

# Educational guide as Open Educational Resource (OER) Inclusive with a Constructivist approach.

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*Abstract.- The design and development of teaching guides is promoted as an inclusive open educational resource, using recyclable materials from the classroom environment, integrating the motivational component, teamwork and improving motor skills in middle-level students, as well as the cognitive-motor development of teachers with skills special motor. It is based on the pedagogical Constructivist model facilitating the work of the teacher, and directing the work towards those who do not have access to ICTs. Chi Square Test was used with respect to the learning cases of Natural Sciences and the use of the Guide as a tool that allows the inclusion of the sayers through activities, promoting the care of the environment.*

**Keywords—** *Open inclusive educational resources, constructivism, didactic guide,, recyclable material, cognitive process*

## I. INTRODUCTION

Open educational resources cover various online formats, such as books, lectures, educational YouTube videos, animations, slides, graphs and diagrams, evaluation materials with automated answers, PDF files. While it is true that OER are important for the educational community in general, who are often limited to the thought that these resources are exclusive for those users with direct connection to the internet network, situation that in sectors of low economic resources hinders its application, however, This work adapts the conception of the OER and does not limit them only to online digital resources. [2] It is proposed to extend this concept to all educational resources of free access, that is to say, within everyone's reach, without losing the characteristic that can be recorded and played for later socialization

However, the issue of improving the quality of life of the students and their relationship with the environment becomes a major concern at all levels of education.; as well as its interaction with the teaching and learning processes; looking for alternatives that allow the fulfillment of the academic requirements raised as part of the programs in educational institutions. Likewise, it must be borne in mind that for learning to be meaningful, the resources used must meet the expectations of encouraging classroom interaction as part of the knowledge socialization..

Thus, the concept of Open Educational Resources (OER) is

integrated as a tool to promote active learning in the context of the work of medium-level institutions.

The resources used under the conception of OER in our study contribute to foster collaborative work through socialized participation. (ONU, 2015) [1]

The work described below, focuses on the expansion of the concept of OER and incorporates the design of teaching resources made from recyclable material; fulfilling the OER profile because they are easily accessible to the user; The content of these procedures can be published on virtual platforms with a set of applications that allows the user to reproduce the teaching process in the classroom , unlike repositories of thesis of degree in Universities and similar ones that only fulfill the function of communication between users.

Based on what is mentioned in the preceding paragraphs, one of the mechanisms adopted in recent years to obtain a university degree specifically in Education, is the production of Teaching Guides, directed to the level of Middle Education in Ecuador, whose information is available in a public repository under the domain of the University of Guayaquil; in which you can find several educational projects and theses of different faculties, The function of the repository is to publicly communicate the works of researchers, increasing its diffusion in this way [3]. .

These Teaching Guides are focused on improving teaching and learning processes based on criteria of resilience and sustainability, promoting the proper management of recyclable waste existing in institutions that can be used and incorporated back into the value chain through a knowledge transfer process. It should be noted that learning is a dynamic process that needs to reflect on the assimilation of knowledge with previous training to incorporate new ideas, check the proper understanding and feedback.

On the other hand, the objectives of the Ministry of Education in Ecuador promote inclusive education for cases of children, young people, adolescents with special abilities (disability) , which become a vulnerable population that need access to quality integral education, This is the reason why educators who seek to design and develop innovative Guides that use didactic materials by integrating the motivational component in future users who are in the middle level and in this way reach to promote cognitive development are formed from the university classrooms.

All this leads to the fact that the didactic guides are a valuable tool in educational environments and can be incorporated as an OER conceived under the constructivist model and the flexibility they represent for the promotion of knowledge among its users through inclusive activities for people with low motor disability.

## I. PROMOTION OF THE EQUAL ACCESS OF THE REA THROUGH THE INCREASE OF THE GUIDES WITH A FOCUS ON THE USE OF RECYCLABLE SOLID WASTE (MATERIAL)

If we talk about the educational field, Teachers currently belong to the digital generation, according to (Gabelas, 2002). **This digital ecosystem permeates each and every one of human activities. However, like any phenomenon that increases its impact in a short time, it requires reflection and debate** [2], so the teacher must locate the learning within the strategic context of the search for content and its subsequent interpretation from the digitized information available in the medium. In this way, the teacher can communicate with the students in a more active, effective, efficient and participative way. The digital information facilitates the search processes, promotes the skills and abilities of the students, it makes them more critical and optimizes their ability to compare, classify and criticize from a more reflective point of view.

Teachers can also optimize the search for information prior to the activities by relying on the repositories of theses and degree projects of the Universities, selecting the required contents without losing the horizon of the initial search.

In order for the search to have productive results, it is essential that the teacher directs the inquisitive participation of the students, suggests search sites about the topics and activities to be shared, which is feasible through the implementation of the Teaching Guidelines that complement the knowledge of the integrating environment. practical activities of environmental care in classroom learning.

A study carried out at the University of Guayaquil by the participants of the Environmental Sciences Education and Community Development career in 2017, [4], whose sample was 180 people who were completing their studies at the level of Bachelor of Science in Education reflected: that 83% of the respondents limited Rea to the use of computers with Internet availability, while the remaining 17% did have knowledge about the nature of these resources and their adaptability to other approaches such as the sustainability and care of the environment, as well as the degree of applicability in the design and development of teaching materials for teaching and learning.

To date it is known that 80% of the educational projects proposed by the participants of the Education Sciences and Environmental Community Development in educational institutions of the environment are educational guides that promote the use and proper management of waste

In Table 1, the results of the survey conducted are shown.

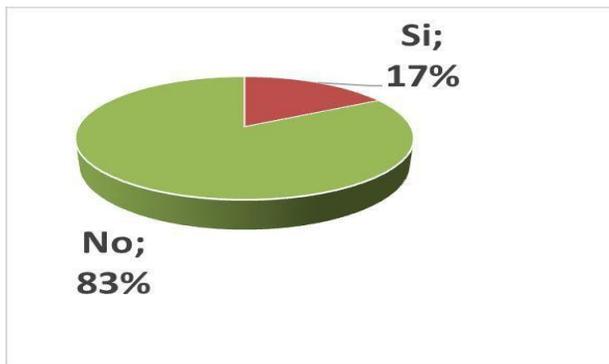
TABLE 1: RESULTS ON THE ADAPTABILITY OF THE OER AND LIMITATIONS TO THE USE OF THE INTERNET

Do you believe that Open Educational Resources can be adapted to other alternatives without internet connections?

VALUATION	FREQUENCY	RESULT
YES	31	17.00%
NO	149	83.00%
TOTAL	180	100.00%

Fuente: Encuestas de campo 2017

GRAPH 1: RESULTS ON KNOWLEDGE OF OER WITHOUT LIMITATIONS TO THE INTERNET



Source: Field surveys 2017

The respondents admitted to being frequent users of the OER but they did not notice the adaptability of the concept and the combination of other resources inherent to topics such as Good Living and care of the environment.

#### IMPORTANT ASPECTS FROM THE USE OF THE DIDACTIC GUIDE AS A INCLUSIVE RESOURCE.

- They offer multiple options for the search of contents with diverse themes focused according to current curricular requirements
- Flexibility in terms of consultation hours to carry out research activities and the activities proposed develop motor skills in their users.
- Facilitates the autonomous learning of teachers.
- Promotes learning outside the classroom and the integration of a team with multiple skills and abilities.
- They can be modified with didactic material generated from their own expressions and results of experiences.
- Increase creativity and the habit of innovating.
- Encourages the user to socialize and improve information, creating awareness in order to share new educational resources aimed at solving society's problems.

The advantages shown are summarized in Figure N ° 1, which were generated from direct observations in different learning environments after implementing the Didactic Guide with focus on the use of solid waste (materials) found in the environment that validate the approach methodological and that is exposed in the methodology

FIGURE 1: ADVANTAGES OF THE DIDACTIC GUIDE WITH FOCUS ON THE USE OF RECYCLABLE MATERIAL.



The approach of the Inclusive REA is associated with the right of any child, young person or adolescent who has difficulties for whatever reason, must receive necessary resources for their learning, therefore it requires the detailed design of pedagogical activities that allow its inclusion in the different groups that are structured at a medium level incorporating cross-cutting issues such as the use of recycled material; which is available to everyone and provides multiple benefits to all population groups under the constructivist framework of pedagogical and curricular work of inclusive education.

Next, Table 2 shows the specific contributions of inclusive OER that incorporate the use of recyclable material in their activities

TABLE 2: POSITIVE CONTRIBUTIONS OF THE USE OF THE DIDACTIC GUIDE AS A INCLUSIVE AREA OF SPECIAL EDUCATION

CONTRIBUTION OF THE REA	BENEFITS
Resources available to everyone	Because they are made with recycled material
Improves classroom interaction	It is effective in the collection and selection activities because teachers and students participate.
Power the skills learner motor	The students elaborate their own didactic resources

Facilitates the teaching-learning process in special education	By working in the process of collection and elaboration the student becomes involved and learn faster
Raises the self-esteem of learners	They feel capable of doing activities by themselves

However, the physical presence in the classrooms and with specific resources are not sufficient for understanding, acceptance and support to people with special abilities of a motor nature, reason for which the combination of traditional elements is foreseen. The activities proposed in the aulic guides incorporating resources made from recyclable materials found in the environment stimulating the motor and intellectual development of the users that are directly linked to these resources when preparing their own learning materials through physical activities, manuals and dynamic.

Under the contributions described above, it can be said that people with special motor skills can be incorporated into the curriculum currently developed in middle-level educational institutions, however, generating new tools that integrate concepts contribute to the development and learning of the students. That could develop with such normality due to these curricular adaptations.

#### EDUCATIONAL RESOURCES FOR EDUCATION OF PEOPLE WITH SPECIAL CAPACITIES

There is a wide range of materials and tools beneficial to the educational process, which serve as feedback for the daily teaching of students or learners, who can develop through them the interest and self-motivation in the content of the topics raised by teachers.

These materials and tools serve to foster learning, through which teachers can assess the knowledge of students, in equal ways for students participating in regular education and inclusive education.

Examples of the didactic resources proposed in this work of research and design of Guides are: puzzles, booklets with physical exercises, panels, among others made from recycled material. On the other hand the programming of activities for the search of these innovative educational resources for special inclusion manages to reach levels of organization since the materials attract the attention of the speaker and is attractive to the first visual contact due to the utility that is pursued at the end of the activity described in the Guide.

It is expected to reach all educational and special inclusion centers with training sessions on the use of these resources, which can be used by all teachers independently if they have cases of special educational needs or not, since one of the scopes of This guide is to reach families with scarce economic resources and with little or no accessibility to technology.

## II. METHODOLOGY

Next, we proceed to describe the processes used during the investigation.

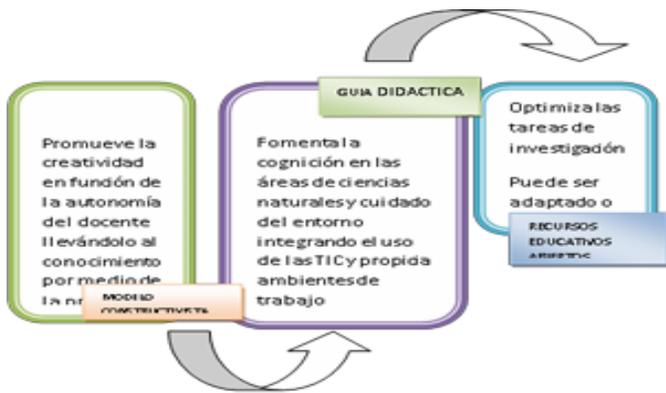
- Selection of the educational model that involves the didactic guide with focus on the use of recyclable materials as an Open Educational Resource (OER).
- Preparation of surveys with questions related to the use of the guide on the development of teaching materials using recyclable waste.
- Application of surveys in educational institutions of medium level to establish the degree of acceptance of the activities carried out from the implementation of the didactic guide to teach classes of subjects related to the Life Sciences - Natural Sciences, with focus of use of recyclable materials as an open educational resource.
- Analysis and comparison of results.

#### SELECTION OF THE CONSTRUCTIVE EDUCATIONAL MODEL IN THE EDUCATIONAL GUIDE AS AN OPEN INCLUSIVE EDUCATIONAL RESOURCE.

The didactic guide proposes a sequence of activities aimed at the creation of new resources using recycled materials such as plastics, cardboard and other organic materials such as dried leaves found in the environment of learning environments of educational institutions.

The creation of teaching resources helps the teacher to promote the cognition of natural science learning and environmental care by incorporating collaborative activities. **Bearing in mind that all constructive learning involves a construction that is carried out through a mental process that ends with the acquisition of new knowledge. (Barraza, 2012) [5].** The didactic guide articulates the constructivist model by its creative character, developing skills and abilities of the teacher turning it into an innovative and reflective individual [6] 7]. 8]. See Figure 2

FIGURE 2: INTEGRATION OF THE CONSTRUCTIVE MODEL IN THE TEACHING GUIDE AS REA



### III. RESULTS AND DISCUSSION

The developed Guide was applied in a sample of 259 teachers of average level of education of eighth year, who are developing subjects of the five curricular blocks of the subject of Natural Sciences related to: the earth a planet with life, the ground and its irregularities, the water a means of life, the climate an ever changing air and the cycles in nature and its changes.

The survey directed to the teachers is carried out after the execution of activities of the Teaching Guide whose results reflected the following:

50% of teachers believe that the incorporation of knowledge into the cognitive system of teachers has improved after the execution of activities such as the construction of models during the learning of topics such as: tectonic plates, the atom, water cycle, parts of the flower. See Table No. 3

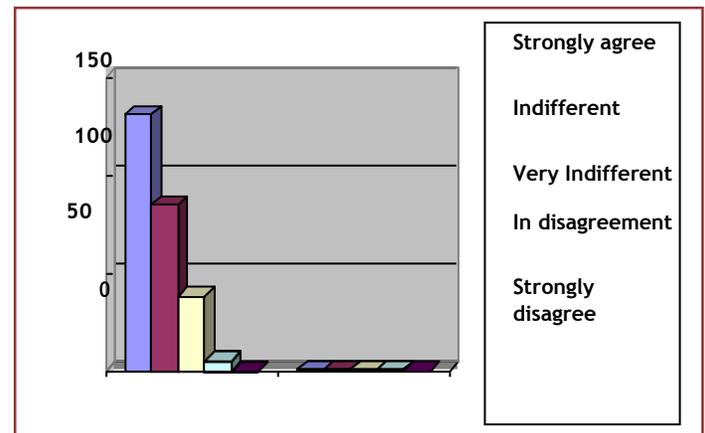
TABLE 3: RESULTS OF VALUATIONS ON THE USE OF RECYCLABLE MATERIAL IN EDUCATIONAL RESOURCES

*Do you think that from the construction of models with recyclable material that represent the subjects of the subject of natural sciences, the saytes assimilated the concepts better?*

ASSESSMENT	FREQUENCY	RESULT
Strongly agree	131	50%
Indifferent	85	33%
Very Indifferent	38	15%
In disagreement	5	2%
Strongly disagree	0	0%
<b>TOTAL</b>	<b>259</b>	<b>100%</b>

Source: Field surveys 2017

GRAPH 2: VALUATIONS ON THE USE OF RECYCLABLE MATERIAL IN EDUCATIONAL RESOURCES



Source: Field surveys 2017

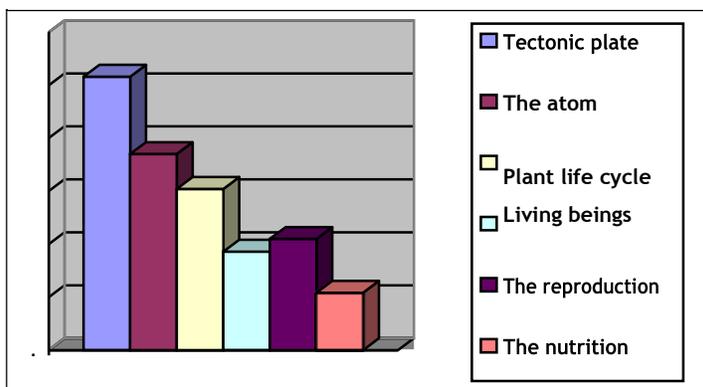
Likewise, it was evidenced that the activities such as elaboration of panels, pots made from used plastic bottles, puzzles and models made with discarded cartons played an important role because it has a high ratio of the amount of solid waste used in its construction and therefore is linked to the topics that the teacher taught for teaching the subject of natural sciences. See table 3 and graph 3, in which the Y axis represents the frequency of responses of the interviewees, topics such as tectonic plates, the atom and the life cycle of plants obtained higher frequency in the answers.

TABLE 4: VALUATION OF FREQUENCIES ON THE USE OF SOLID WASTE DURING THE TRANSFER OF CONTENT OF SUBJECTS OF THE COURSE OF NATURAL SCIENCES

*After the use of the Teaching Guide. Which of the following subjects of the subject of Natural Sciences used a greater amount of recyclable material?*

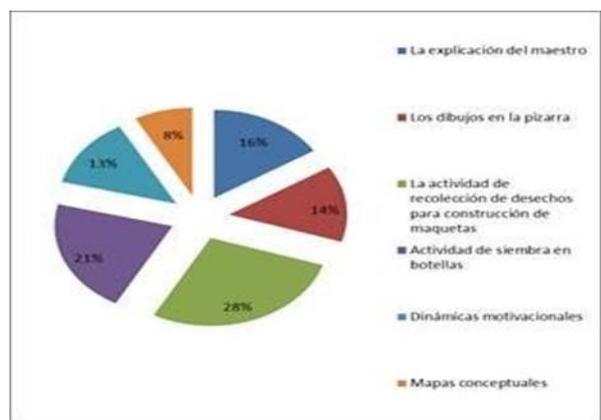
ASSESSMENT	FREQUENCY
Tectonic plate	258
The atom	185
Plant life cycle	152
Living beings	93
The reproduction	105
The nutrition	54

GRAPH 3: VALUATION OF FREQUENCIES ON THE USE OF RECYCLABLE MATERIAL DURING THE TRANSFER OF CONTENT OF SUBJECTS OF THE COURSE OF NATURAL SCIENCES



Source: Field surveys 2017

GRAPH 4: VALUATION OF EFFECTIVENESS OF METHODOLOGICAL ACTIVITIES IN TEACHING-LEARNING PROCESSES LINKED TO COLLABORATIVE WORK AND MOTORCYCLE



\* Graph No. 4 confirms that 28% of teachers consider that the activity of collecting recyclable materials for the construction of models consolidates collaborative work according to the perception of the teachers interviewed.

The results of the survey also included the respective analysis on the effectiveness in the methodological activities of the teaching-learning processes as a result of the good use of the Didactic guide as REA, which influenced the increase in the collaborative work of the classroom and improvements in motor skills See Table N°5 and graph N°5.

TABLE 5: RESULTS ON EFFECTIVENESS OF METHODOLOGICAL ACTIVITIES IN TEACHING LEARNING PROCESSES LINKED TO COLLABORATIVE WORK AND MOTORCYCLE.

*From the use of the didactic guide, what activities were effective to increase the collaborative work in the classroom?*

ASSESSMENT	FREQUENCY	RESULT
The teacher's explanation	41	16%
The drawings on the blackboard	36	14%
The activity of collection of waste for construction of models	73	28%
Sowing activity in bottles	54	21%
Motivational dynamics	35	13%
Conceptual maps	20	8%
<b>TOTAL</b>	<b>259</b>	<b>100%</b>

Source: Field surveys 2017

For the analysis of qualitative data, the Chi square statistical test was used, whose analysis variable was the perception of the use of recyclable materials incorporated in the Teaching Guide as OER in the teaching of natural sciences

TABLE 6: PROOF OF SQUARE CHI

Pruebas de chi-cuadrado			
	Valor	gl	Sig. asintótica (2 caras)
Chi-cuadrado de Pearson	213,668 <sup>a</sup>	16	,000
Razón de verosimilitud	195,018	16	,000
Asociación lineal por lineal	48,824	1	,000
N de casos válidos	140		

a. 17 casillas (68,0%) han esperado un recuento menor que 5. El recuento mínimo esperado es ,60.

#### IV. CONCLUSIONS

The application of the guide can contribute to achieve an increase in collaborative work activities within the classroom and can contribute to improvements in motor skills in the case of students who possess special motor skills through activities; visibly applying constructivist pedagogical bases that allow taking advantage for the transfer of knowledge of natural sciences and the concepts involved about the use of recyclable material found in the environment. According to the Chi Table statistical test, there are 140 valid cases in which there is corroboration in which the didactic guide used as REA is a tool that allows the inclusion of sayers with special motor abilities and links the teaching of natural sciences.

In addition this Guide contributes to the increase of motivation and innovative spirit of the educational community, playing an important role in the regular and inclusive education achieving the combination of the concept of INCLUSIVE OER with the one of GUIDE TEACHING, since the content of the activities of the guide transfers knowledge through state-of-the-art technological means such as the use of computer platforms and repositories, and can be distributed and socialized manually and physically to families that do not have easy access to Tics

The results obtained clearly in the survey show that the application of the educational guide of REA with a constructivist approach using recyclable contributes effectively in the processes of knowledge transfer, maintaining interest in the contents of the subject of natural sciences being feasible to replicate in other media since the materials promoted in this Didactic Guide are available to everyone; so it can be classified as an open or free educational resource.

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