Lesson 5: Big, Open, and Crowdsourced Data

Overview

Students will complete a jigsaw of three different topics at the intersection of data, computing, and global impacts. These are topics, big data, crowdsourcing, and open data. Students will watch videos or listen to audio recordings about the different topics. Groups will each complete an activity guide about their topic before having individuals from each group share out their findings. The lesson concludes with a review of key points.

Purpose

This lesson zooms back out from the data analysis process to the ways that is applied in a wide variety of contexts. Students learn how big data, open data, and crowdsourcing apply this process in interesting ways that cleverly modify this process. For a summary of key points of this lesson review the key takeaways in the slides. In short however:

- Big data: "Collect huge amounts of data so we can learn even more from it"
- Open data: "sharing data with others so they can can analyze it"
- Crowdsourcing: "collecting data from others so you can analyze it"

This lesson further builds towards the following lesson on machine learning which explores a different application of the data analysis process.

Standards

Full Course Alignment

CSP Conceptual Framework

▶ **DAT-2** - Programs can be used to process data, which allows users to discover information and create new knowledge.

▶ **IOC-1** - While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences.

CSTA K-12 Computer Science Standards (2017)

▶ **DA** - Data & Analysis

Objectives

Students will be able to:

- Define and explain the impacts of crowdsourcing, crowdfunding, and citizen science
- Explain the impact of open data on scientific research and discovery
- Explain why in some contexts large amounts of data need to be analyzed in parallel and scalable systems

Preparation

- Ensure students will be able to access all of the videos / articles linked in the lesson.
- Review at least the key takeaways and ideally some of the content from each topic to ensure you understand how these topics relate to what students have studied in previous lessons.

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the teachers

- **CSP Unit 9 - Data** - Slides

For the students

- **Big, Open, and Crowdsourced Data** - Activity Guide

Agenda

Warm Up (5 minutes)

Activity (35 minutes)

Wrap Up (5 minutes)

Teaching Guide

Warm Up (5 minutes)

Discuss: *With a partner review the data analysis process and for each step talk through:*

- What is this step and why is it important?
- Where have we done this step together?
- What could go wrong if you do this step poorly.

Have students brainstorm silently on their own, then have them share with neighbors, and finally have them share out with the room.

Discussion Goal: This is designed entirely to be a review of concepts students have previously covered and doesn't foreshadow the lesson of the day. If you feel confident your students are comfortable with this process already then quickly move on to the main activity of the day.

Remarks

> Today we're going to be looking at a lot of ways that data is being used in exciting and innovative ways. We're going to stop looking just at the data in App Lab and start thinking about the impacts data has on our lives. Along the way we'll talk about how the data analysis process looks different or has been manipulated in different contexts in order to answer questions or make decisions that matter.

Activity (35 minutes)

Group: Place students in pairs

Distribute: Give each pair a copy of the **Big, Open, and Crowdsourced Data**

Teaching Tip

Complete the Activity Digitally: Students will have a much easier time accessing articles and videos if they complete the activity digitally. Alternately students can complete printed versions of the activity guide but still access links through the digital versions.

Supporting the Jigsaw: In this lesson students do a jigsaw of a number of different topics. Students will need access to computers and should spend roughly 10 minutes in each group listening to audio / video content. During this period circulate the room encouraging them to focus on the questions they've been asked to respond to. This will also help you anticipate or even specifically ask different students to participate during the discussion.

With a partner:

- Choose one of the topics
- Watch the related videos / listen to the podcasts

- Take notes and be ready to share responses to the questions on your activity guide

Discuss: *Have members from each topic share the conclusions from their watching and research. Make sure that students from each group have time to share*

- What the topic is
- The key vocabulary they were responsible for researching
- How this concept uses or modifies the data analysis process
- Examples of the problems this technique is being used to solve

Wrap Up (5 minutes)

Review: Review key takeaways on the slides

Assessment

Assess: You can collect and evaluate students' activity guides

1 **Check For Understanding**