# 

# **PROMOTING**

ENVIRONMENTAL EDUCATION IN STUDENTS MAJORING IN ENGLISH LANGUAGE TEACHING

Fecha de presentación: septiembre, 2021 Fecha de aceptación: noviembre, 2021 Fecha de publicación: enero, 2022

# PROMOTING

# ENVIRONMENTAL EDUCATION IN STUDENTS MAJORING IN ENGLISH LANGUAGE TEACHING

# LA PROMOCIÓN DE LA EDUCACIÓN AMBIENTAL EN ESTUDIANTES DE LA CARRERA LICENCIATURA EN EDUCACIÓN LENGUAS EXTRAJERAS

Julio César La Rosa Ponce<sup>1</sup> E-mail: julitinc97@nauta.cu

ORCID: https://orcid.org/0000-0001-8455-5174

Adrian Abreus González<sup>1</sup> E-mail: aabreus@ucf.edu.cu

ORCID: https://orcid.org/0000-0003-4643-3269

<sup>1</sup> Universidad de Cienfuegos "Carlos Rafael Rodríguez". Cuba.

# Suggested citation (APA, 7th edition)

La Rosa Ponce, J. C., & Abreus González, A. (2022). Promoting environmental education in students majoring in English language teaching. *Revista Metropolitana de Ciencias Aplicadas*, 5(1), 220-227.

# **ABSTRACT**

Environmental education is one of the aspects tackled within the 17 Development and Sustainability Goals (SDG). Environmental education can be related to all levels of teaching and all subject areas. The following research proposes a set of activities to promote Environmental Education for Sustainable Development in sophomore students of the English Language Teaching Major of the University of Cienfuegos "Carlos Rafael Rodriguez". The proposal of activities can contribute effectively to the students' assimilation and integration of environmental knowledge in Integrated English Practice Lessons. Moreover, the exercises help the students develop abilities, attitudes and capacities useful to their professional life. Therefore, the proposal intends to guide a correct environmental education in schools. The authors consider that the proposal of activities throughout a multimedia may easier the English teaching learning process, allowing the students to continue learning English language outside the classrooms and develop critical thinking.

### Keywords:

Environmental, education, multimedia. English language, skills.

# **RESUMEN**

La educación ambiental es uno de los aspectos abordados dentro de los 17 Objetivos de Desarrollo y Sostenibilidad (ODS). Esta se puede relacionar en todos los niveles de enseñanza y en todas las materias. La siguiente investigación propone un conjunto de actividades para promover la Educación Ambiental para el Desarrollo Sostenible en estudiantes de segundo año de la Carrera Licenciatura en Educación, Inglés de la Universidad de Cienfuegos "Carlos Rafael Rodríguez". La propuesta de actividades puede contribuir de manera efectiva a la asimilación e integración de conocimientos ambientales por parte de los estudiantes en las clases de Práctica Integral de la Lengua Inglesa. Además, los ejercicios ayudan a los estudiantes a desarrollar habilidades, actitudes y capacidades útiles para su vida profesional. Por lo tanto, la propuesta pretende orientar una correcta educación ambiental en las escuelas. Los autores consideran que la propuesta de actividades a través de una multimedia puede facilitar el proceso de enseñanza aprendizaje del inglés, permitiendo que los estudiantes continúen aprendiendo el idioma inglés fuera del contexto escolar, al tiempo que permite desarrollar el pensamiento crítico.

# Palabras clave:

Medio ambiente, educación, multimedia, idioma inglés, habilidades.

### **INTRODUCTION**

The current global situation demands an emerging attention in relation to the environment, not only of an individual person or an individual country, but of global citizens. It is an international problem all governments should take responsibilities for. However, responsibility is not only meant to be achieved by the authorities, it is also a work for those who are aware about the issues related to this topic.

Due to the magnitude of the problem and its consequences for the world, in the United Nations Conference in 1972, some strategies were developed for the preservation and care of the Environment. After more than four decades of dialogue and multilateral debate on how to respond to environmental, social and economic challenges, the international community is still facing environmental problems nowadays. The United Nations Summit on Sustainable Development in 2015 decided to implement the Agenda 2030 for Sustainable Development. This Agenda has 17 Sustainable Development Goals (SDG), ratified by 193 states committed to ensuring sustained and inclusive economic growth, inclusion and the protection of the environment. Therefore, these goals should be achieved in a framework of peace and cooperation (Comisión Económica para América Latina y el Caribe, 2018).

The SDG 4 aims at guaranteeing inclusive and equitable quality education and promote lifelong learning opportunities for all. Item 7 of this SDG 4, implicitly makes reference to the environmental education that takes place in school contexts. However, this item does not explicitly state the benefits of working with different social sectors in order to promote environmental education. According to this item of SDG 4, by 2030, all students should have acquired the theoretical and practical knowledge necessary to promote sustainable development (Comisión Económica para América Latina y el Caribe, 2018).

When teachers educate about the environment, they must identify their responsibilities as global citizens and make a positive change for the world. Environmental education encourages creative thinking and inspires students to become more involved with their communities (Gutiérrez, 2020). Moreover, by providing environmental education to students they will relate problem-solving techniques of the outer world to their subjects in order to understand a particular problem by implying outdoor environmental solutions.

In order to lessen the effects of environmental issues and contribute to Environmental Education for Sustainable Development (EESD), the relations established by Cuba with the international community are indisputable. Cuba has always supported any action that is aimed at the care and preservation of the environment (Gutiérrez, 2020), and has supported the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the dissemination of the environmental education program in the world. In

this sense, the Cuban government supported the initiative of the Decade of the World Summit for Sustainable Development, held in Johannesburg in 2002.

In addition, Chapter VIII of the Law 81 launched in 1997 (Cuban Environmental Law) contains the National Strategy of Cuban Environmental Education. In the biannual National Action Plans of the Cuban Network of Environmental Training and the Forum of Ministers of the Environment of Latin America and the Caribbean; the Latin American and Caribbean Project for Environmental Education (PLACEA) was launched as a working platform.

Cuba makes an effort to prepare the population to mitigate the effects of climate change at present, and thus being able to raise knowledge to influence the actions of the National Plan for mitigating environmental issues, called "Task Life" (Rodríguez, et al., 2019).

The Task Life constitutes a comprehensive proposal, in which a first identification of prioritized areas and places, their effects and the actions to be undertaken are presented, which can be enriched during its development and implementation. It has a scope and hierarchy superior to other previous documents on climate change in the country. It also includes the territorial dimension, and requires conceiving and executing a program of progressive investments in short (2020), medium (2030), long (2050) and very long terms (2100); according to Rodríguez, et al. (2019).

On the other hand, the "Task Life" contains five strategic actions and eleven tasks; task 10 refers to raise the risk perception, the level of knowledge and the degree of participation of all the citizen in the fight against climate change, which highlights the need for Environmental Education.

Several national and international authors have conducted research about Environmental Education, such as Stapp et al. (1997); Proenza (2001); Escobar (2009); Mulhu (2011); Hauschild et al. (2012); Stavreva & Kirova (2013); Valdés et al. (2013); Bosque (2014); Rodríguez & Rodríguez (2015); Gámez (2018); Gutiérrez (2020); Márquez et al. (2021). These authors propose the development of environmental education intended to form attitudes and values in the students so that they can face the real environmental issues in their social life. However, most of those authors have focused their proposal of activities in strengthen the environmental education in High School and in Senior High School, only focusing in the content of class-prepared materials. Only Gutiérrez (2020), has proposed activities for junior students of the English Language Teaching Major with a similar approach to the one mentioned before.

After applying an interview to teachers of Integrated English Practice (IEP) of the Major in English Language Teaching, and a survey to sophomore students of the same major at the University of Cienfuegos, as well as

revising the documents for the teaching of IEP at this level of education, the authors can state that:

- There are not enough activities intended to develop environmental education, and the activities planned do not integrate the English language skills.
- The course book used to teach English in IEP lessons only has three units related to Environmental Education.
- Students have scarce vocabulary and knowledge to allude to environmental problems and how those problems could be solved.
- No strategy and research treating environmental education in the English learning process at this level were found.

Taking the above mentioned regularities as a starting point, the following scientific question was stated: How can Environmental Education for sustainable development be promoted in sophomore students of the English Language Teaching Major of the University of Cienfuegos "Carlos Rafael Rodriguez". Thus, a set of activities to promote Environmental Education for Sustainable Development in sophomore students of the English Language Teaching Major of the University of Cienfuegos "Carlos Rafael Rodriguez" was elaborated to provide a pedagogical solution to the question formulated.

In order to guide the research, the following tasks were taken into consideration:

- To make a literature review of environmental education and its treatment in the teaching of English as a foreign language.
- To diagnose the students' needs for Environmental Education in the English Language Teaching Major at the University of Cienfuegos "Carlos Rafael Rodríguez".
- To elaborate a proposal of activities to foster the promotion of environmental values in students.
- To assess the proposal of activities with sophomore students of the English Language Teaching Major at the University of Cienfuegos "Carlos Rafael Rodríguez".

The present research has as a main contribution a proposal of activities, which can contribute effectively to the students' assimilation and integration of environmental knowledge. Moreover, the exercises help the students develop abilities, attitudes and capacities useful to their professional life. Thus, the proposal intends to guide a correct environmental education in schools.

The proposal of activities also motivates the students to continue learning about the environment and encourage them to develop their linguistic skills. The author tries to expose interesting topics, which contribute to develop critical thinking in the students in order to prepare them to deal with different environmental issues present in the society, and to become competent citizens, especially when taking care of the environment, an aspect that is so important and relevant nowadays.

### **METHODOLOGY**

To fulfill tasks defined by the authors, several methods were applied. The historical-logical method was used to analyze the development of Environmental Education throughout the teaching-learning process of IEP, and to examine its historical evolution and importance for students. The Analytical-synthetic method allowed to analyze and make a summary of the results from the instruments and the techniques applied during the process of diagnosis of the scientific problem. In order to realize the results of the analysis before and during the research, and helped to make generalizations about the improvement of the environmental education in the University of Cienfuegos "Carlos Rafael Rodríguez", the authors used the inductive-deductive method.

The diagnosis test to determine the scientific problem to be solved, as well as the regularities presented by the students, and the observation conducted to seven IEP lessons in order to observe how the language professor deals with topics and ideas related to Environmental Education were some of the methods used form the empirical level. Also, the analysis of documents to analyze the bibliography, especially how environmental issues are introduced in the English teaching-learning process and to determine whether it is according to the students' needs. A Survey was applied to the IEP professors at the University of Cienfuegos "Carlos Rafael Rodríguez" in order to gather information about the treatment of environmental education in English teaching-learning process.

### **DEVELOPMENT**

The term environment is defined by Merriam Webster dictionary (Merriam-Webster Inc, 2002) as the complex of physical, chemical, and biotic factors such as climate, soil, and living things that act upon an organism or an ecological community and ultimately determine its form and survival. That is, the aggregate of social and cultural conditions that influence the life of an individual or community. In other words, environment can be defined as all the living and non-living elements and their effects and influence in the human life (Webster, 2002).

Environmental Education (EE) is recognized by different definitions in the specialized literature in relation to the environment, Bosque (2014), adopts it as a continuous learning process; Valdés et al. (2013), as a discipline; and Rodríguez & Rodríguez (2015), as a dimension. They agree on the need for a systemic, integrating, interdisciplinary approach, addressed to the development of knowledge, skills, values and attitudes for environmental issues.

Escobar (2009), considers the conception of environmental education is not reduced to forming a citizenry to conserve nature, raise people's awareness or change behaviors. Environmental Education has a specific task: to educate students in order to change the society;

assuming responsibility in the formulation and management of public policies for development, but with a real sense of democratic participation.

Márquez, et al. (2021), conceives environmental education as a link with the problems of the natural, social and built environment, in which the responsibility of the different social sectors is evidenced. For the reasons above, it is defined as a continuous and permanent learning process that is directed in favor of individuals and communities understanding the complexity of environmental problems and acting on their solution, from the appropriation of new knowledge, skills, values and attitudes, different from those that want to change the current social rationality.

For the purpose of this research, the authors agree with Escobar (2009), in the fact that environmental education is a permanent and interdisciplinary process of knowledge and comprehension of the reality in an extensive view, which creates a process of critical thinking in learners.

EE can be introduced and systematized through the subject IEP, which can give the learners tools to deal with real problems in the society using the language. Consequently, the topics used should be interesting to the students and motivate them to learn the foreign language as they learn aspect about EE. At the same time, English Language teachers will be forming environmental values in their learners. Considering that students will be English Language teachers, they have to be trained to become promoters of environmental care in their community and the school they will work at in the future.

The main objective of EE is to keep people aware about the harmful damage that is affecting the world and how to contribute to reduce the impact of environmental issues in our community (Gamés, 2018). Environmental education is of a vital importance in favor of the full realization of human rights, peace, and the responsible exercise of local and global citizenship, gender equality, sustainable development, and health. Thus, an adaptation of the contents of environmental education is required to favor the acquisition of knowledge, capacities, values and attitudes that citizens need in order to live a fruitful life, adopt informed decisions and assume an active role, both locally and globally, when facing and solving problems worldwide (Márquez et al., 2021).

 The Teaching of EE through Integrated English Practice in the English Language Teaching Major

According to Mulhu (2011), the aim of incorporating environmental education into the English as a Foreign Language (EFL) classroom is to raise students' awareness of the global environmental crises. Knowledge of environmental protection is at the core of environmental education and should be done with any age group (that is at the nursery, primary, secondary, post-secondary or higher education levels), with any linguistic rules and language specifics like vocabulary, grammatical rules, syntax,

semantics and discourse of the target language. Thus, teaching English as a second or foreign language can emphasize the language skills and environmental issues in the school context in order to raise awareness about global issues like environmental degradation

Rethinking and extending the aims of the English Language Teaching profession is another reason why it is necessary to involve environmental education in the profession. Environmental education is necessary in English lessons because, successful language learning equally involves a successful combination of the micro and macro skills acquired into appropriate expressions of communication; and, environmental issues are rich subject matters of communication (Mulhu, 2011). This has been needed by the advent of more practical teaching approaches like the communicative approach, which is based on the idea that learning a language successfully comes throughout having to communicate real meaning and its main objective is to present a topic in context as naturally as possible. This approach is considered as the one suitable for developing EE in EFL because of the principles it states.

Throughout the contents of the syllabus for language teaching, several exercises of the different language skills can be developed, and they are very easily to treat in lessons. Then, everything depends on the type of content and linguistic function that will be taught to the students regarding EE. Environmental education could be treated in a curricular and extracurricular way. From the curricular way the main propose of the English teacher is to develop students' English language skills.

For example, the ability of writing is important to the students; since it allows them to transmit a written idea about a random topic. Several writing activities could be elaborated related to EE such as: a letter to governments, organizations and business or essays (Stavreva & Kirova, 2013).

Harmer (2012) proposes several writing activities that teachers can use to develop vocabulary about environmental issues. For instance, students can write in pairs about a random topic, in which student A proposes ideas and the student B writes as quickly as possible. Students can write a story about a picture and a portrait and/or create a story using social media, such as Facebook or Twitter. Furthermore, students can write emails to each other giving about different topics.

According to the strategies for reading comprehension, when students have read a text in class, teachers can ask them to respond to it in various ways. They can share ideas with their partners about the text, and organize it according to its meaning. Teachers can also ask students to look for details in the text or sentences with a specific tense or grammar structure. At the intermediate level, students can discuss any issues that were introduced through the text, as well as read and retell the story

with their own words. They can also write a dialogue, a newspaper report, or a letter according to what they have read (Harmer, 2012).

As for listening comprehension, different activities could be developed using audios, videos, songs, and podcasts about environmental topics in English. Teachers can develop listening comprehension and foster the development of other languages skills. For instance, during the pre-listening stage, teachers can give words or phrases from the audio, while the students watch pictures related to the situation or topic of the listening material and predict what they will hear. For the while-listening stage students can fill charts according to the information they hear, make a list about the topics they hear, and put a sequence of pictures in the correct order. During the Post-listening tasks, students can act out the roles of people from the original audio recording, retell what they have just heard, and/or write paragraph, text and essays according to what they have heard (Harmer, 2012).

In all cases, the environmental topics addressed should be relevant and meaningful to students. Pair work, simulation and roleplaying, information group, interviews, storytelling, interview to the picture, making oral presentations and reaching a consensus are the types of activities that could be used to improve students' speaking skills throughout environmental education (Harmer, 2012).

# Teaching aids and resources to develop Environmental Education

The ways of teaching have changed over time. At present, teachers do not play the main role in the lessons, since the approach used is more student-centered. That is, they focus more on the students to guide their learning. Then, teachers will guide students in the process of learning a new language, helping them to find new ways of learning by themselves.

On the other hand, English language skills can be integrated to environmental education. Most of the textbooks used to study a foreign language contain, at least, a section related to environmental issues. Some other resources and materials can be brought into the EFL classroom to make lessons more interesting and meaningful to learners. Those materials should be developed at a local or national level and closely connected to students' lives (Mulhu, 2011).

A multimedia based on environmental education may contribute to improve English language skills, as well as motivate them. The use of multimedia may encourage students to work in groups, express their knowledge in multiple ways, solve problems, revise their own work, and construct knowledge. As well, using multimedia in the classroom can promote the usage of cognitive skills grouped into some categories, such as 'focusing, information gathering, remembering, organizing, analyzing, generating, and evaluating'. Multimedia allows the students to

focus on course content, promote active and cooperative learning, engage students in higher-order thinking skills, and represent ideas through a variety of media.

In order to create different activities to foster EE in English lessons this proposal was created. The activities of this proposal integrated all the English language skills, so that students can develop them simultaneously. This proposal motivates the students to learn a new language and to protect the environment, and could be developed outside the classroom context, where students may feel comfortable and more confident to use the language.

Some of the activities compiled on the multimedia are explained bellow, and are based on the integration of the four English language skills in order to foster the environmental education in the learners. Every activity in the proposal contains its objective, procedures and form of evaluation taking into account the assessment scale proposed by Harmer (2012). The activities are organized by units; it means that each of the eight units that appear in the course book will have different complementary activities, based on the contents of each unit and their integration with the environmental issues. The assessment scale of Harmer (2012) helps the teacher evaluate students' knowledge and make informed decisions that improve their learning experience. Moreover, it helps students control their progress towards English language skills and modify their learning strategy in order to achieve their goals.

Harmer (2012) proposes this assessment scale to assess students' writing and speaking skills, and the authors of this research consider that the scale can be used to evaluate reading and listening comprehension adapting the rubric of the scale.

# Sample activities to promote environmental education through IEP

**Topic:** Criticism and alternatives

**Environmental content:** Environmental Issues

Teaching aids and materials: Computer

**Listening Material:** Greta Thunberg and George Monbiot make a short film on the climate crisis.

**Objective:** to express alternatives about the solution of some environmental issues in order to develop students' English language skills and increase their environmental values

# Listening Comprehension Tasks:

# Pre listening Activities:

- 1. Watch the first 20 seconds of the video material without sound. Then, try to figure out what it is about.
- 2. Answer the following questions:
- » What kind of environmental issues do you know about?

- » How many of these environmental issues are there in your city?
- » What should people do to protect the environment?
- 3. Fill in the gaps with the words you listen to from the recording:

List: Drizzle; rain; storm; mild; hurricane; showers; clear up; cool; warm; patches of cloud; hot; breeze

# While Listening Activities:

1. Match the weather forecast to the name of the corresponding places:

Weather forecast: Isolated showers, heavy showers, drizzle and light rain, foggy patches, dry.

Places: England, London & Kent, Manchester & Pennines

Say true or false according to what you watched and listened to:

It is not going to rain at lunch in the east
The thunderstorm will appear during the week in England
The temperature in everywhere will be at 27 to 39 degrees
The rain will arrive the south coast of Scotland on

Sunday morning

\_\_\_\_A hurricane will arrive London on Friday and people must be at home

# Post Listening Activities

- 1. What do you usually do in raining days?
- 2. Write a weather forecast for your country and be ready to tell your class about it.

# Reading Comprehension Tasks

Source of the text: <a href="https://www.englishclub.com/reading/environment/world-wildlife-fund.php">https://www.englishclub.com/reading/environment/world-wildlife-fund.php</a>

# Pre-reading:

Answer the following questions:

- a. What does "wildlife" mean? Explain with your own words
- b. How many animals do you know that are in danger of extinction?
- c. How can you contribute to save those animals?

# While reading:

1. Choose the best title to the text.

- a. People can save the world
- b. An overview of WWF's history
- c. The poems about the wildlife
- d. WWF a governmental organization
- 2. Match the subtitles from a to c with the paragraph 1 to 3
- a. The Founding of WWF 3
- b. WWF Projects 1
- c. Future Visions of Our Planet A WWF Challenge 2
- 3. Answer the following questions:
- a. When was the WWF founded?
- b. How many species are identified as threatened with extinction?
- c. What was the first project the WWF did in the 1970s?
- d. What is the purpose of WWF's educational project?

# Post-Reading

- 1. Do you agree with the projects launched by the WWF? Why or why not?
- 2. How would you describe the actions carried out by the WWF?
- 3. Write a text in which you make up your organization to save endangered animals. Write about the projects and actions that you do to protect those animals.

# CONCLUSIONS

As a conclusion of the current research, the author can state that Environmental Education can be treated in the English lessons in order to form values, attitudes and aptitudes in the students. The current research expresses the problems that are affecting the environmental education in sophomore students of the English Language Teaching Major at the University of Cienfuegos.

In addition, a sample proposal of activities are provided for fostering the promotion of environmental values in learners. The authors consider that the proposal of allows the students to continue learning English language out of the classrooms and teachers to develop critical thinking in the students, assuming that teachers may train linguistic specialists and promoters of environmental protection.

# **REFERENCES**

Bosque, R. (2014). El estado del arte de la educación ambiental y energética en las universidades de ciencias. Varona, (58), 67-77.

Escobar, O. (2009). La Educación Ambiental en la Enseñanza del inglés en una Secundaria del D.F. *Caminos Abiertos*, *95*, 3-5.

- Gámez, Y. (2018). An Environmental Interest Group for 5th grade students from "Ramón Pando Ferrer" Elementary School. (Trabajo de Diploma). Universidad Central Marta Abreu de las Villas.
- Gutiérrez, M. (2020). Experiencias de aprendizaje en la formación inicial docente desde la perspectiva de la educación ambiental. Revista Varela, 20(55), 115-129.
- Harmer, J. (2012). Essential teacher knowledge. core concepts in English language teaching. Pearson Education Limited.
- Hauschild, S., Poltavtchenko, E., & Stoller. F. (2012). Going Green: Merging Environmental Education and Language Instruction. English Teaching Forum.
- Márquez Delgado, D. L., Hernández Santoyo, A., Márquez Delgado, L. H., & Casas Vilardell, M. (2021). La educación ambiental: evolución conceptual y metodológica hacia los objetivos del desarrollo sostenible. *Universidad Y Sociedad*, *13*(2), 301-310.
- Merriam-Webster Inc. (2002). Merriam Webster Dictionary. <a href="http://www.mw.com/home.htm">http://www.mw.com/home.htm</a>
- Mulhu, C. (2011). EFL/ESL and Environmental Education: Towards an Eco-Applied Linguistic Awareness in Cameroon. World Journal of Education, 1(1), 109-118.
- Proenza, J. (2001). Propuesta metodológica para la introducción de la dimensión ambiental en la carrera de química del Instituto Superior Pedagógico "José de la Luz y Caballero. (Tesis de Maestría). Instituto Superior Pedagógico José de la Luz y Caballero.
- Rodríguez Gómez, R., Chaviano Corrales, A., & González Aranguren, A. (2019). La tarea vida y su implementación mediante las ciencias naturales en la educación primaria. <a href="https://trabajos.pedagogiacuba.com/trabajos/37La%20tarea%20vida%20y%20su%20implimentaci%C3%B3n%20mediante%20las%20ciencias%20naturales%20en%20la%20eduaci%C3%B3n%20primaria.pdf">https://trabajos.pedagogiacuba.com/trabajos/37La%20tarea%20vida%20y%20su%20implimentaci%C3%B3n%20mediante%20las%20ciencias%20naturales%20en%20la%20eduaci%C3%B3n%20primaria.pdf</a>
- Rodríguez, P., & Rodríguez, M. (2015). La educación ambiental para el desarrollo sostenible en la formación de técnicos. Revista Ciencias Pedagógicas e Innovación 3(1), 7-14.
- Stapp, W. B., et al. (1997) The concept of environmental education. <a href="http://hiddencorner.us/html/PDFs/The\_Concept">http://hiddencorner.us/html/PDFs/The\_Concept</a> of EE.pdf
- Stavreva, S., & Kirova, S. (2013). Blending the Teaching of Environmental Matters and English as a Second or Foreign Language in Macedonia. Natura Montenegrina, Podgorica, 12(3-4), 1065-1071.

Valdés, O, Rodríguez, A., Llivina, M., Betancourt, A., & Santos, I. (2013). La educación ambiental y desarrollo sostenible: estrategias de integración interdisciplinaria curricular e institucional en los programas, proyectos y buenas prácticas en las universidades, escuelas, familias y comunidades en cuba. Educación Cubana.