

Integrating Active Learning Methods through Environmental Education in Rural Peru

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Abstract

The purpose of this study was to observe if providing an alternative teaching method of environmental education would allow students in a rural northern Peruvian elementary school (I.E. 10020° - Zaña¹, Lambayeque) to retain the information better. Currently teachers are using traditional styles that do not promote an active learning environment. This theory was tested by integrating active learning methods through environmental education, which included starting an environmental club and having students start community engaged projects such as a tree nursery and a compost pile. Results showed that students did retain information better through active learning methods and adopting new teaching styles shows promise in the future.

¹ Name of the elementary school I worked with.

Introduction

There has been growing interest in the field of environmental education in developing countries in recent years due to rising concerns of environmental issues. Environmental education constantly gets overlooked in schools or is not valued as important. Many teachers in rural Peruvian communities are not transferring this information to students in a satisfactory manner. Román Núñez and Cuesta Moreno (2016) showed that, “environmental communication should be a process of social interaction that helps people to understand the key environmental factors and their interdependence, but that at the same, enables citizen’s feedback and constructive response.”

Background

Peace Corps

My research was driven by my acceptance into the Peace Corps where I served as an environmental volunteer with the Community-Based Environmental Management program in Peru. The Peace Corps is an international government agency that works with developing countries to provide technical assistance with various projects. Environmental volunteers have three main goals; environmental education/awareness, management of natural resources, and solid waste management.

After six weeks of training we receive our community assignments that we will be working with over the next two years. The community assigned to me was Zaña. Zaña is located in the region of Lambayeque in northern Peru. It is considered a coastal desert region with

average temperatures ranging from 65°F to 95°F. Zana has a population of 4,000 and a rich Afro-Peruvian history.

There were five schools in Zaña and I worked with the public elementary school, Institución Educativo 10020°-Zaña¹. The school was comprised of about 456 students in grades 1-6 (ages 5-13). Each grade was split into three classrooms ranging between 10-35 students with one teacher per classroom, 18 teachers in total. Each grade was assigned either a morning or afternoon block since there are not enough classrooms for all students to come at once.

Objective

Goal Through Environmental Education

In thinking about the goals set by Peace Corps and looking at the condition of my site, focusing on environmental education at I.E 10020° - Zaña was the best solution. The overall goal would be to improve the students' knowledge of environmental education through integrated active learning methods. Active learning refers to a learning situation in which students are active participants rather than passive observers. Learners engage in a variety of open-ended activities and the approach allows students to take on a more protagonist, less passive role than in traditional transfer of knowledge approaches (Olgun 2009). As stated before upon observing the current teaching styles I wanted to give the students the opportunity to learn the material in a different manner to see if it would help them better retain the information.

Methods

Community Diagnostic and Interviews

When volunteers first arrive to their communities they are expected to fill out a community diagnostic. The community diagnostic is a way to learn more about our communities including historical background, social indicators, health status, education levels, community activities and information about our respective programs. During training we are given tools to help us acquire this information. We are expected to talk with various members of the community to get their perspective on what should be done as a means to integrate and practice our Spanish.

To get the view of Zaña from my community I did interviews with students, locals, and representatives of various associations. In total I performed about 120 interviews. I started with the SWOT method and used this with the locals and some representatives since it was less time consuming and I could easily gather this data. With the SWOT (Strengths, Weakness, Opportunities, and Threats) method I would ask for strengths, weaknesses, opportunities, and threats in the community and write them down in my notebook. I did not relate these questions specifically to the environment because I wanted it to be open-ended and hear what most people had to say and see how they felt about their community.

The results for SWOT were fairly consistent among everyone. They felt that their strengths and opportunities were tourism, culture, and agriculture. Zaña is very well known for its ruins and Afro-Peruvian culture which includes a museum, dances, and traditional candies and foods. Weaknesses and threats included; lack of motivation from the people, gossip, lack of

transportation, poor economy, and El Niño². The gossip in the community played a key role because there was no separation of work and personal relationships. A personal falling out with someone could lead to someone not being able to participate in certain events or refusing to work with others because they do not like them. There are not many opportunities for work within the town so many of the people travel everyday to the capital, Chiclayo³ or the next town over, Cayalti⁴ to find these opportunities. El Niño has impacted Zaña consistently about every ten years and this is the main environmental impact they are aware of.

During training we were given a general overview of how the Peruvian school system is set up, but they assured us that each school system would be run differently. I visited the primary and high school a few times to shadow the teachers and learn how the school worked. After about a month I gave a survey (See Appendix) to a few of the classrooms, teachers included, that included general and environmentally specific information. I surveyed two elementary and high school classrooms totaling about 130 students. Most students struggled to answer the environmental questions but once I explained it to them in further detail they understood a little better.

The general portion asked about their households; how many people live in their house and how many are children (15 and under), the occupation of their parents, after-school activities, and what they like about their community and what they would and wouldn't change. The environmental portion asked if they had a CTA⁵ program in their school and if they were

² Change in ocean currents that lead to devastating heavy rainfall in the coastal regions of Peru.

³ Chiclayo is the capital of Lambayeque and is located about 45 minutes north of Zaña.

⁴ Cayalti is located about 10 minutes east of Zaña.

⁵ CTA (Ciencias, Tecnología, y Ambiental) This program is equivalent to the STEM program in the U.S.

receiving classes with basic environmental knowledge on natural resources and solid waste management. The last few questions were designed to determine what type of programs they would like to see in their school, how they thought they could benefit from an environmental club, and what they could do in the future.

The results showed that both schools had CTA programs but in the elementary school there was a fault. The high school students were able to answer the environmental questions more thoroughly than the elementary students. At first, I thought the results weren't a fair representation because ideally the high school students should be more knowledgeable than the elementary school. I talked with one of the tenured⁶ teachers and the director at the elementary school to get more information. Both agreed that the elementary school CTA program needed improvement.

Integration into the Community

A volunteer's integration is very key to their success. Integration is the means of learning how your community interacts and being a part of their culture. We are considered outsiders in our communities when we first arrive, and we must build and earn the trust of the community. Without this trust it can be very difficult to accomplish our projects. To integrate at the elementary school, I started teaching English and participated in all the school events. Being present built a lot of trust with the faculty and students which granted me support for the environmental club and summer school.

⁶ Tenured professors in Peru have received a Masters degree and have been teaching for at least 5 years

Teacher Shadowing

Before working with the students, I wanted to shadow the teachers in a few of their classes to observe the teaching style and to see how the students reacted to it. The current teaching methods in the public-school systems in rural Peruvian communities are very textbook heavy. The teachers write on the board directly from the textbook and then the students copy verbatim from the teacher. Olgun (2009) found that “course instructors tend to teach the same way they were taught, using lectures and promoting rote memorization of disconnected facts.” There were not many active learning methods which was surprising to me because this was a primary school with most students ranging in age from five to twelve.

I noticed that there were some teachers who did involve active learning methods and there were some that did not at all. The main difference in these teachers was tenure. Teachers that had tenure were using hands on activities more than non-tenured teachers. Since teachers do not have to be certified or have a teaching background anyone can be considered for this profession.

When deciding what lessons to teach I would often ask the students what they were interested in learning about. Niemi (2002) found that “in most cases, teachers are still steering and guiding the learning process, a situation which does not invite students to use or develop their cognitive or motivational self-regulatory skills.” Niemi also found that from the viewpoint of the student they wanted teachers to explain things so that they understood, give support and encouragement, and listen and take care of them. It was important to me to provide a productive healthy learning environment where students didn’t feel intimidated by me being their teacher.

Vacaciones Útiles (Summer School)

My first opportunity to work one on one with the students was through Vacaciones Útiles. Vacaciones Útiles are eight-week summer programs/camps that students participate in for about two hours daily. I did this program twice; January/February of 2016 and 2017 and had a total of 68 students in attendance. During the 2016 summer session I led a lot of discussion based activities and games. I was still fairly new in the school and students didn't know me very well yet but from observations in the classroom I knew that I didn't want the sessions to be one-sided with just me talking. In the 2016 session we played a lot of environmental games. Since the students had some familiarity with the environmental topics I wanted to see if a game or activity would help them understand that concept better.

The 2017 summer session went a lot smoother. The students and I had time to build a relationship and they were familiar with the Brigada Verde so they were more eager to participate. The second time I did Vacaciones Útiles (2017) I used the projector sparingly as compared to the first time. The activities included games, worksheets, posters, etc. The teaching style was favorable for the students and they were able to learn from me and their peers. Everyone was able to contribute and leave with fulfillment of gaining new knowledge.

Brigada Verde (Green Brigade)

Niemi (2002) states "Active learning theories stress the social elements of learning, e.g. the importance of cooperative action, collaborative problem-solving, and sharing as tools for attaining deeper processes of learning and in many cases also achieving better results." From this framework I felt that an environmental club would be beneficial to the students giving them the

opportunity to learn from each other as well as contribute to their school. The objectives of Brigada Verde were; to promote the spirit of volunteering among youth, train environmental facilitators, promote the protection of natural resources, and create a network of support for groups and youth that work with the environment. Most students didn't have the opportunity to participate in other teams or groups within the community, so this was their opportunity to be a part of something.

Brigada Verde included 43 students and met about twice a month during the 2016 year and started two projects in the school. Aydede-Yalçin (2016) stated "ecological education given with active learning based activities has an effective impact on students' conceptual knowledge". To build on this, we developed two projects that expanded beyond the school and into the community. This included a tree nursery with native species and vermiculture. We were able to obtain Algarrobo (*Prosopis pallida*) from a fellow volunteer to start the nursery and we were able to plant about sixty seedlings. The plan was for these trees to be monitored at the elementary school and would then be transplanted throughout the community to increase green areas. The vermiculture project was a way to introduce solid waste management of organics and produce fertilizer for local farmers and the school gardens.

Activity Engagement

I chose most of the activities based on what I saw in their textbooks and what students told me they wanted to learn. I then looked at what I felt they were lacking and what could be sustainable projects for the school and community. Active learning activities included games, worksheets, community projects, parades, a mural, and demonstrations. When we were in Vacaciones Útiles we had uninterrupted time, so we were able to accomplish longer activities.

The tree nursery and vermiculture were projects used to teach about the benefit of trees and how to manage organic waste.

Through Brigada Verde meetings and the allotted English times we played games to teach concepts. Some topics included; ecosystems, birds, pollution, ecoregions, and biodiversity. To teach about ecosystems we played “web of life” which involved giving everyone a card that represented an animal, plant, resource, or process and then they had to figure out how each part related to each other. This activity required them to think about the connections in ecosystems and challenged them to think of connection that weren’t obvious. We played this for about ten rounds because after each round they understood more how ecosystems work and soon they wanted to see if they could relate all the cards.

During English class we talked about biodiversity of animals. Since English was during school hours I only had an hour a week so we spent about a month and half discussing animals all over the world. I categorized animals by insects, sea animals, farm animals, etc. and had students tell me where they could find these animals. Many thought they only existed in Peru so this was an opportunity to tell them where they are located and how to say the names in English.

To raise awareness in the community we painted an environmental mural and participated in environmental parades. The mural serves as a reminder to protect the environment and includes natural resources found in the community like the river, plants, and trees. The parade was an opportunity for the entire school, not just members of the club, to show the community the importance of our environment. Students created posters filled with environmental slogans to let people know why they should protect the environment. These activities were excellent aids in the classroom.

Creating an Activity Guide

From my own observations and according to Niemi (2002) from the viewpoint of the teacher the main obstacles they face with incorporating active learning are; heavy preparatory work, lack of time, size of student groups, and weak learning conditions and materials. Taking all of this into consideration I wanted to create an activity guide specifically for the teachers of I.E. 10020° - Zaña that would supplement what they already teach.

The lessons are prepared by theme, take about 30 minutes to execute, can accommodate larger groups, and do not require the purchase of resources (outside of copies but the school and municipality will provide this). The materials and worksheets are based on topics that are included in their curriculum.

This guide would be presented to teachers to use during class or outside the classroom. Each lesson contains a worksheet, activities, and discussion questions. This will promote a teaching style of getting students actively engaged in the lesson and developing their mindset to have an active role in the classroom. The activities are set up in a manner that will allow all students to participate. It can be challenging to do activities with a large number of students because some students can feel left out and the teacher can feel overwhelmed. These activities will give all students an opportunity to participate and will ease the stress on the teachers.

Results

After the 2016 summer session the students returned to classes and I was scheduled to work with the school as the English teacher. When I started my classes I used this as an opportunity to evaluate how the summer session had gone and what improvements could be

made. The overall result was that they enjoyed it a lot and were looking forward to next year. I started by asking the students what they learned during over summer with me. After about two months they remembered most of the material we had covered. I was very impressed and surprised by this. They explained the topics and as they were telling me I noticed that the majority of it coincided with the activities we had done. I asked what they like best and made it a group discussion and told them it was ok if they didn't like something because I could adjust it. They didn't like the daily duration of the sessions which was two hours. When asked what they did like most of them said the games and activities. To wrap up the discussion I asked if doing activities helped them remember better and they said yes. Games and activities were easier to remember than looking at it in the textbook. I then asked if they could do similar activities with the lessons they receive in class would that help them understand better and the response was yes.

I needed to get more feedback, so I talked with the director and a few teachers. I gave an overview of the summer program; what topics we covered, the types of activities we did, and who was participating. The director was pleased with the results and added that he talked with a few of the students and they said that they enjoyed it especially the activities. The teachers had shared with me that they could tell what we covered during summer school because the students were more engaged during their CTA courses and they did better on their in-class assignments.

The museum director was a big advocate for understanding environmental issues and he would often have visitors coming to the museum and visiting other places in the town. He always invited me to these events and meetings and would encourage me to talk about my environmental work with the students. I always encouraged the students to talk about our projects because I felt it would mean more coming from them than me. Without preparation and

based off only what they could remember they explained many environmental issues within the community and what they could do to address them. They also did this for Peace Corps officials when they would come to check on the status of my work. Everyone was impressed with the knowledge of these young students and asked how I was teaching them. I explained my theory of teaching and how I wanted the students to actively engage in what they were learning.

Discussion

Influencing Factors

Throughout my time in Peru I had to make many adjustments, the main one being “culture shock”. This included language and time constraints. Coming in with a western mindset proved difficult at times because I had to let go of my American methods and learn the Peruvian way of life. Slowly I adapted to these customs and was able to have a successful service.

Language

The official language of Peru is Spanish, and as a native English speaker I had not had much experience with oral Spanish. This was the number one factor that would influence a lot of my work because it was my only means of communication with others. Planning and preparing lessons proved challenging because I would have to review them more often to ensure the material was grammatically correct, practice the verbal delivery, and prepare for potential questions that students may have.

After about six months of constant conversation and asking many questions I began to feel comfortable with the language, so it became easier to communicate my lessons to students and talk with the community.

Time Management

The other factor that would influence my work was time. In Peruvian culture they are not concerned about time management because there is an expectation that things will always take a while to get done. When it came to celebrations and events in the community they take precedence over everything. I had to compete with many community and school events to make sure that I would have time to work with the students. The school calendar was tied in with the community calendar which led to conflicts.

The students had two shifts at school, the morning group and the afternoon group. In the beginning lessons were done twice so that both groups of students would be able to participate. Unfortunately, I started running into conflicts with schedules, so I then switched the meetings to Saturday mornings. Saturday mornings worked better for a while because I could work with the students for a longer time period, but after about a month of Saturday meetings I ran into other problems with students participating due to their other community activities that included religious studies, sports teams, and work with the family.

Due to these conflicts I started fitting lessons in where I could and took advantage of my allotted English class time. I was teaching English weekly for an hour per classroom and I would take advantage of this time period to also work on environmental lessons with added English elements.

Teaching Constraints/Resources

One of the challenges of integrating the active learning was the issue of resources. I had to be very cognizant of using my personal resources and the school's resources. We received a small monthly stipend from Peace Corps that we could use towards buying supplies, but we were encouraged to see what the school and community had to offer. Paper, posters, and copies were the main supplies I was purchasing. In this culture if you want to create copies you need to supply your own paper as well. I had purchased a personal printer and used this to print off the initial worksheets and documents. The price of copies was about .031 cents per page and a pack of paper (500 sheets) cost about \$3.40.

I talked with the director of the school and some of the officials in the municipality about this and they agreed that if I provided the paper the municipality would provide copies for free. The school had a projector that I used at the beginning of summer school. I started using the projector to show powerpoint to provide visual aids and have the opportunity to watch supplemental videos. Powerpoints and videos had a positive reaction with the students and this worked well for the first month until the projector broke and was unable to be fixed. This was a huge setback because I had not prepared alternative lessons, so I was forced to think of other ways to engage the students without relying on technology.

I wanted to be sure that the activities could easily be replicated with little to no cost. I got more involved with doing the activities with them and they responded positively. My teaching style included brief lecture, activity, discussion, and review. I started off with lecture and every 10-15 minutes I would transition into an activity, follow it up with discussion, and end the lesson with a review to check for understanding.

Community Support

When we are sent to our communities and work on projects people can begin to see it as “the volunteers work” and not the work of the community. Our goal is to work together not alone. Many people want to help with our projects but don’t want to be fully responsible or don’t have the time to take it on by themselves. While a volunteer is working there is a lot of motivation and drive to keep a project going, but when we leave projects often are left alone. Many people in the community don’t have the time to be solely responsible for our projects unless it aligns strongly with their own work or personal affairs. We invest a lot of time and resources into our projects and gain recognition for them but there is always the possibility that no one will continue the projects.

Changing of authority figures in the community can also be detrimental to the continuance of projects. When elections are held, or people choose to pursue other jobs there is no guarantee that the new figure will continue prior projects. There are no established rules with transitions of power and corruption exists. We can have support today under one authority and it can change in a month under a new authority. Support is a huge factor to the success of our projects and if we lose it the project becomes very hard to sustain.

Long-Term Involvement

Due to our service being only two years it can be hard to measure the long-term effects. As stated above when we arrive we are the outsiders and must use integration as a method to start projects. Integration is a process and can take up to a year to truly accomplish it. Once integrated you can then begin your projects with support. With the added idea of Peruvian time

management, it can take even longer for a project to gain momentum. This adds to the challenge of long term monitoring because once a project has started the volunteer is about to end their service.

Since a majority of the teachers without tenure serve only a year and don't need certification to teach, it can be hard for them to understand why they should update their teaching style. To incorporate active learning a teacher would need to be willing to learn how to incorporate it into their lessons, but without a direct benefit or incentive it would be hard to motivate the teachers.

Conclusion

This study asked the question how could I get students engaged in environmental education and I found that active learning methods proved successful. By creating an open and positive learning environment I was able encourage students to become more involved in the learning process and express their thoughts and ideas. The environmental club was a key factor with getting students to start community based projects and encourage activity within the CTA program.

Looking at the literature there is strong evidence that integrating active learning through environmental education can be a gateway to changing the mindset of how students and teachers interact and what can be done to increase the communication between the two. Some limitations to this research can be the differences among communities and the level of support being offered for this kind of study. Looking ahead I think this process can be recreated with a variety of different groups, the research shows positive outcomes and leads to creating more environmentally conscious people.

Appendix

Environmental Survey with Responses

General Questions	Open-Ended Responses	Yes/No	Avg.	Min.	Max.
How many people live in your house (including you)?			5	2	10
How many people are 15 and younger?			3	1	5
What is your mom's main occupation?	Stay at Home Mom and Farmer				
What is your dad's main occupation?	Farmer				
What do you do after school?	Help my mom with different things (cooking, cleaning, taking care of siblings)				
What type of clubs are in your school? Do you participate in a club and what types of activities do you do?	There are no clubs				
What makes your community special?	Culture and Traditional Candies				
If you could change something in your community, what would you change?	More activities for kids and more plants				
What is something in your community that you would never change?	Our Culture				
Environmental Education					
Is there a STEM program in your school? Have you previously received STEM courses in each grade?	We have received classes in each grade, but we are lacking in the program	Yes - 95% No -5%			
How many days during the week do you have STEM classes?	Elementary - 1 day/week High School - 2 days/week				
Natural Resources					

Name 3 natural resources that exist in your community (*There were issues with this question because many did not know what a natural resource was.)	River, plants, crops, and the dry forest.				
Explain why those natural resources are important.	It's good for the environment				
Name 2 threats to the environment	El Niño and Trash				
Solid Waste					
What do you understand about recycling?	It's when you separate trash				
Is there a recycling program in your school?		No - 100%			
Mention 2 benefits of recycling.	Cleaner streets and protect the environment				
In the Future					
What type of educational program would you like to have in your school?	Elementary - Music, environmental, and art High School - Sexual Education and Music				
What would be the benefits of an environmental brigade at your school?	Protect the environment				
How can the environment be protected against threats?	Throwing trash in trashcans instead of the streets.				

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