
Joint Efforts for Innovation:
Working Together to Improve Foreign Language Teaching in the 21st Century
TAKSIM
Dolors Masats, Maria Mont
& Nathaly González-Acevedo (Editors)

A book for the curious and passionate 21st century language teachers and teacher trainers.

Tired of reading about the wonders of technology enhanced project-based learning but not knowing where to seek inspiration to start to adopt this teaching approach? A team of in-service teachers, teacher trainers, pre-service teachers and researchers have worked together to present a simple, engaging and practical book to offer fellow education professionals stimulating ideas for their teaching practice.

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This book includes

- accessible examples of teacher-led classroom research small-scale studies.
- calls for teachers to do research in their classrooms.
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This book is an invitation for practicing teachers and teacher trainers to be creative and to develop learning skills, literacy skills and life skills.

Are you ready to become an innovative 21st century educator?

JOINT EFFORTS FOR INNOVATION: WORKING TOGETHER TO IMPROVE FOREIGN LANGUAGE TEACHING IN THE 21ST CENTURY

Dolors Masats, Maria Mont & Nathaly Gonzalez-Acevedo (Editors)

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How do plants survive? Observing a carnivorous plant

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Introduction

How do plants survive? Observing a carnivorous plant is a three-month interdisciplinary project that gives young learners of English the responsibility of learning to work in teams to create a video documentary to help younger students understand how to take care of a Venus Flytrap. Based on the premises of project-based learning (PBL), this student-centred proposal, carried out by a group of four graders in the English class, was interdisciplinary in nature as it linked contents from six areas: Maths, Arts and crafts, English, Science, Social sciences and Catalan.

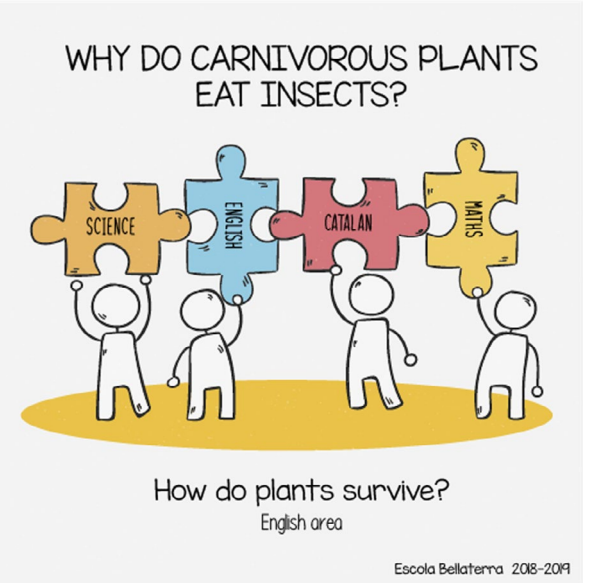

Figure 1. Front cover of the Power Point document created to present the project

Students in our school start taking care of a vegetable garden at the age of five. By the age of 10, growing plants is a relevant task for them and they are fully aware that plants are helpful not only because they have fundamental nutrients for us, but because they are essential for all of the ecosystems as they clean the air we breathe. Children are constantly making parallels between plants and human beings.

Project contents and learning objectives

Bearing in mind the fact that the project is interdisciplinary, contents dealt with are closely linked and related to most of the areas in the Catalan curriculum. They are listed in table 1 below, together with the target competences for each area of knowledge.

Skills /Subjects	Contents	Competence-based learning objectives
Numeracy/ Mathematics	Time and calendar	To identify mathematical concepts in everyday objects, paying special attention to the characteristics of 2D and 3D geometrical figures.
Fine Arts	Materials and forms	To manipulate plasticine to create 3D models. To express knowledge through drawings.
Autonomy, empowerment and entrepreneurship	Reaching agreements	To be able to imagine how to explain what they've learnt to other students. To develop creativity and teamwork skills.
Learning to learn	Making connections	To be able to interconnect knowledge in order to build a mind map.
ICT Literacy	The use of digital tools to express complex concepts in a mind-map. The use of digital tools for interpersonal and personal communication	To use Popplet to create a mind map. To use digital tools to communicate ideas and create multimodal texts.
Citizenship Education	Cooperation & solidarity	To develop ethical critical thinking skills linked to the establishment of connections between cause-effect and means-ends actions. To identify ethics and empathy values. To adopt a solidarity attitude towards the environment.
Social Sciences	The world around us: Plants' native habitats Different climates, different needs	To pose critical questions related to what plants need to survive. To locate different countries on a map. To understand the consequences of the climate linked to plants.

Skills /Subjects	Contents	Competence-based learning objectives
Literacy	Reading and writing short multimodal texts Understanding and producing short oral texts Asking and answering questions Recognising the need to know more than one language to communicate	English: To create an audio-visual text. To understand short oral texts. To make descriptions. To read short texts. Catalan: To create a written scientific text describing an experiment. To share knowledge about what one has learnt. Plurilingual competence: To determine which language should be used in each communicative situation.

Table 1. Overview of the project contents and learning objectives

Project Outline

Getting Started

Creative teachers often see PBL as a huge opportunity to engage all the educational community members (students and teachers, even families) in a marvellous learning adventure. After deciding the topic of the project (plants) with children, we brought a carnivorous plant to class and told them that second graders would get one too and would need advice from us to learn to take care of it. The objective was to trigger students' motivation to get the project started and help learners to design a good driving question to lead their inquiries. Getting the "wow effect" beforehand made things simple. Children were simply amazed by the fact that they were going to have a carnivorous plant in class and eager to discover how they survive.

During the first days, pupils shared their ideas on how to take care of the plant. They knew how to make a plant live, but this experience was different. Lots of questions were raised after they observed how the plant ate insects. They first read the label on the pot (see figure 2) to know the conditions that the plant needed to live. Then, students surfed the Net to find more for information.

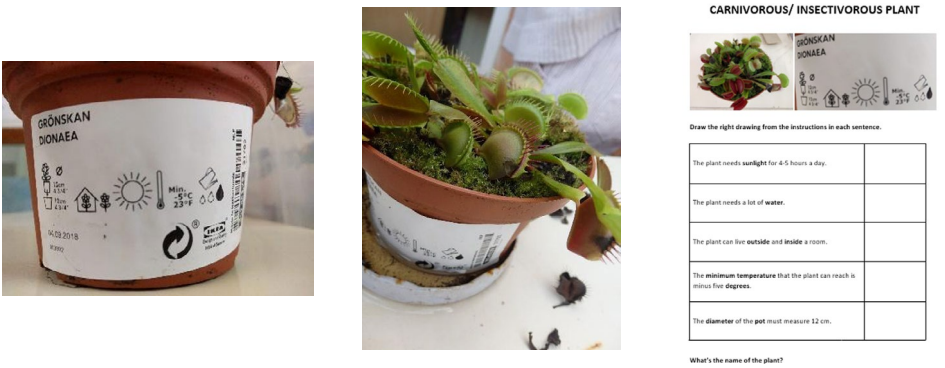

Figure 2. Shots of our carnivorous plant, its pot and the worksheet students had to complete

During their search, they had to find out the *common* and the *scientific name* of the plant, discover which its *native habitat* is, determine the *type of soil* that it needs, and learn to name specific *parts of the plant*. The worksheet also contained *instructions* (see figure 3) in English, supported by icons and drawings, that children had to read and understand to take good care of the plant.

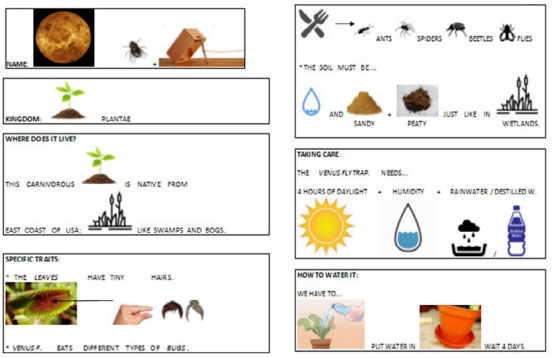

Figure 3. Instructions given the very first day the carnivorous plant got into the class

Implementing the project

With the help of their teachers, children decided to observe the Venus Flytrap (aka *Dionaea muscipula*) and investigate how plants survive. Following an enquiry-based methodology, students engaged in experiments, and through processes of observation and analysis they learnt complex scientific concepts such as adaptation to a habitat, digestion, water types, water cycle, nutrients, the periodic table, etc. It is important to highlight that the project was carried out through

English so students had to learn new vocabulary related to the topic and to create sentences using the present simple tense. In the Catalan class, pupils engaged in the process of creating distilled water for the plant and wrote about it (what water is, where it comes from, etc.). Moreover, they also learnt the water cycle and the periodic table elements essential for the carnivorous plant. Maths also played a key role throughout the project, as students wanted to create a model to show younger students how the carnivorous plant survives. For example, they focussed on numeracy when they counted the days the plant needed to digest an insect. They also had to decode the information about the diameter of the Venus Flytrap contained on the label of the original pot, before deciding the size of the pot they would need to repot it. At that point, they also had to figure out what ¾ of water meant.

Figure 4. Reading the instructions and repotting a new carnivorous plant

Before creating the video documentary, students had to produce two sub-products. Sub-product 1 was aimed at creating a mind map with relevant information about carnivorous plants. Sub-product 2 focused on the creation of a Venus Flytrap model to illustrate all the important aspects related to the plant's survival. Both sub-products were necessary to create the project's final product: a video documentary on our carnivorous plant (why there aren't carnivorous plants in "el Bosquet", the forest near the school, what and how often the plant eats, how the digestion process works, etc.) to illustrate how they live and how they should be grown.

Sub-product I: *Creating a mind map using ICT tools*. The tasks necessary to elaborate this sub-product were mainly carried out in the areas of English and Science, as pupils had to look for scientific information related to the plant. Specific scientific vocabulary was introduced through different worksheets with activities in which students had to match pictures and words. They were also asked to create a picture dictionary with the key words that they would need to use throughout the whole project.

First, pupils focused on learning basic and elemental information about the plant.

After some discussions about what we had also observed, as a group we came up with certain sentences that described what we knew about the Venus Flytrap. Then, students, in pairs, wrote down a scientific text explaining what they had had learnt about the plant.

Figure 5. Writing a scientific text cooperatively

Children also produced drawings of the plant (see figure 6). Amazingly, students' drawings were based, in part, on what they had learnt during the previous school years in the lessons devoted to take care of the school vegetable garden. Some of the children also illustrated how they imagined the plant looked like inside and related its digestion process to ours by drawing small stomachs in the stems. Drawing is a common tool used in our school to explain a process or a statement, because it helps students organise information to make it understandable for others. They are used to doing it from a very young age.

Figure 6. Scientific drawings based on children's representation of the plant's digestion process

Through the analysis of their drawings (some were similar, others were different), we focused on understanding the plant's digestion process from the start (when

they catch the prey) to the end (when an exoskeleton is left in its leaves). To do this task, we had to take a close look at a leaf, so we used a 'Motic loupe', a binocular loupe that allows users to take pictures of the objects observed and to project the images directly into a computer. With the loupe we could observe many things: digestive glands, exoskeletons, trigger hairs, three wings, etc. We read some information about the plant to be able to identify its parts. Then, we watched a time-lapse video related to the digestion process of a Venus Flytrap in which we could see the digestive liquid and the length of the process.

As stated previously, drawing is a powerful tool used commonly in our school in the Science, Maths or Literacy lessons, not only as an art technique itself, but also as a tool to understand processes and as a visual representation of our thoughts. So, students drew how the digestion process works to have their ideas clear.

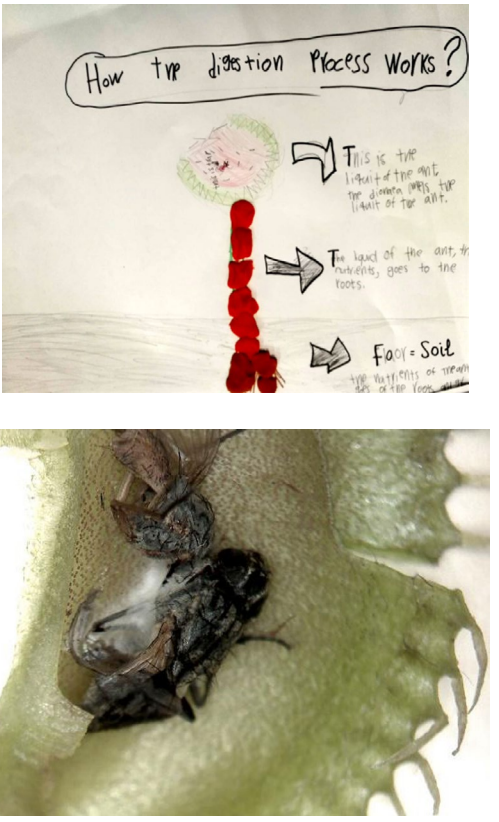

Figure 7. Digging into the digestion process

Afterwards, they watched a video from 'Doctor Binocs'[2] about the different types of carnivorous plants, first all together, and then in pairs. During the second

viewing, they took notes, focusing only on the types of carnivorous plants. Then, they created a collaborative poster (see figure 8) with some shots from the video. This was just a starting point, as this collaborative poster grew exponentially along the lessons and was used by children to produce their own with Popplet (a mind maps creator).

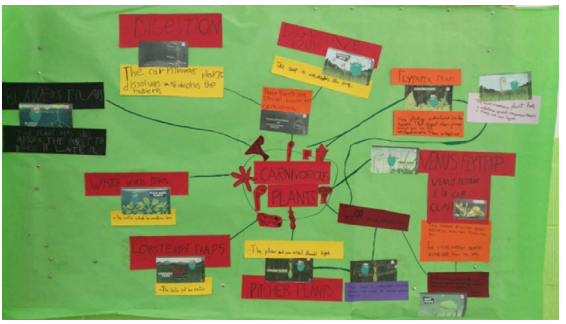

Figure 8. Shots of the collaborative mind map

After that, in the computer room, students created a more complex mind map using Popplet (see figure 8). Students had a template of a possible mind map and key words. In groups, students filled the template using the words they thought were essential to describe the plant: habitat, types, characteristics, preys, parts, etc.

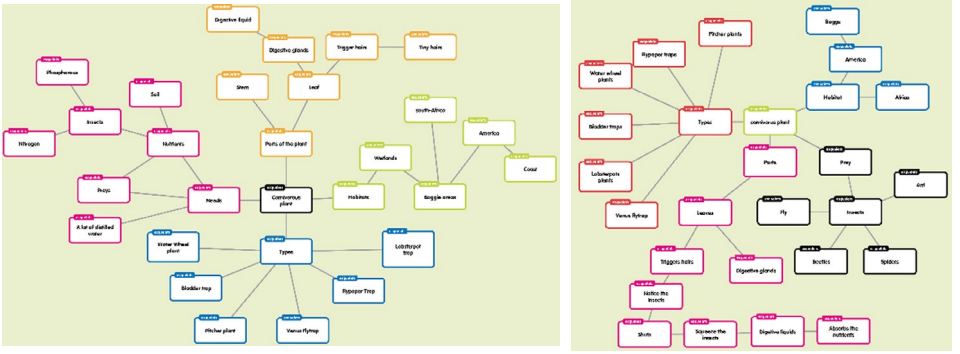

Figure 9. Shots of the Popplet mind maps

Sub-product II: *Creating a Venus Flytrap scale model made of plasticine*. Thanks to the elaboration of this sub-product, children developed teamwork skills and acquired the most important concepts related to the life of a Venus Flytrap. This hands-on approach helped students understand what happens in the inner body of a Venus Flytrap. To produce the scale model, pupils had to bear in mind all

they knew about the Venus Flytrap (sub-product I) and they had to decide how they would represent it to students who had not observed the plant. The model would later be used as support material to record a video documentary (the project's final product).

Figure 10. Creating the Venus Flytrap scale model

Final product: *Recording a video to explain what we know about the Venus Flytrap.* As we said earlier, the groups in second grade had also received a Venus Flytrap, so the video documentaries fourth graders had to produce were targeted at them. Fourth graders produced the documentaries in groups, so there were a total of six videos. In them, fourth graders let second graders know what they had learnt about the Venus Flytrap and gave them instructions to help them take care of their plant. The documentaries presented more or less the same information but some groups gave more detailed descriptions than others.

Figure 11. Screen shot of one of the video documentaries used to explain to a 2nd grader how to take care of the plant

Presenting the project final product

The various videos created were later projected along the school corridor during the days in which the school held an exhibition entitled "Discovering our environment". Other groups in the school had learnt about trees or about the medical properties of some plants. The video documentary on the carnivorous plant served to illustrate the whole community how plants adapt to their environment. As in our school we follow the PBL approach, for us it is important to establish links between what students in the different grades are learning, and between school contents and real life. The exhibition followed these two objectives.

Concluding remarks

The project demonstrates that learning complex and abstract scientific facts in English is possible if tasks conducted for such a purpose are meaningful, functional and real. Pupils were at the centre of the learning process, were given responsibilities and had a real motivating objective to fulfill: helping younger schoolmates take care of a Venus Flytrap. The experience was so fulfilling for them that a few have a carnivorous plant at home. During the project, students' competence in English improved considerably and some of the students are no longer afraid of using this language to communicate their ideas and thoughts.

Acknowledgements

We want to express our gratitude to the A+ Project group leaders for inviting us to write this article. As teachers, sometimes we tend to think that what we do at our schools is not important and we need empowering tasks like this one to realise we dreamt big and managed to conduct a good project.

We want to give our special thanks to our colleagues from Escola Bellaterra who are always eager to help us. This project was successfully developed thanks to their enthusiasm and support.

Notes

1. Time-lapse video on the digestion process of a Venus Flytrap: https://www.sciencemag.org/news/2016/01/video-venus-flytrap-counts-avoid-being-tricked
2. Video on the different types of carnivorous plants: https://www.youtube.com/watch?v=4yvUjwt2-jl