STIMULATING AN INQUIRING ATTITUDE

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"More than to learn things, the interesting thing is to learn how to discover" (Gardner: 1989).

This article presents the first year experience of teaching Science combined with English in the preschool section with ages between 4 and 6 in the Gimnasio Campestre. A brief theoretical framework is exposed based on inquiring attitudes and theoretical models about this. Then a proposal is presented which was applied to these children; the purpose is to show a new methodology where students will acquire an inquiring attitude through a Science class taught in English.

Introduction

After many observations in Science class taught in English, it is surprising how the lack of an inquiring attitude in students from 4-5 years old is presented. That is why an exploration about students-teachers and students-students was made to look for the best way to interact and motivate students to acquire inquiring attitudes in a classroom where the teachers act as mediators.

Nowadays, kids in our society are expected to get things easily (spoon-feeding). We as teachers must provide students with a new method for a new generation, we do not want this generation to just "absorb" any kind of knowledge or information uncritically.

Since I began to work at the Gimnasio Campestre, I have noticed a lack of stimulation in the inquiring attitude of Pre-Kinder kids in science class taught in English. At the beginning, they looked at me like passive receivers who were not able to discover the environment. That's why, this project attempted to find a methodology which would stimulate the Pre-K kids with an investigative attitude and, at the same time, encourage them to practice it as a part of their lives. At the end of this project, students will be capable of questioning their surroundings instead of getting the "correct" answer to a question from a teacher.

Research questions

There was also a main difficulty, which captured my attention and it was the enormous adult dependency the kids had shown throughout the learning process and often gripping firmly the act of being guided and their lack of confidence or curiosity of new experiences leading toward the development of knowledge. So, the main question sprouts: how can I stimulate Pre-K kids toward developing an inquiring attitude in science class taught in English? Also two sub-questions addressed my research:

- What kind of activities could I design to stimulate the development of an inquiring attitude in Science class taught in English?

- What are the characteristics that show evidence of inquiring attitudes in the kids during Science class?

Theoretical framework

After having kept my journals, the two question-survey applied orally (Figures 1 and 2), and exploratory experiences in the laboratory or just outside the classroom, I noticed that my students from Pre-K in science class needed a new methodology where they would acquire an inquiring attitude, at least from the very beginning guided by the teacher.

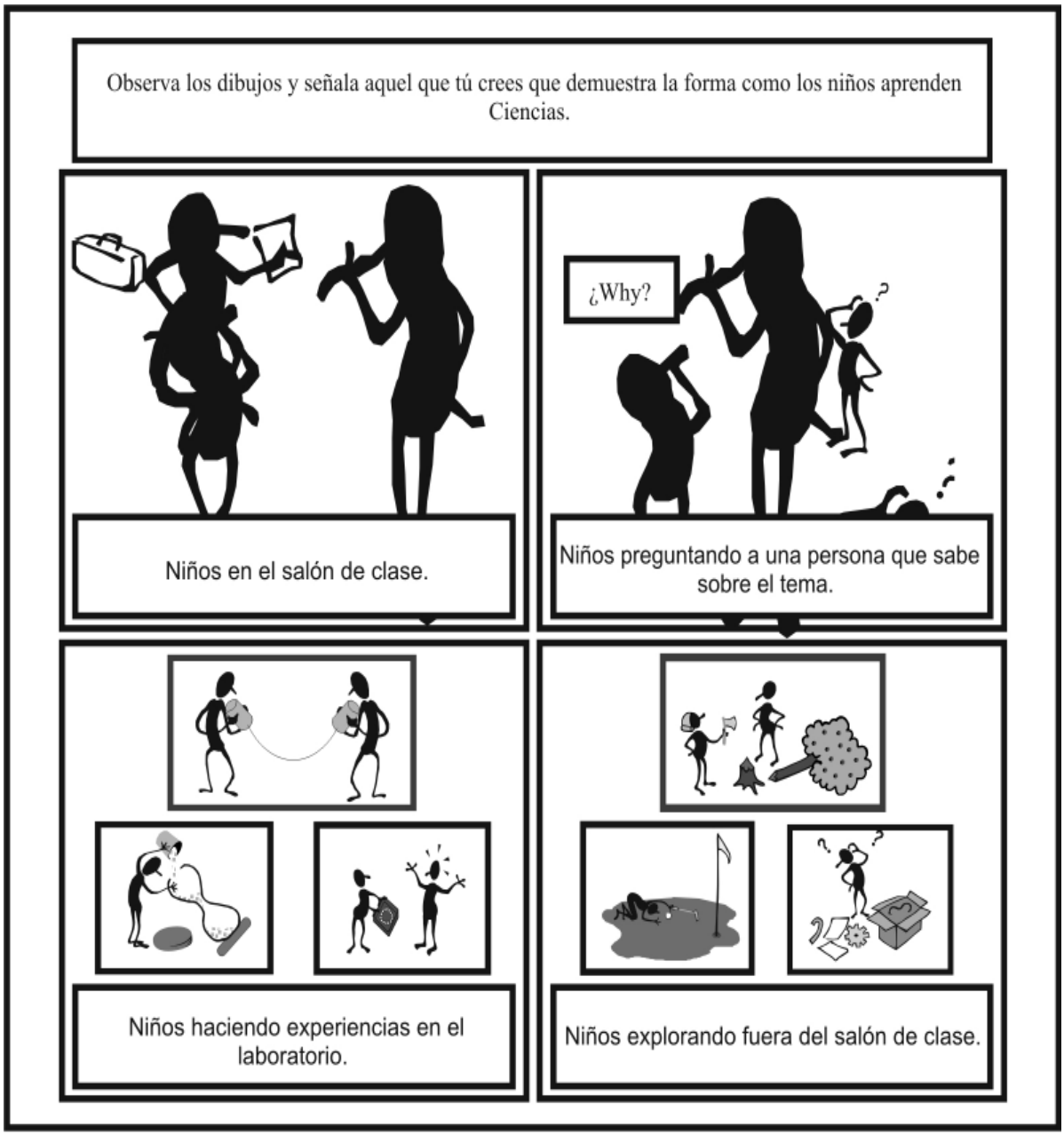

Figure 1. First question made to the students

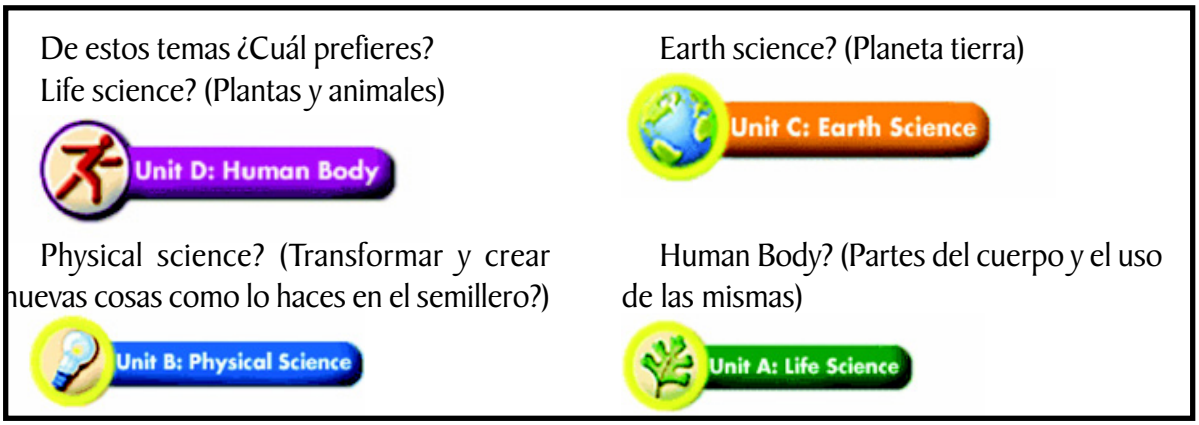

Figure 2. Second question

The main objectives, traced throughout this project, were to find activities to stimulate an inquiring attitude and identify characteristics that show evidence of an inquiring attitude in Pre-K kids through Science in English.

It is necessary that they must be able to apply their ability to questions of importance to them, not be told in advance the questions to be answered. A partial answer to this challenge can be found by looking at one of the central beliefs of the early science reform movement of the 1960's; to learn science, students should do science. It seems from here the doing of science is then boiled down to a set of processes called "inquiry." Sund and Trowbridge (1967: 49) gave a description of inquiry: "The inquiry approach requires the learner to be an active participant in the quest for knowledge. In so doing, the student discovers his ability on how to learn by using his own mind to solve problems".

Vaidya (1970) applied Piaget's theories to children's learning in science and was more successful in articulating a constructivism theory that could empower the learner. He wrote: "the goals of science education are effectively achieved if students base their work on their personal question and problematic situations encountered by them in their own immediate environment. The role of laboratory then, is to raise and define problems, to learn the meaning and use of controls and to test hypotheses and interpret data" (272).

In addition, students should be helped to distinguish between those questions that can be meaningfully posed and answered within science, and those other nonscientific questions that are outside the purview of science. Students should be taught the art of formulating scientific questions, breaking up "large" questions into more manageable "smaller" questions, and designing a procedure (whether involving experimental work, library research, or other means) for answering them (Mestre: 1990).

Harlen (1996) details the significance of children's questions as well. Harlen proposes that teachers categorize questions into those that are investigatable and those that are not, and work to turn children's questions into the bases for investigations. She writes: "'Turning' questions into investigatable ones is an important skill since it enables teachers to treat difficult questions seriously but without providing answers beyond children's understanding. It also indicates to children that they can go a long way to finding answers through their own investigation, thus

underlining the implicit messages about the nature of scientific activity and their ability to answer questions by 'asking the objects'" (112). It is possible. If students can get the confidence in their ability to investigate and in their own ability to make and answer their questions they will get some very real power.

The idea is to provide a structure to carry out experimental work. This should give students the freedom to explore and learn on their own. Rather than providing all the details of an experiment, as in cookbook labs, the structured inquiry approach provides students with both designated topics that will be the focus of the experiment and the equipment to conduct the experimental work. Within this framework, the teacher acts as a mediator.

The methodology

Based on those ideas, my research project investigated a structure that carried out experimental work and which is presented in figure 3.

The first stage had many activities which were carried out in and outside the classroom. At the very beginning, students started to work with hands-on and Total Physical Response (TPR) activities where they had the possibility to interact with others, using English and the vocabulary in a proper way.

Hands-on and TPR activities were the ones needed to put the guided instruction into practice, where students were able to acquire and practice the vocabulary and structures. This stage represented more traditional instruction in which the questions and procedures had basically been determined by the teachers. The activities they did were cooperative. These activities were always done by cooperative groups and I designated their roles in the group so the students avoided fighting while working. The direction always came from me. The methodology carried out followed the structure above:

• *Review*: Sing a song, review vocabulary seen in the last classes using pictures or mimics.

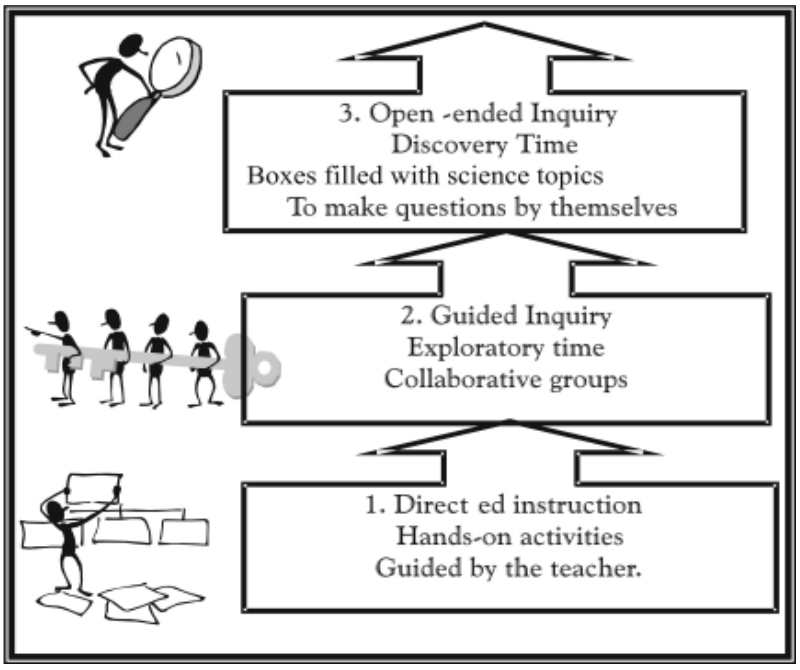

Figure 3. Structure to carry out experimental

• *Introduce vocabulary:* Introduce new vocabulary to work on the activity, show them materials saying the name of the object and the action they can do, ask them to repeat it.

• *Observe:* Teacher does the experiment with the help of some students, always demanding repetition.

• *Collecting data:* Students draw what they observe.

The second stage of this project, called "guided inquiry", was the exploratory time, where kids continue working in collaborative groups but on this opportunity they had the chance to look for answers with little help from the teacher. They counted on some guidance. The students started to answer their questions thanks to the teacher's role (teacher as a mediator). I began the process of motivation towards making question by themselves.

The scientific process is followed strictly throughout this step. The methodology carried out followed this structure:

• *Review:* Sing a song, say rhymes about the topic. Then, review vocabulary seen in the last classes, using pictures or mimics.

• *Introduce vocabulary:* Introduce new vocabulary to work in the activity. Show them materials saying the name of the object and the action they can do. Ask them to repeat it.

• *Observe:* Students do the experiment with a little help of the teacher. Sometimes the teacher can ask about the process or vocabulary used.

• *Predict:* Students express what they think they will do and draw it.

• *Test hypothesis:* Students check whether the hypothesis was true or false. Teacher repeats the question: *What happens when/if...*

• *Collecting data:* Students draw what they observe.

• *Experimenting:* Students motivated by the teacher try other variables; they test and try to give reasons.

• *Inquiring attitudes:* Teacher makes suggestive questions about the process. For example in the topic about physical science: *How can the sense of touch feel the temperature?* Their answers were a reflection, where kids had the opportunity to use the vocabulary they knew in English and shared their ideas in Spanish. At this point, the concept they wanted to express was important rather than the language they used.

If the students could come up with the questions for our experiment with some guidance from the teacher, now we are on the road to inquiry. In other cases, the teacher asked one group of students to do the experiment in front of the class.

This project is missing the last part of the method I had investigated. An open-ended Inquiry, called "Discovery Time," where they would have boxes with different materials according to the topics worked in science where they would find an inventory and a signout sheet. This stage could not be applied due to the lack of time.

Activities	Observations	Results
• Orchard Project	• Some guidance	• Answer questions
• Go to the lab	• Scientific process	• Students conduct activities
• Problem solving	• Look for answers	• Students create possibilities

Figure 4. Chart of activities with results

Results

According to the activities done (Figure 4), students were more concentrated in their Science classes, and the distraction was a word that was disappearing little by little. My students were familiarized with some simple structures and vocabulary not only related to Science but with other subjects.

Repetition of words and sentences showed me they could differentiate when an expression was a question or an answer, so they could give a correct answer to the teacher. They improved much better in their other subjects taught in English (Arts and English).

Also, students tried to answer questions using the vocabulary or just gave their answers in Spanish creating a possible solution, which means they are on the way to act by themselves. When students conducted activities, some of them proposed new things to do. This indicated that my students were much more motivated towards the class, their interest was shown in the moments when they got new information inside the classroom. On the other hand, I could notice there were some students who decided what to do or where to go.

Children engaged in 'The orchard project'

At the end of the second stage, my students felt more confident and happier in the process of experimentation due to the repetition of the scientific process in all the activities done inside and outside the classroom (e.g. Animal Farm and the Orchard Projects).

Conclusions

As a conclusion, it is important, to take into account that the activities proposed to the kids in Science class must be according to their necessities and interests. In addition, they must be repeated later, always forcing students to recall the vocabulary used in the experiences not only inside but outside the classroom.

The ones that kids in these ages prefer are hands-on activities. Students show

inquiring attitudes when they are able to make questions with more freedom and the teacher does not condition the questions, but acts as a mediator during this process.

When the students are able to give some predictions and create their own hypotheses they are ready for the inquiry approach. With strong help from the teacher at the very beginning, then less, students give possible answers to be rechecked with experiments. They build, day by day, their own bank of possible answers, pooling the concepts, vocabulary, and experiences lived.

The teacher is a mediator along the process but s/he must be ready to assist the student before, during and after s/he shows evidences

of inquiring attitudes. It is possible they could find instructions, which they can follow or not. Thereby, the teacher would be asked to make questions for the kids along the way, and keep a record of these, along with the answers. Monthly, it is hoped; the information will be collected.

Other interesting topics to continue researching as part of this project should be the third missing part and the teacher and students' interaction or the interaction among the students. They are quite giant and interesting topics to work with further on, and in that way, it would be possible to enrich this project because it will improve the relationship between teachers and students. In doing so the process followed will gain new activities to be done and develop inquiring attitudes more easily.

References

Gardner, H. (1989). *Art, mind, and Education: Research from Project Zero.* Urbana, IL: University of Illinois Press.

Harlen, W. (1996). *The Teaching of Science in Primary Schools, Second Ed.* London: David Fulton.

Mestre, L. (1990). Bottenfield Elementary School. *(Re)Forming a Community*. Vol 2, Spring.

Sund, R. B., & Trowbridge, L. W. (1967). *Teaching Science by Inquiry.* Columbus, Ohio

Vaidya, N. (1970). *Some Aspects of Piaget's Work and Science Teaching*. New Delhi: S. Chand and Co.