Introducing PRA techniques in the learning of environmental education in Southern Peru

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Introduction

We have been using participatory approaches in our work in Environmental Education (EE) since 1994. We have adopted such techniques in the classroom in order to raise environmental awareness amongst young people in the 'Victor Mayuri' public school of Calana, in the department of Tacna in Southern Peru. The school is located in a rural valley near the coast where agriculture and tourism are the main economic activities.

Our project is called 'Asignatura Experimental de Educación Ambiental' (Experimental Course in Environmental Education) and is part of the official curriculum of our school, having been accepted by the Ministry of Education. The course involves two hours of interactive teaching-learning per week. This article presents some of the participatory techniques used in the project. These techniques have allowed the students to develop knowledge about economics, ecology, crop techniques and other such factors relating to the intricate relationship between mankind and nature. In summary, the main objectives of the project are:

- to show the benefits of a sustainable lifestyle to the students through their education;
- to improve their knowledge about the environment (information objective); and,
- to develop their capacity and skills regarding finding solutions to environmental problems (action and participation objectives).

The context

Calana is a rural town which has strong in-migration from the highlands of Southern Peru, a predominantly agricultural area. The migrants' mother tongue is Aymara, with Spanish as their second language.

Our students come from poor families and most of them have to work to help support their families. However they have valuable knowledge about their environment, which has been developed through daily life and their primary education (this involved forestry education for children between 8 and 11 years old in the rural zone as directed by the Ministry of Education in Peru[1]). Whilst we work in a formal school situation, most of our experiences with participatory methods are developed outside the classroom. The students we have been working with are aged between 12 and 16 years old. We decided to adopt participatory methods in teaching, since the experiences of others (such as Paolo Freire) have shown that more formal, traditional methods of teaching are not always appropriate. Such research has shown that more traditional teaching methods can lead to a poor interchange of information from and between the students, since they are often just 'fed' information, rather than actively contributing to it (this is known as 'banking education'). However, with the use of participatory techniques in the education sector, students are more involved and thus, have greater motivation during the entire session which is very important for the group reflections at the end of each session.

1 For more details, see work of Ceruti, 1993 cited in the notes section at the end of this article.

The techniques used in the project

The subjects on offer are taught using the students' own opinions and information, which makes them reflect on, and change, their behaviour, if it is not beneficial to the environment. The students are organised in groups so that in the class situation, they are able to learn more enthusiastically, benefitting from greater interaction with their peers and sometimes, they enjoy it so much that they think they are playing. In actual fact, they are sharing and verifying information related to the overall project; meeting the objectives of information provision and participation. The techniques used with the students in this project are discussed in the following section.

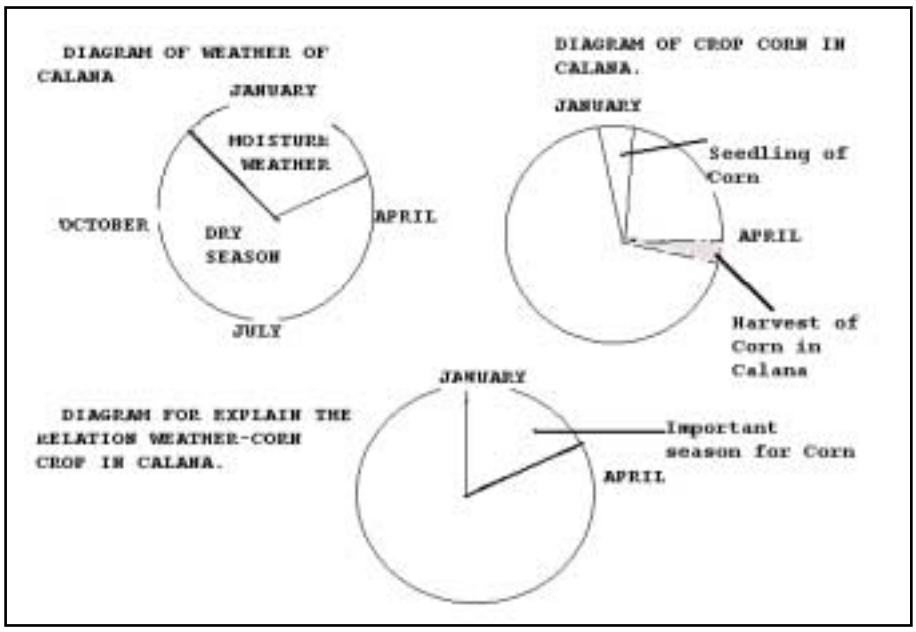
Participatory tools used in the classroom context

Socio-economic calendar

Method

The students draw a circle divided into twelve segments to represent the twelve months of the year on transparent film with different colours (see Figure 1). In the example above, the students have been divided into two groups: 'meteorologists' and 'harvesters'. The group of

Figure 1
A social-economic calendar of Calana, Peru



'meteorologists' marks the months on the circular graph on a transparent film according to the seasons (in Calana there is a dry season between April and November with wet weather in the other months). The group of 'harvesters' write on a second transparency to show the seasonality of the main crop of the zone (in this case, this is corn), marking a 'pie' (segment) on the circular graph to show the time of harvest (months of April and May).

Finally, all the students place the first and second transparencies on top of one another in order to study the similarities and differences between the weather and the time of the corn harvest. The use of transparencies is helpful, as it allows the diagrams to be placed on top of each other so that similarities and differences between each of the stages can be easily seen.

A variation of this technique is research into school-agriculture linkages, replacing the weather factor (from the above activity) with school activities. Using the information from the circular graph, the students develop a matrix on the board to show the relation between two factors (such as school activities versus corn harvest).This helps us, the teachers, to understand more clearly why students are not able to attend school at certain times of the year.

In the session shown in Figure 2, the pupils are interpreting the data from the graphs. Some of their interpretations of the results follow.

- *'The potatoes are cultivated all year round... this crop was not cultivated in the past with the same intensity... now, the potatoes provide our economy...'*

Photo by Sonia Gomez

Figure 2
Children analysing results from the social-economic calendar exercise

- *'The strong winds of August could affect the Plum, Damask and Vinegrap fruits harvested in summer. However in these months I am working in other things but the bad harvest of these fruits brings many problems for those who are living off these crops'.*
- *'The teachers do not allow us to miss school on certain days in the month when we must work. For example, in April* [beginning of the school year in Peru] *I am involved in harvesting the corn and I have difficulties with the usual attendance in school. I expect more consideration on the part of the teachers in the future'.*

From the experiences revealed through this technique, we, the teachers, also learned more about the pupils' situations and hence, became more aware of their circumstances. This has helped us to respond to their needs in a more flexible way, particularly when their outside work requires them to be away from school for a while. This exercise enhanced our understanding of the lives of the pupils.

Life Web

This is an adaptation of participatory technique proposed by the *Asociación Peruana para la Conservación de la Naturaleza*, an NGO which has an Environmental Education Programme in Peru. The aim of this tool is to get the student to reflect about the role of each part of an ecosystem and how they interact. The game is important for enabling the students to discuss the ecological equilibrium of any ecosystem.

Method

In the life web, the pupils take a part of a rope and stand in a circle around it. Each pupil assumes the identity of a natural resource (for example, crops, livestock, wild animals, the soil, water, sun, rain and other elements) to represent an ecosystem and all its parts.

In the next step, the ecosystem suffers 'changes' (i.e. the loss or replacement of elements in the ecosystem) which results in a new situation. When an 'element' disappears, the pupil representing it leaves the circle around the rope. The pupils then discuss the effect of this 'loss' on the other elements. They also discuss if other 'elements' of the ecosystem would also have to leave the circle as a direct result of this loss. The same process takes place when an 'element' is added to the circle. The implications of this are also discussed by the participants. Some of the students' conclusions from this exercise follow.

- *'In nature the cultivated plants are as important as the wild plants'.*
- *'Some insects which are useful for agriculture live in stones, soil and wild plants... we will not damage the home of these animals'.*
- *'Water is the most important of all the elements in Calana's agriculture... However, in a natural environment, the plants and animals resist more time without water than human beings.* [The pupil explains the life strategy of wild plants of desert].

The participation of the students in this exercise makes the study of ecosystems more 'real' as it enables them to discover the importance of each component through their physical involvement in the exercise. Since the pupils were physically involved in the change process of the ecosystem, they learn this subject more easily.

The letter

The use of a letter to improve writing skills is common practice in many schools of the world. In this case, students attempt to communicate with local authorities or important people within the community. This activity covers the project objectives of developing communication, participation and practical skills.

Method

To set it in context, this activity is linked to the organisation of an 'environmental forum' by the school, in which environmental issues and problems are discussed by the students. The forum encourages the participation of young people through working in teams. In their groups, students discuss issues around various environmental problems, such as the use of dangerous agrochemicals, the absence of sanitary services in the town, etc. The student working groups facilitate information exchange between one another through discussion, which often results in changes in their personal attitudes to certain issues. The final activity of the forum is to write a letter to a key figure or organisation within the community.

In their letter, each student writes a line about their own opinion regarding the state of the local environment and suggest some possible solutions. Afterwards, all the letters are sent to the Mayor of the District of Calana. Unfortunately, to date, no replies have been received from the Mayor or his colleagues to the children of Calana, indicating that he has taken on board their concerns.

Recovery of local knowledge

Traditional knowledge has been lost in the rural zones of Peru because western culture has modified the lifestyle of the people. For this reason, we have developed various techniques for the recovery and preservation of local knowledge within the education arena. The most important of these is called *'sopa de letras'* (which means 'hidden words' in English). This is basically an ethno-biological study. In this way we meet the project objectives of developing information, participation and practical skills.

In Calana, indigenous knowledge about local plants is mixed with the traditional knowledge of the in-migrants,

Figure 3 The school's bulletin *El Calanito*

who arrived in the area mainly from the department of Puno in the Andes of Southern Peru. In Calana, the pupils' knowledge of the properties and uses of plants in folk medicine, forestry and agriculture is very well developed. Some of them even came to school with a greater knowledge of indigenous biology and ecology than the teachers themselves! Therefore, we designed a matrix to present information such as the name of the plant, its market price, its medicinal properties, other uses etc. Animals have been studied in a similar way to obtain ethno-biological information.

Method

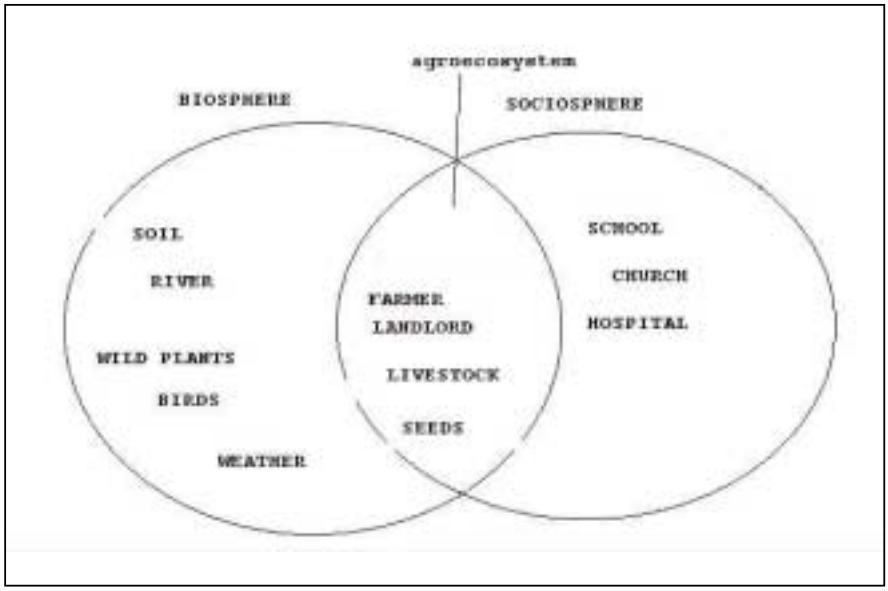
Each pupil constructs a matrix to show the properties of each plant/animal in question and the information from each matrix is then combined with all the others. The pupils form a master matrix and they also produce a final report which is published in the school's bulletin, *'El Calanito'* to present this information to a wider audience. This is the only publication produced in the town. The bulletin is sold at the equivalent of 30 US cents.

Sociosphere-biosphere diagram

This exercise has been developed using Venn diagrams (See Figure 4). The pupils talk about the origin of organisms in the world and then identify elements of the environment which are classified into three systems: Sociosphere (all elements made by man), Biosphere (natural elements) and the Agroecosystem (the linkages between man's agricultural activities and the environment).

The objective of this activity is to enable students to recognise elements of these groups in their daily rural lives. Some natural resources are considered to be commonly owned, for example, water, but other resources are thought to be the property of the land owners, such as the soil (certain families own most of the land in Calana). Another group of elements is clearer to define because, although it is a natural element, it is most likely to be the property of someone (e.g. crops and livestock). Figure 4 shows an example of the application of the technique. In the following session, the information generated by the diagrams is organised by the teachers and students into a list of elements which is written on the board for pupils. In this way, they develop better knowledge about their ecosystem and the power relations in Calana in relation to important natural resources and man's activities.

Figure 4 Sociosphere-biosphere diagram to explain the relationships between different parts of an ecosystem



Conclusion

The development of local knowledge about the environment in the classroom is very important for helping to solve environmental problems of the community (primarily agricultural issues). This is an important part of the project and, through the use of PRA techniques in the classroom, this can be achieved with pupils of school age. In this way, the families of students improve their knowledge about subjects related to the environment through interactions with the children who are able to share their learnings. As such, it is hoped that residents of Calana will learn to value a more sustainable lifestyle.

Through our experience with the Environmental Education project, the main conclusions of using participatory techniques in the classroom are as follows.

- We found them to be appropriate for use with the rural young people of 12 years and upwards that we have been working with in this project.
- The necessary requirements for working with these techniques are simple, although it is important to have teachers trained in the use of participatory techniques. At the moment, the school in Calana is the only educational centre of Tacna with teachers trained in participatory techniques specifically for environmental education.
- The students benefit more from learning about complex issues such as the environment through the use of participatory methods because both the classroom environment and the learning process are more entertaining, more interesting and democratic, with greater opportunities for students to voice their own views on the subjects being discussed.
- The disadvantages of using such participatory techniques in the teaching environment are that there is not much space to incorporate them into the development of formal school curricula and that, in order to manage these tools, the teachers need training in participatory techniques and also need to be open to their use as well as being enthusiastic and creative.

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Notes and references

Asociación Peruana para la Conservación de la Naturaleza. 1993. Guía de actividades de Educación Ambiental. Lima. Available from: APECO, Parque José de Acosta 187, Lima 17, Peru. Email: apeco@datos.limaperu.net

For further information, see Ceruti, Fiorella. 1993. *Practical Experiences with Environmental Education and Awareness Raising in Perú*. (pp.227-238) In: H. Schneider (ed.) *Environmental Education; an approach to sustainable development.* OECD, Paris.

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