Exploring Multiple Ways of Studying Clouds for Blind and Sighted Students Alike

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Abstract

This project explores multiple ways of studying clouds that can be used by blind and sighted students alike. First, the use of an app called “Be My Eyes” to participate in the NASA GLOBE CLOUD GAZE citizen science program will be discussed. Then, the development of a tactile cloud identification chart will be illustrated. Finally, the benefits of adding audio description to clouds’ science videos will be highlighted.

Research Question

How can blind and sighted students learn about clouds alongside each other?

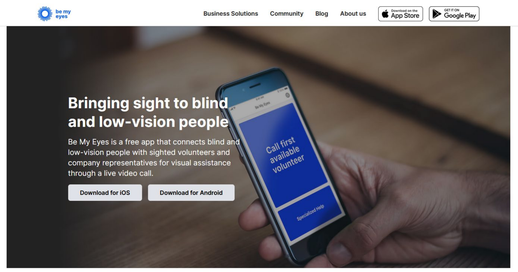
Introduction

Clouds have a powerful impact both on our local weather and the Earth’s climate system, playing a very important role in controlling Earth’s energy budget and long-term climate. However, not all clouds affect Earth’s temperature in the same way. Different types of clouds absorb or reflect the Sun's energy. Therefore, studying clouds is essential. However, science isn’t always as accessible as it should be. When people describe clouds, they usually describe them as white and fluffy, and use cotton balls to represent what a cloud looks like in activities. When blind students learn alongside their sighted peers, they may come to the conclusion that there are only a couple types of clouds. But there are more than just white and fluffy clouds.

Inspired by Universal Design for Learning guidelines, this project aims to provide multiple means of engagement, representation, action and expression, to broaden participation of diverse students in the study of clouds.

Methods

1. NASA GLOBE CLOUD GAZE is a NASA funded project aimed to help NASA better understand the effect clouds are having on Earth’s climate. Citizen scientists help identify different types of clouds shown on photographs submitted by other citizen scientists through the GLOBE program. “Be My Eyes” is a volunteer-based app, which helps the blind with tasks which make sight useful. For this project, Be My Eyes’ sighted volunteers described the main features of the clouds shown on the NASA GLOBE CLOUD GAZE screen for blind users, who in turn used their scientific knowledge to identify clouds.



1. A tactile cloud identification chart was built with common arts and crafts materials to represent most cloud types. It represents clouds based on their visual look.

1. Audio description of clouds’ science videos helps provide access to visual information. In the example explored in this project, a video of a scientist illustrating how different satellites help study clouds was used. A sighted student wrote a script describing what was seen on the screen while the scientist was speaking; then another sighted student used a free text-to-speech solution demo named “Nuance” to record a voiced version of the script.

Results

1. Multiple trials of NASA GLOBE CLOUD GAZE photographs’ identification were performed with the use of the “Be My Eyes” app. Sighted volunteers described what they saw on their screen, and students who are blind used their scientific knowledge of clouds to identify what kind of cloud was pictured on the screen. Three examples of the collaborations are available by scanning the following QR Code.

1. The tactile cloud identification chart shown on the image provides a representation of the visual aspect of clouds that we can use to classify clouds.

1. The video “Clouds & Weather” by Kristopher Bedka was audio described, and it can be accessed with the following QR Code.

Discussion

The “Be My Eyes” app proved to be a successful collaboration tool that let sighted volunteers explore visual features of clouds that a student who is blind could use to identify the NASA GLOBE CLOUD GAZE photographs used by scientists.

A tactile cloud identification chart offers an alternative route to access and to represent knowledge. Engaging in the creation of a tactile cloud identification chart can help both sighted and blind students remember the features we use to classify clouds.

Sighted students working on describing the visual information of the videos benefit from this exercise because they need to pay very close attention to the visual information on the videos, while developing their verbal and technical skills. Blind students benefit from this exercise because they get an alternative route to access the visual information. Both blind and sighted students gain a deeper understanding of the science of clouds.

Conclusions

Given the important role clouds play in the local weather and in the climate system that affects everyone on Earth, we must all find alternative ways to make the science of clouds accessible to all students.With the help of citizen science collaborations, tactile materials, and audio described videos, both blind and sighted students can reinforce their learning about clouds. They can strengthen sighted students’ knowledge while helping blind students gain information about clouds they may have not known before. The blind and sighted students can work together to ensure that they both learn about clouds and can challenge what they may and may not know about them as well.

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