

6930 Instructional Design Framework for Interactive Learning Project

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Topic/Content

The topic of our project is *Discovering the Environment of Chile*. The content incorporated into the project will be information about the various types of environments in Chile, animals that are indigenous to Chile, Spanish language content that corresponds with the environments and animals, and research robots that would be useful to study the rainforest area of Chile.

Purpose

The purpose of this project is to incorporate Spanish, Biology, and Technology Ohio content standards into a common lesson for our students. Spanish students need to develop awareness of Spanish speaking areas and learn vocabulary relating to that region. Since there are varied environments within Chile, it is an ideal location to help the biology students review biome characteristics and explore how multiple biomes can be located in such a small area of a continent. Students will also practice utilizing scientific names. The technology portion of the project is designed to review the types of robots and apply their use to a realistic situation. Demonstrating that the information studied in class ties together and actually pertains to the real world by integrating our three subject areas will increase the students' appreciation and retention.

Target Audience/Learner Characteristics

Our target audience is a combination of students in 10th grade Spanish, 10th grade Biology, and 10th grade Technology. In general, the learners range in age from 14-16 and are in classes of approximately 25-27 students. The gender ratio is approximately 1:1. While several students are on IEPs, they are mainstreamed and do not require any modifications except extended time for assessments. This unit is intended to be incorporated toward the end of the school year so students have built the necessary understanding of the respective subjects to complete the project.

Spanish students participating in this project are at least at the end of level 1 and have established a baseline understanding for Spanish language grammar and vocabulary. They have studied other Spanish speaking cultures as well as nouns covering animals in those geographical areas. Biology students have already explored the characteristics of different biomes and will be able to relate those features to both the Spanish language and how robots would be appropriately and safely used in the rainforest biome. The technology students, having a general background in the various types of robots and their uses in society, have reported on the applications of the robot types in the past. Throughout past science and technology classes all participating students have considered the impact of technology on the environment and human lives.

Instructional Goals/Content Standards

Instructional Goals:

- Students will be able to locate Chile on a map
- Students will be able to explain environmental characteristic of Chile
- Students will be able to identify native animals using target language
- Students will be able to identify scientific names of organisms in English
- Students will be able to explain how robots are used in an exploratory manner

Spanish Content Standards:

Communication: Communicate in languages other than English.

K. Present information orally, signed or in writing.

Connections: Connect with other disciplines and acquire information.

A. Investigate and report on concepts from across disciplines.

Biology Content Standards:

F. Explain the structure and function of ecosystems and relate how ecosystems change over time. (09-10)

15. Explain how living things interact with biotic and abiotic components of the environment (e.g., predation, competition, natural disasters and weather). (10)

16. Relate how distribution and abundance of organisms and populations in ecosystems are limited by the ability of the ecosystem to recycle materials and the availability of matter, space and energy. (10)

Technology Standards (Grade 10)

1.C.3 Define examples of how technological progress is integral to the advancement of science, mathematics and other fields of study.

2.A.4 Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning and workplace needs.

2.B.1 Explain how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision- making (e.g., satellites can be used to monitor wetlands in order to control disease spread by mosquitoes).

2.B.2 Understand that the appropriate design of technological devices and systems maximizes performance and reduces negative impacts on the environment (e.g., design vehicle components for ease of recycling after use).

Description of Media

The project, as a whole, will be delivered through a series of interlinked web pages. Links to external sites will also be used. As the students work through the pages of our project, they will access internal links to audio, video, and evaluative sources. Audio will be utilized within the project to provide accurate pronunciation of Spanish words and scientific names, allowing the students the ability to repeat them as many times as necessary. Video will be used to review robot types and applications and to address the benefits and drawbacks of research robots. All graphics being used within the project web pages accurately portray the environments and organisms of Chile. Robot images incorporated represent realistic versions of what could be used in the rainforest environment. Interactive quizzes will be utilized so that immediate feedback can be provided for the students. Text will be used to convey directions, important concepts regarding the environments and organisms of Chile, and robot data.

Content Sequencing

As instructors work on creating an interactive learning project, they need to account for content sequencing that will ensure students transition through the lesson smoothly and receive feedback. Material needs to be presented so the students have adequate information to progress through the lesson. Students need to be given guidance from the instructor and through multimedia resources in order to fully understand the concepts. The chance to practice using the information in the lesson needs to be provided, as well as feedback, so the students know what they are comprehending compared to what they still need to work on. Once the students have been through the presentation, guidance, and practice, the assessment can take place to evaluate learning.

During the Spanish portion the students will be able to observe images and listen to the pronunciations for the necessary terminology. After they practice, they will use an assessment to provide feedback as they identify the correct Spanish terminology utilized during their lesson. Similarly, the biology portion will contain images and the pronunciations for the necessary scientific names. An assessment in this section will provide feedback as they identify the correct biological terminology demonstrated within the lesson. For the technology portion, the students will watch a video to review robot types. Then they will utilize a spreadsheet, which contains details of various robots, to select which robot they would use if they were going to research the environmental conditions of the Chilean rainforest. They will also have the option of combining their characteristics to create a more ideal robot for the surroundings. The assessment in this portion of the project will provide feedback as students select what they feel would be the best robot characteristics in the rainforest. In addition to the interactive assessments throughout the project, the students will also be further evaluated within each classroom setting upon completion of their respective units of study.

The five types of learning identified by Gagne have also been taken into consideration. Our students will demonstrate verbal learning by demonstrating the ability to state the correct Spanish terminology and scientific name for each organism and discuss the reasoning behind their robot selection. Problem solving will be utilized when determining the best type of robot to be used for data collection within the Chilean rainforest. Concept learning will occur and be expressed through students being able to classify organisms as members of various environments and through their ability to identify various types of robots and their uses.

Learner Control

As instructors are well aware, the learners need to feel some element of control during the lesson. The student involved in this project will have several opportunities to control their learning. First, the instructors have no requirements as to what portion is completed first. So, depending on what topic the students prefer, they may decide to get their least favorite out of the way and save the best for last, or vice versa. Students can flip back and forth between pages as many times as they need or want, too. Within each portion of the lesson students also have the ability to control the audio and video portions in case they need to listen to pronunciations or watch concepts repeatedly. Finally, interactive quizzes providing feedback also offer an important element of learner control. The students can practice and test their knowledge and reinforce accurate information at their own speed and without anyone else being aware of any mistakes they make.

Design Considerations

During the design of an interactive web-based lesson there are many factors that must be considered. First and foremost, the availability of the necessary technological resources must be considered. If the equipment students use does not have the necessary hardware, software, and internet access to successfully complete the project, it will be a waste of time. Other questions exist regarding the equipment. Do students have access to their own computer or will they have to share? Will the students have headphones so they can hear the pronunciations of the Spanish words and scientific names clearly? Will filtering issues prohibit any of the lesson's features to be available to students? Can students access the project from home or during other times at school if they need the reinforcement? Instructors must also make sure that all students have submitted their Acceptable Use Policy sign off sheet.

After the adequacy of resources has been addressed, the instructors must consider design features that will impact the project. This project, in particular, uses a wheat-colored neutral background to enhance picture contrast the colorful environment and organism images. Black text will be used to provide good visibility against the neutral background. This text will be aligned left within the paragraphs. Repetition is demonstrated through the consistent placement of the menus on the left side of each page and the heading at the top of each page. Internal, external, and email links will be identifiable by a change color when rolled over. Hot spots will be used on images to help associate those images with the material they represent.

Due to the nature of the lesson, which includes pronunciations, clarity of the audio is of utmost importance and will be reviewed to make sure it is understandable. The sizes of images, audio, and video have also been addressed to ensure quick loading of the pages.

During the design of the project, the instructors felt that including the vivid and attractive images would appeal to the students and increase interest. Incorporating audio and video, rather than just text and images, also helps to increase student interest and motivation since different learning styles are addressed. Utilizing ungraded assessments that provide feedback reduces student anxiety, which also helps sustain motivation. Finally, providing a large amount of learner control helps maintain interest and motivation among the learners.