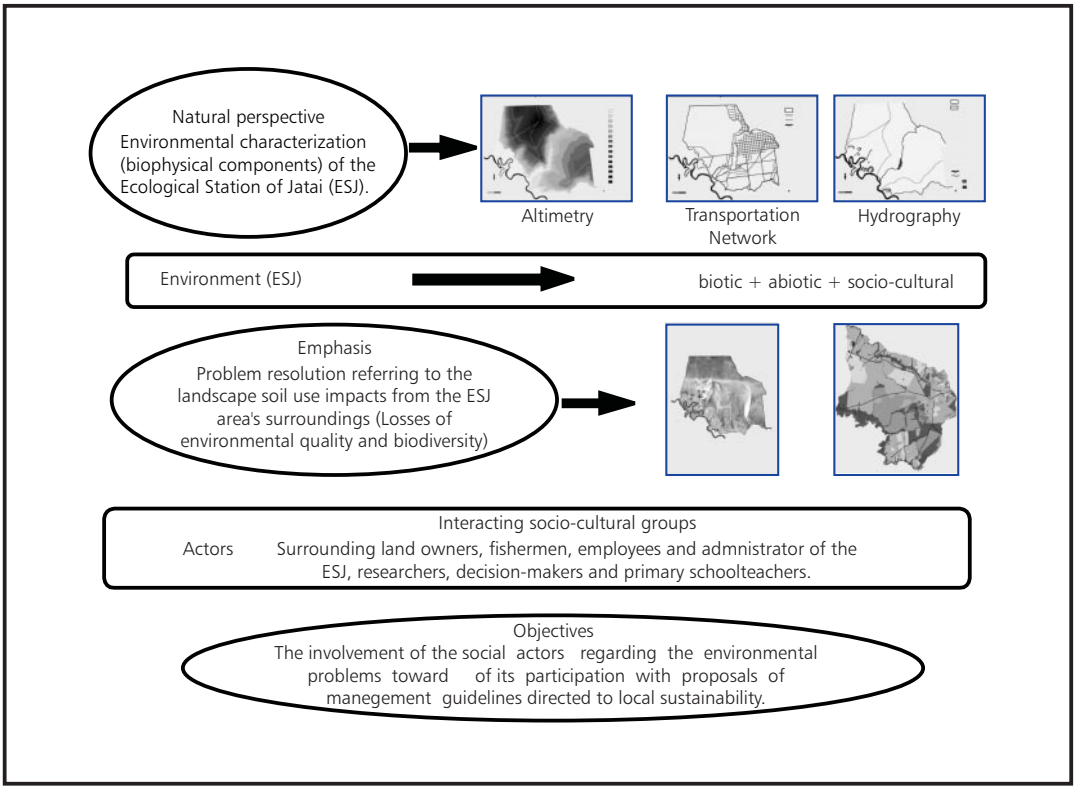

Fig. 3 — Methodological approach for Environmental Education praxis toward a natural conservation area (Ecological Station of Jataí, ESJ).

The proposed model is being applied in three stages: 1. environmental characterization involving the biophysical and social aspects of Ecological Station of Jataí; 2. investigation of the environmental perception of the Ecological Station Jataí's interacting groups, through non-patterned interviews, questionnaires (open and closed questions) and use of mental maps; and 3. implementation of Non-Formal Environmental Education Program.

Following the conceptual evolution in Environmental Education, the model was projected concerning the local reality, in the context of *man – environment* interaction, considering the total scope of the environmental system (Ecological Station of Jataí), through the union of its biological and physical, structural and functional aspects with the economical and social dimensions related to it. Even though the biophysical aspects represent the basis of the activities, the economical and social complexities are considered responsible for the diffusion of orientation and of conceptual and technical instruments for the management of the natural conservation area. The guidance toward sustainability and development of interdisciplinarity is being capacitated through the union of ecological and socio-economic aspects of the environmental system, associated with the processes developed in the community, preliminarily observed in the experience of a model previously utilized (Fig. 4). These aspects support that the interdisciplinarity

is being realized in a gradual way, considering its incorporation as a necessity to break the practice of isolated thought, increasing the scope of each theme, recovering the humanist dimension of thought (Sato, 1994).

The investigation of environmental perception (Fig. 5) was the strategical tool to monitor and stimulate attitude changes in the social-cultural groups interacting with the conservation area (surrounding land-owners, fishermen, employees and administrator of the Ecological Station of Jataí, researchers, decision-makers, primary schoolteachers (of the city of Luiz Antônio) and with the governmental organisations related to it. The concepts of the interacting social groups were verified through the basic ecological knowledge of the natural conservation area, with relation to the environmental impacts and risks identified, assuring the accomplishment of theirs proposals for the maintenance and conservation of the Ecological Station of Jataí. The methodological process allows the valuation of the cultural diversity through environmental planning in the perspective of ecological sustainability.

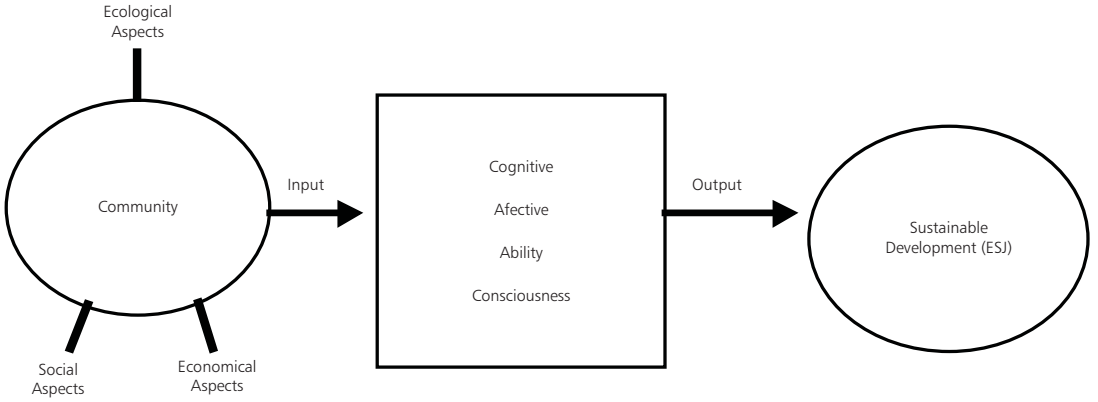

Fig. 4 — Preliminar model utilized for Environmental Education praxis toward Ecological Station of Jataí (ESJ) considering the ecological and socio-economical aspects in the compromising of biodiversity and environmental life quality in the local scope.

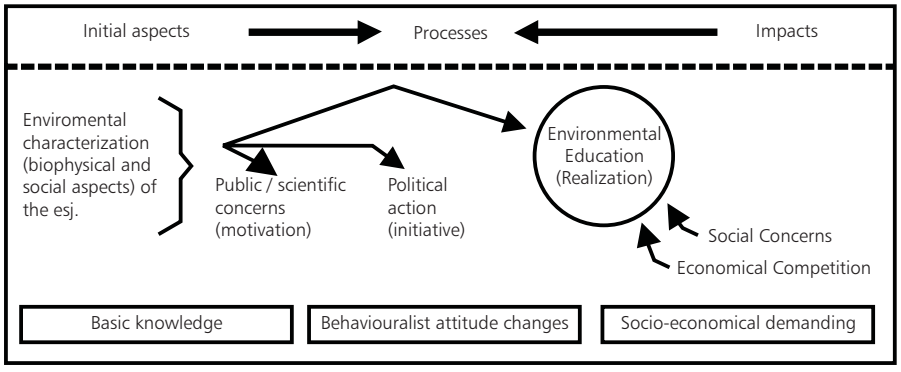

Fig. 5 — Investigation of Environmental Perception of the Ecological Station of Jataí (ESJ) through interaction socio-cultural groups (surrounding land-owners; fishermen; employees and administrator of the ESJ; researchers; decision-makers and primary schoolteachers).

RESULTS AND DISCUSSION

Several concepts have been attributed to Non-Formal Environmental Education, and the majority associated with subject not restricted to cycle programs of the teaching system, but involving rules and pedagogical planning.The guidelines for an Environmental Education Program for the Ecological Station of Jataí is extremely dependent on the knowledge of the regional values, on the thematic-environment and social scope, on environmental descriptors, on the types of animals, existing water and soil resources and other abiotic components (Fig. 3), to determine the availability of the natural resources for the dissemination of an environmental awareness in the community. The environmental characterization of the Ecological Station of Jataí was based on a physical area description, through the use of thematic maps (hydrography, altimetry, pedology, soil use and occupation, transportation network and zoning proposal) via a Geographic Information System (GIS-IDRISI), permitting the elaboration of a georeferenced data base (Pires *et al.*, 1998b) for interpretation, evaluation and decisions regarding the management of the Ecological Station of Jataí. The natural conservation area was delimited in 4 watersheds, defined by its topographical limits on the planialtimetric map, and the loss of environmental quality and biodiversity of these basins was analysed in function of the impacts resulting from the soil use, determining the fragmentation of the landscape of the surrounding area (Pires *et al.*, 1998a).

The involvement of interacting socio-cultural groups with natural conservation areas has been considered of great importance as a maintaining natural resources of these areas (Pádua, 1995), as well as a participative element of the established conservationist goals, since the majority of people do not understand, through ignorance or through inadequate information, the relationship between human activities and environmental quality (Agenda 21, Chapter 6 *in* Sato & Santos, 1997). The investigation of environmental perception of the socio-cultural groups interacting with the Ecological Station of Jataí with regards to primary schoolteachers (Maroti & Santos, 1998a,b), of the decision-makers (Kataoka-Silva, 1997) and of researchers, fishermen, neighbouring individuals and the conservation area administrator (Santos *et al.*, 1996), show clearly the necessity to work for clarification of concepts related to the processes of conservation, biodiversity, and impacts from soil use, among others, in the supplying of conditions and assistance for interacting groups to formulate proposals, in the conception as well as the discussion, concerning the compromising of environmental quality and of the biodiversity of this natural conservation area. Under local and regional identification of available natural resources and of how the environmental problems and issues are developed in the municipality, there will be greater viability for environmental conservation.

This involvement implicates the development of actions that enable the analysis of the natural and social realities, allowing actions in the environment (Ecological Station of Jataí), but differentiated by the conditions that define the various socio-cultural groups. Further, in the development of a more critical pedagogical action, in which the social actors can construct their knowledge, for the reconstruction and transformation of the natural and cultural reality. The process of *awareness* through ecological knowledge (biophysical), facilitates the *involvement* of interacting groups, awakening mechanisms that favour the participation of these groups, in an educative process *for* the natural conservation area. In other words, the building of a more participative community for problem resolution, referring to the soil use impacts, from the conservation area's surroundings, in the compromising of biodiversity and environmental/ life quality in the local and regional scope.

The implementation of Non-Formal Environmental Education in the scope of the Ecological Station of Jataí was initiated with the elaboration of technical-pedagogical material, directed toward the various interacting socio-cultural groups, highlighting the effects of soil use impacts in the city of Luiz Antônio resulting mainly from sugar-cane monoculture, in the compromising of biodiversity and environmental quality of the conservation area (Guará Wolf; Ecological Station Mammals; Land Use in the City of Luiz Antônio; Historical Aspects of the Waterway and of the Jataí Harbour; the Legend of Mogi-Guaçu River; Knowing the Environment). The organization of lectures for the various groups of the community was also utilized as part of this strategy, working themes specific to the environmental reality of the city of Luiz Antônio, contributing to the comprehension of the

necessity and importance of maintenance and conservation of the Ecological Station of Jataí. The activities in Environmental Education with the elaborated materials do not plan a simple divulgation of information and fragmented knowledge about specific problems of contamination or environmental degradation, or even the extinction of animal or vegetal species of the Ecological Station of Jataí. Seeing that the environmental conditions depend much more on political, social, economical and technological decisions than on biophysical factors only, the implemented activities should provide a new system of values for the community, enabling the inquirement of management options proposed for the conservation area, also associated to a program of capacitation related to conservation and environmental research.

Considering that the Environmental Education practice should not only prioritise the conservation of nature as a mark of sustainable development, but also should enable the manifestations of natural and cultural diversity, and of the development of individual and collective potentials for the transformation of an educative project, it is necessary to highlight and discuss the pedagogical basis used in the developed actions. Beyond the traditional models available (Table 2) and still under construction, a guidance towards comparative analysis of the evolution of Environmental Education has been evidenced, with the tendency of substituting the behaviouralist focus of attitude changes for professional qualification orientations and their actions (Breiting, 1993 *apud* Smyth, 1995). The union of the aspects contained in these models, within critical pedagogy, seems to be the most used path in Environmental Education, considering the involvement of the community and the increase of participation of the different socio-cultural groups (Sato, 1997). An approach towards at human relations among themselves and with nature, giving greater emphasis to human solidarity than to environmental problems (Table III).

TABLE 2

Privileged paradigms in Environmental Education (Sato, 1997).

Authors	Utilized classification	Privileged paradigm
MEC (1996)	Traditional, renovated, technical and critical	Critical
Minini (1994)	Traditional, behaviouralist, socio-cultural humanist, historical-critical and cognitive	Cognitive
Sato (1992)	Utilitarian, post-positivist, humanistic and liberating	Liberating
Sauvé (1996)	Rational, humanistic and inventive	Inventive
Robottom & Hart (1993)	Positivist, post-positivist, interpretative and critical	Critical

TABLE 3

Evolutionary aspects in the approaches of Environmental Education (modified of Smith, 1995).

Components	Traditional paradigm	Modern paradigm
Social actors	Teachers and specialists	Teachers, specialists and community
Epistemological base	Transmission of knowledge	Reconstruction of reality
Focus	Behaviouralist "attitude" changes	Participation (action)
Relation of actors with nature	Direct (human being - nature)	Mediated (human being - society - nature)
Emphasis	Environmental problems	Human solidarity
Scientific paradigm	Exclusively natural	Natural inclusive
Research centralisation	Life systems	Community experiences
Sustainability emphasis on	Natural resources	Cultural resources
Society with equity	Little emphasis	Much emphasis

It is fundamental that the Human Sciences do not incorporate Environmental Education as exclusive to that area. Although the Natural Sciences do not include the social components in their investigation, the Human Sciences are not able to incorporate and deal with ecological questions of fundamental importance in Environmental Education (Smyth, 1995). The tendency of Environmental Education towards the aspects of the conservation of nature can be related to the phenomenon of *imprinting* (Morin, 1996), determining those institutions that suffer less *imprinting*, that is, that consider Environmental Education as an educative process, are considered as opponents or dissidents. However, the dialectic and practice in Environmental Education demonstrate that it must articulate both Sciences, demanding a polyvalent competence able of initiating a new paradigm. The recent criticism about Environmental Education has caused the reflection about its evolution by the diverse professionals acting in the area. This evolutionary process has evidenced disordered actions in the perspective of valuation of nature, within a determinist ecologism, with little attention to the educative aspects of Environmental Education.

This is a fundamental aspect for the awareness and action in the search for development that prioritises human quality in relation to economic quantity. Considering the aims, the problems, the premises, the social actors and goals of the natural perspective in Environmental Education (Fig. 3), the incorporation of the *cultural perspective* in this approach (Fig. 6) is fundamental, seeing that these are all complementary.

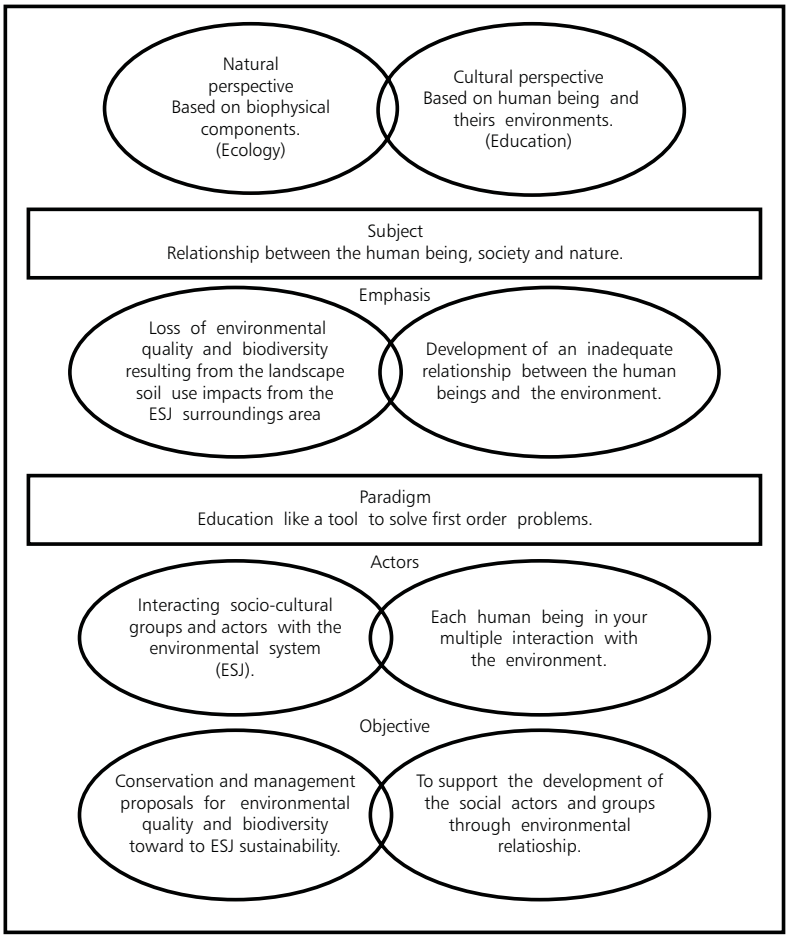

Fig. 6 — Natural and cultural perspectives in Environmental Education approach toward to a natural conservation area (Ecological Station of Jataí) (modified from Sato, 1997).

While the environmental problems damage and compromise the environmental quality of the Ecological Station of Jataí, the educative action has its commitment in personal relations for social development. It is in this challenge that Environmental Education appears to be inserted: *in the dialogue between nature and culture*; that is, in the responses to environmental problems to human development and to the educative process. The comprehension of some ecological concepts, and of Ecology itself, allied to the educational process awakening the ethical and environmentalist concern of the social groups, will be able to conduct human society to a more rational interaction with the environment, and perhaps of greater significance, enabling the change of individual and collective conception in our interaction with the environment, providing for the construction of abilities and mechanisms necessary for sustainable development.

In redeeming the true function of Environmental Education, the Program implemented for the Ecological Station of Jataí intends to incorporate the new reorientation of *ecological sustainability*, with the commitment of ratifying the responsibility of Environmental Education for the maintenance of the biosphere and for the improvement of living conditions of the community. The experience developed with this Program of Environmental Education will allow its enlargement in the involvement of neighbouring municipalities (Guatapará and Rincão) of the city of Luiz Antônio, in the perspective of providing an awareness to their respective populations of the necessity and benefits of conservation of biodiversity and of sustainable development.

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