

Problem-Solving Activities in Computer Assisted Language Learning

Introduction

Hanh thi Nguyen

This series of activities brings together two key elements: problem-solving as a vehicle for language learning, and computer technology to enhance learning. Problem-solving as a learning activity can be said to support John Dewey's (1930) notion of experiential education, in which (among other things) the emphasis is on the learners' direct and subjective experience.

A problem-solving activity includes the following steps: understanding the problem, learning about the problem, researching how the problem can be solved, testing the new information, and building solutions (Egbert, 2005). In a problem-solving activity, the learners practice the skills of observing, gathering, organizing, predicting, and synthesizing information about a problem and use creative, critical thinking skills to find solutions to the problem. Problem-solving activities are beneficial for language learning because they integrate all skills. In addition, they focus on tasks rather than language forms per se, i.e., the learners get to do things in the target language in context rather than, for example, trying to memo-

rize language structures. For these reasons, problem-solving activities can be quite engaging. Furthermore, problem-solving activities involve critical thinking as they are applied to real-world problems, and thus, these activities can be highly authentic. Finally, since the students select what problems to work on and come up with their own solutions, problem-solving activities are also learner-centered.

Computer technology plays a central role in the problem-solving activities presented here. The computer is used for gathering, organizing, and presenting information.

Regarding the role of the teacher, it should be noted that in problem-solving activities, the teacher is the organizer and facilitator. Consistent with these roles, teachers should make sure to convey, from the outset, a clear rationale for the activity as well as clear expectations for the final product of the project. The teacher should also provide clear guidelines at each step and assign clear roles to students in the group work.

References

- Dewey, J. (1938/1997). *Experience and education*. New York: Simon and Schuster.
- Egbert, J. (2005). *CALL essentials: Principles and practice in CALL classrooms*. Alexandria, MD: TESOL.

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O'ahu's Coral Reefs

Alison Fukuchi

1. Teaching Situation

This problem-solving activity was designed for use with an intermediate-level Japanese high school EFL course. There are 20 students in the class. In their science class, these students are learning about coral reef systems and they plan to visit O'ahu for a spring break school trip.

2. Understanding the Problem

O'ahu's coral reef system is in danger. Only 0.2% of the reefs on O'ahu are protected. To begin understanding the problem, students will be presented with the following questions. They will answer the first three questions. Questions 4 and 5 will be answered by the end of the activity.

Q1. What do I know about coral reefs?

Q2. What dangers are facing coral reef systems in Hawai'i?

Q3. What do I want to know about coral reefs?

Q4. What have I learned about coral reefs on O'ahu?

Q5. How can coral reef systems be protected?

3. Learning about the Problem

Students will form 5 groups of 4. Groups will be divided into the following two categories of "Experts."

1. Reef Experts: these students will examine how coral reefs are created, how Hawai'ian reefs are unique and how reef health can be determined by marine life present in the reef system.

2. Protection Experts: these students will investigate the Marine Protected Areas (MPAs) of O'ahu, examine what is being done to protect O'ahu's reef systems, and assess the danger to O'ahu's coral reefs.

During class, groups will meet to discuss findings and brainstorm possible solutions.

For research, students can examine the following resources:

www.waquarium.com

www.library.thinkquest.org/J002237

www.coralreefnetwork.com

www.sailHawaii.com/coral.html

www.wildHawaii.org/reef.html

www.co.honolulu.hi.us/parks/facility/hanaumabay/welcome.html

4. Solving the Problem

After groups have gathered, organized, and synthesized their research in a short paper summarizing their findings, they will be responsible for presenting possible solutions to the problem of O'ahu's coral reef endangerment to the other classes in their school who are also going to visit O'ahu on their spring break school trip. Emphasis will be on identifying the most dangerous threat to O'ahu's reef system (human impact) and educating classes on how to minimize their impact.

Students will have the following choices for presenting their results:

- a) Power Point presentation
- b) Educational brochure
- c) Educational video

5. Reflecting on the Problem

Students will complete the given questions by answering questions 4 and 5 (“What have I learned about coral reefs?” and “How can coral reef systems be protected?”). Students will then compose a list of unanswered questions they will use to investigate further during their trip to O'ahu. Teachers will need to ensure that students have the opportunity to participate in educational activities such as spending the night at the Waikiki Aquarium and snorkeling at Hanauma Bay where they will be required to watch a safety video that should reiterate points they discovered in their research.

The process of inquiry could begin anew with investigation into Japan's reef systems and conservation efforts.

Endangered Species

Yoshie Nishikiori

1. Teaching Situation

This activity is designed for an ESL class in the US with students from various countries. There are 15 students in the class; ideally, at least two or three students are from the same country. Their English level is high intermediate.

2. Understanding the Problem

Endangered species is a population of an organism, which is at risk of becoming extinct because it is either (a) few in number or (b) threatened by changing environmental or predation parameters (Wikipedia, 2007). It is said that the percentage of endangered species is 40% of all organisms. Do you know what kinds of species are facing the danger of extinction in your country? What is causing the increase in the number of endangered species? What will happen if many species become extinct? How can this problem be solved?

3. Learning about the Problem

Students who are from the same country get together, and think about the species that are endangered in their countries and why. They also try to answer the questions above. They need to take notes. Later, they will share what they discussed with the rest of the class so that they can get feedback from others before they start their projects.

The students are encouraged to use the following resources:

EndangeredSpecie.com (<http://www.endangeredspecie.com/>)

World Wild Life (<http://www.worldwildlife.org/endangered/>)

Endangered Species (<http://edtech.kennesaw.edu/web/endangsp.html>)

Wikipedia - Endangered species (http://en.wikipedia.org/wiki/Endangered_species)

EE-Link (<http://eelink.net/EndSpp.old.bak/>)

E Species Fact Sheet (<http://www.kidsplanet.org/factsheets/map.html>)

World Endangered Species (<http://library.thinkquest.org/19689/data/menu.html>)

4. Solving the Problem

Each group tries to come up with solutions. Depending on the number of species or amount of information that is available, they might need to focus on one region or one species. The teacher should guide this process. The final product that the students create at the end of the project will be a website about endangered species and suggestions to save them. It would be a good idea if the front page has a world map, and web visitors can click on a country to get to the page about that country. Students need to include not only the solutions, but also background information about the environment and situation surrounding the endangered species in their country because other students may not have enough knowledge about other countries.

5. Reflecting on the Problem

For evaluation, each group will give a short presentation on their solutions, showing the web page they created. They will be evaluated by their peers as well as the teacher. Also, they will be given a chance to evaluate their own performance by answering the following questions:

- Did you learn something new from completing this project?
- Can you now answer the questions given at the beginning of the project?
- What did you also learn from the other groups' projects?

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Homelessness in Hawai'i

Sieu Phan

1. Teaching Situation

This activity is designed for advanced-level ESL students. The ideal class size is 15 students. The objective of the activity is to develop students' language proficiency as they observe, gather, organize, predict, and synthesize information as well as practice creative and critical thinking to find solutions to a problem.

2. Understanding the Problem

Homelessness is not a new social problem in Hawai'i because in 1996, there was a federal welfare reform act to deal with this matter. However, since 1999, the number of homeless people in Hawai'i has doubled. A recent report shows that there are over 6,000 homeless people in Hawai'i, which is 0.47 percent of the state's 1.2 million residents. In fact, the percentage of Hawai'i's population that is homeless is 4th highest in the US. Many homeless people suffer from mental illnesses. Take females alone, 80% of them suffer from some form of mental illness.

3. Learning about the problem

After the brief introduction about homelessness, students are broken into groups of 3 to learn about this problem more deeply. They will answer the following questions:

1. Where do homeless people sleep at night?
2. Are all homeless people unemployed?
3. Do homeless children go to school?
4. Why do people become homeless?
5. Where do you often see the homeless?

Students are encouraged to visit the following websites for information:

<http://the.honoluluadvertiser.com/article/2006/May/01/br/br11p.html>

<http://starbulletin.com/2003/12/07/news/story1.html>

<http://the.honoluluadvertiser.com/article/2003/Nov/19/ln/ln03a.html>

<http://www.publicpolicycenter.Hawai'i.edu/miniforum/homeless.html>

<http://starbulletin.com/2005/01/11/news/story8.html>

<http://www.knowledgeplex.org/news/197066.html>

<http://starbulletin.com/2007/02/04/editorial/special.html>

<http://the.honoluluadvertiser.com/article/2007/Jan/10/ln/FP701100352.html>

As they visit these websites, students are required to take notes and check the reliability of the information. They may focus on some factors such as

- a. Is the information from a personal blog?
- b. Is the information from an online local newspaper or magazine?
- c. Is there an author of the article?

4. Solving the problem

After the groups have gathered information about homelessness in Hawai'i, they will try to explain the causes of homeless and come up with solutions to reduce homelessness in Hawai'i.

Based on the information gathered, students in each group will choose two solutions that they like most. Each group will introduce their solutions in front of class with explanation about the feasibility of the solutions. Their solutions may focus on the role of government, the home-

less themselves, and the community. Students could use posters or PowerPoint for their oral presentation

5. Reflecting on the problem

Teachers should give students opportunities to share their personal opinions about the homeless by asking them the following questions:

- a. What have students learned about homelessness in Hawai'i? How do they relate to the homeless situation in their country?
- b. What can students do to help the state to solve this social problem? (Possible answers: make donations, participate in community services, study/ educate themselves to have appropriate behaviors toward homeless people, etc)
- c. How do students feel about homeless people after they research on these people? Why?