

# Another Environment: Art, Science and Technology for Sustainable Development

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**Abstract:** The present paper was a study on art as an instrument for environmental education. The objective was to demonstrate its impact on the way that Cuban population makes the transition toward sustainable development. To achieve that, documents and visual aids were studied, and a survey to experts and scholars involved in the environmental education process was carried out. As result, an environmental initiative was designed under the Art, Science, and Technology Studies (ASTS).

**Keywords:** Environmental education, ASTS, sustainable development.

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## 1. Introduction

Environmental education, as a full change process toward sustainable development, has a leading role. That points to the significant responsibility it has in the formation of environmentally responsible behaviors, attitudes and values. Precisely, the Intergovernmental Conference on Environmental Education declared that “to defend and improve the environment for present and future generations has become an imperative goal” [...] “education should play a leading role in creating an awareness and a better understanding of environmental problems. It must foster positive patterns of conduct towards the environment [...] should be provided for all ages, at all levels and in both formal and nonformal education” [1].

Since that time – and some years before – science has shown that it is essential to prepare ourselves to be able to adapt to the inevitable and irreversible change in environmental conditions. Therefore, at the third World Conference of the United Nations, it was agreed that the first priority is, for example, “Promote national strategies to strengthen public education and awareness in disaster risk reduction, including disaster risk information and knowledge, through campaigns, social media and community mobilization, taking into account specific audience and their needs” [2]. This is reason enough for “Prioritize measures and actions to increase risk perception and improve the levels of knowledge and participation of the whole population in dealing with climate change” [3] is one of the tasks – eleven as a total – of the *State Plan for Facing Climate Change in the Republic of Cuba*.

Exactly in this sense, “Promote and increase the education, awareness and environmental culture of citizens, as well as their effective participation and the role of the media, in a harmonious, systematic and coherent manner, incorporating the entire Cuban society” [4] constitutes a specific objective. In the same way that, since the approval of the *National Environmental Education Strategy 2010-2015*, “consolidating environmental education for sustainable development” in order to achieve “sensitization and awareness of the Cuban population” has been a constant aspiration [5]. That is why the Ministry of Higher Education (MES), to cite an example, also approved that: “The management of science, technology and innovation for the solution of environmental problems, has to be accompanied by educational and communicative processes that enhance the development of an environmental culture [...] for the exchange of information with the university and non-university community on the main environmental problems in the territories through sociocultural promotion actions” [6].

If people who are aware of climate change, disaster risk, etc., are needed for the protection of the environment, it is essential to let them know about it through all possible means. Disseminating scientific knowledge is essential to educate people while educating them environmentally, and art is an excellent tool for this. We believe – as José Martí did – that it is “the shortest way to reach the triumph of truth” (that *truth* is no other than science), “so that it endures and sparkles in minds and hearts” [7].

Therefore, the synergy between art and environmental education, in the process of communication and development of environmental values, is the object of study in this paper. Demonstrating its scope and impact is essential in light of the always plural forms of teaching-learning, as well as the present and future demands of Cuban environmental education. Then, all the information obtained in the documents and videos analyzed, along with that provided by a group of surveyed specialists, leads us to the design of an environmental initiative. Initiative that under the suggestive title *Another Environment* proposes an active collaboration among art (music, literature, filmmaking, and photography) and environmental sciences.

## 2. Methods

During the research, the methods used for its effective development were: documentary analysis, survey, and descriptive-inferential statistics. With them, art and environmental education are analyzed as processes in constant transformation according to the political, economic and social context; its particular elements are interpreted and synthesized –from transdisciplinarity–; the selected bibliography and video material were studied; the *potential impact* (PI) and the *impact perception* (IP) of art in Cuban environmental education were analyzed; and the data obtained in the investigation was also described.

To support what was mentioned above and fulfill the objective of this paper, the following materials were used: documents on the usefulness of art in environmental education; videos broadcast by Lucas and/or that can be watched on the digital platform YouTube; a questionnaire with 18 single or multiple choice closed questions; and the R2016a version of the MATLAB mathematical software.

## 3. Results

According to a survey published by IFACCA and Julie's Bicycle in 2014, the Cuban Ministry of Culture was the only respondent that confirmed having available funding for environmental sustainability, which places Cuba at the forefront of nations with policies to *educate about the environment* through art.

This information is significant, since science must often overcome its language in the same way that art assumes scientific and technological advances [8], which encourages them to approach. In addition, on this inevitable approach, each time much closer, “the science/art encounter is not born in a vacuum. It is an expression of a new interpretive paradigm that invites us to get out of this crisis of civilization by thinking and acting in a different way from the one that led us to it [...] in order to advance towards an integrated and transdisciplinary model of thought. [...] We intend to *show the viability of a dialogue between scientific principles and artistic forms*” [8]. Then, art “is a necessary symbolic field for the human being, since it is a tool with which the individual is able to transcend to communicate their emotions and thoughts” [9]. Therefore, “the current mission of art, if it really wants to maintain a socio-transforming role and bet on a change in favor of a sustainable future, needs to be built from the understanding of our interdependent and eco-dependent condition” [9].

With the aim of awakening solutions, it is opportune to interconnect art with the socio-environmental reality, since art has the capacity to intervene in our environment and penetrate our consciences, which acquires a relevant connotation in its link with the problems associated with the global environmental crisis [9].

In fact, an “art of ecological awareness activated in collective places and from collaboration can be an art capable of recycling our thoughts and uniting our roots to the earth, valuing and respecting what we have” [9]. The references to experiences that “interconnect art to the different scientific, technological, environmental and social areas” [9] highlight the importance of a holistic and interdisciplinary vision with the common goal of influencing public awareness and producing respectful attitudes towards the environment [9], [10]. And in the same direction goes the idea that “working in a transdisciplinary way is important as a crucial alternative for addressing the social and environmental problems that the planet is experiencing, by virtue of being an inclusive methodology that values science, art, culture, spirituality and local knowledge” [11].

We need to understand that the “arts, as a vehicle for making science and policy both digestible and effective, will be instrumental in understanding both what is happening and how it is changing us and our world. They are our best coping strategy, whatever else happens. We do not exist outside the environment, nor does the artwork we create. [...] It is the unique utility of the arts and their ability to affect us in ways that are hard to describe that will make them the key to our ongoing adaptation to a changing world, a shifting environment” [12]. Recognizing this change is essential in order to be able to “use art as a means of knowledge and appreciation [...] to convey to citizens, to the local population, the environmental values” that enable the development of

skills, attitudes and coherent decisions. “Use art, definitely, as a means of raising awareness” based on “the possibility of art to recognize and evoke these values [...] and provide new avenues in research on how to effectively link art as an instrument of environmental education” [13].

In this direction, we agree that through “art it is possible to establish a type of relationship with the environment that hardly takes place in other areas. [...] This means in particular that, if we set our minds to it, we could Educate through Art the ability to cultivate personal relationships with the environment. [...] Artistic manifestations constitute an inexhaustible source of reflection about the attitudes and relationships that man has established with the environment” [14]. An effort in this direction is arts-based environmental education (AEE), a concept that the Finnish professor Meri-Helga Mantere defined as a mode of teaching with the purpose to develop an environmental understanding and responsibility [15].

The truth is that several experiences corroborate this impact on environmental education, taking into account that “from the expressions of art, an active and conscious role can be assumed in the care of our planet” [16]. Art can help us to “make visible the problems that affect humanity, pollution, the extinction of various species, the preservation of flora and fauna, the care of air and water, resources that are vital for the subsistence of human beings, in addition to being agents responsible for the consequences that can cause the non-rational use of natural resources. That is why art represents a language that makes possible to visualize, understand, analyze and raise awareness of repercussions on environmental issues” [16]. Also, when all these issues are “addressed through creative interventions through art and environmental education, seek to generate reflections that allow our young people to become aware of the conflicts that affect our environment and afflict the community” [16]. We believed that “art and education have to be increasingly linked, because it is essential that artists are more and more educators and educators more artists”. For this reason, we find it very encouraging to know that “the Ministry of Culture of Cuba highlighted the responsibility that culture and arts have to educate the public about environmental sustainability” [17].

However, how many Cuban video clips educate about the environment? Just to mention the artistic product that dominates the indicators of cultural consumption worldwide. It was not difficult to verify that, in a television program like Lucas and on a digital platform like YouTube, these type of video clips have a very low presence because they are not produced in the necessary numbers.

But that and other questions have not only provided the material to prepare a questionnaire on the impact of art on Cuban environmental education, but have also helped us to design an environmental initiative.

It is important to understand how the many educational contents have been moving from offline reality to online reality: virtual libraries, virtual galleries, etc., are examples of this movement in which science and art are very well placed at the forefront. Both scenarios complement each other, which makes possible to develop –based on their particularities– better quality environmental education.

In fact, we know that the potential of the art produced in Cuba has much to contribute to Cuban environmental education. Everything that has contributed, to date, has been less than what we consider it could have been. But in the creative force of Cuban science and art, as well as in the will of the institutions that represent them, are the best options for environmental education. The aforementioned environmental initiative –and described further on– is the result of this creation will.

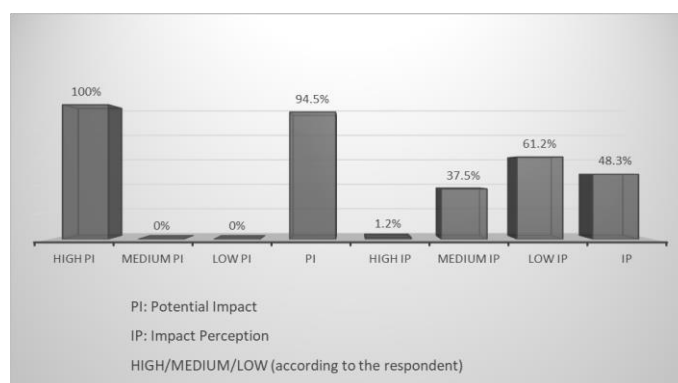
Then, in order to demonstrate the impact of art, we carried out a survey that was applied to 80 experts and scholars involved in environmental education, both the generation of scientific knowledge and its subsequent dissemination. The information obtained was used to evaluate the PI (hypothesis or expectation about the level of influence that a phenomenon has in a specific context) and IP (interpretation of the level of influence that a phenomenon has in a specific context) of art in environmental education in Cuba. For both cases, qualitative and quantitative evaluations were used:

In the case of PI: Low (0% - 49%), Medium (50% - 79%) and High (80% - 100%).

In the case of IP: Low (0% - 49%), Medium (50% - 79%) and High (80% - 100%).

According to the results obtained, 100% of the surveyed specialists consider that PI is High, while 1.2% have High PI, 37.5% have Medium PI, and 61.2% have Low PI. Hence, the PI is High (94.5%) and the IP is Low (48.3%). The data described is shown in the graph below:

GRAPH 1. Results of the survey.



Source: authors' elaboration.

Below, there is a table with the results obtained from the first 8 experts and scholars surveyed.

TABLE 1. List with the results of the first 8 respondents.

No.	Name	PI	%	IP	%
01	Respondent A	High	100	Short	33.0
02	Respondent B	High	88.8	Short	44.4
03	Respondent C	High	94.4	Short	47.2
04	Respondent D	High	88.8	Short	44.4
05	Respondent E	High	86.1	Half	58.3
06	Respondent F	High	88.8	Short	44.4
07	Respondent G	High	100	Half	55.5
08	Respondent H	High	100	Half	55.5

Source: authors' elaboration.

These results demonstrate that, in Cuban environmental education, art has to be used much more. For this, the environmental initiative “Another Environment” was designed under ASTS and proposes three products: a music album, an essay book, and a photography and film exhibition.

The initiative is based on the scientific knowledge provided by the environmental sciences, on artistic theory and practice, and on the information obtained through the research. It was designed based on the need to increase people's information and improve their education regarding the protection of the environment, since reality shows that more and new actions are necessary to contribute to that purpose.

Concepts such as capacity building, capacity development, coping capacity, and others related to disaster risk reduction in Cuba, are fundamental within this initiative. The resilience and sustainable development of Cuban society imply creating capacities and systematically developing them in a way that our coping capacity can be superior in quality and effectiveness. In order to adapt to climate change this is essential.

The three products that of the initiative are described below:

1. *Another Environment*: proenvironment music album that promotes sustainable development, and invites you to trans-read the essay *Introduction to proenvironment music*, which is the first text about the music that represents environmentalism.
2. *Another environment for a sustainable future*: book-essay in which the expertise of specialists linked to environmental protection is used to raise awareness and educate the public.
3. *Another environment on images*: photography and film exhibition that based on the effective collaboration among science, music, literature and image, supports all the creation produced into the environmental initiative.

#### 4. Conclusions

This paper allows us to demonstrate that Cuban environmental education requires a greater presence of art. The *potential impact* and the *impact perception* reflect it, but they also argue the reason for the initiative: a tool for the formation of environmental values that the Cuban population needs.

Implementing the environmental initiative “Another Environment” and continuing to elaborate ideas that make it possible to develop similar actions make it worth paying attention to the following words:

On the educational level [Maria Novo has affirmed], along with scientific content, it is necessary to revalue the capacity of art *to encourage a more sensitive and conscious look and listen* [authors’ emphasis].

Therefore, in order to educate about the environment and position environmental education content among the first priorities of the population, we propose products designed under ASTS as an alternative.

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## 6. Annexes

## Impact of Art in Environmental Education

The following survey is to evaluate the impact of art (music, literature, filmmaking, and photography) as an instrument for environmental education. This evaluation is based on the criteria from experts and scholars involved in that process. You should know that your valuable collaboration is appreciated and the anonymous nature of your answers is also guaranteed.

*\*So please, write (x) inside the box of the option selected.*

01. Do you consider necessary to disseminate scientific knowledge?

Yes ☐ No ☐

02. Do you consider art is useful for disseminating scientific knowledge?

Yes ☐ No ☐

03. What impact does promoting environmental science through art have?

High ☐ Medium ☐ Low ☐ None ☐

04. Do you consider environmental education is necessary?

Yes ☐ No ☐

05. Do you consider necessary to use art for environmental education?

Yes ☐ No ☐

06. How important is art for environmental education?

Very much ☐ Not much ☐ They aren't ☐

07. Which art(s) do you consider effective for environmental education?

All ☐ Painting ☐ Filmmaking ☐ Literature ☐

Music ☐ Photography ☐ None ☐

08. Which place(s) do you consider effective for environmental education?

All ☐ Park ☐ Library ☐ Movie ☐

School ☐ Club ☐ Gallery ☐ None ☐

09. When environmental science should be promoted through art?

Always ☐ Sometimes ☐ Never ☐

10. How frequently is art used for environmental education?

Always ☐ Sometimes ☐ Barely ☐ Never ☐

11. How is art used for environmental education?

Very well ☐ Regular ☐ Not well ☐ Never ☐

12. Do Cuban artists contribute to environmental education with their own art?

Very much ☐ Not much ☐ Barely ☐ Never ☐

13. How many Cuban artists contribute to environmental education with their own art?

Many ☐ Few ☐ Very few ☐ None ☐

14. Does television promote the environmental work in Cuba?

Very much ☐ Not much ☐ Barely ☐ Never ☐

15. Does the radio promote the environmental work in Cuba?

Very much ☐ Not much ☐ Barely ☐ Never ☐

16. Do musical shows on Cuban radio and television contribute to environmental education?

Very much ☐ Not much ☐ Barely ☐ Never ☐

17. Do you consider the environmental work in Cuba is promoted on digital platforms?

Very much ☐ Not much ☐ Barely ☐ Never ☐

18. Do Cuban art on digital platforms contribute to environmental education?

Very much ☐ Not much ☐ Barely ☐ Never ☐