Lesson 11: Interpreting Data

Overview

Question of the Day: How can patterns in data help us make decisions?

Students begin the lesson by looking at a cake preference survey that allows respondents to specify both a cake and an icing flavor. They discuss how knowing the relationship between cake and icing preference helps them better decide which combination to recommend. They are then introduced to cross tabulation, which allows them to graph relationships to different preferences. They use this technique to find relationships in a preference survey, then brainstorm the different types of problems that this process could help solve.

Purpose

In the previous lesson, students used data visualization to help them make decisions using a single data source (toppings on a pizza). In this lesson, they learn how to find relationships between variables using cross tabulation in the responses to different survey questions. Determining how answer choices relate to each other will allow them to make predictions about users based on previous responses. In the final project, they will use this same type of analysis to help them to design an algorithm for their recommendation generator.

Assessment Opportunities

1. **Visually organize data to highlight relationships and support a claim.**

   Activity Guide: The charts on the left side of the page should be filled out to reflect the given data. (See exemplar)

2. **Use cross tabulation to find patterns and relationships in data**

   Activity Guide: The relationships on the right side should demonstrate accurate analysis of the frequency table. (See exemplar)

Agenda

Warm Up (5 minutes)

Journal

Objectives

Students will be able to:

- Use cross tabulation to find patterns and relationships in data
- Visually organize data to highlight relationships and support a claim.

Links

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

For the teachers

- **CSD Unit 5 - Data & Society** - Slides

For the students

- **Interpreting Data** - Activity Guide
- **Interpreting Data** - Resource

Teaching Guide

Warm Up (5 minutes)

Display: As students enter, have the Warm-Up slide displayed on the board

Remarks

> Here are some more survey results, but this time instead of looking at pizza toppings, we're looking at cake and icing flavors.

Journal

Prompt: If you could choose one cake with icing, what would it be? Why?

Share Out: Have students share their choices and why.

Discussion Goal

There is no one recommendation that is correct, but make sure students understand that although chocolate was the most popular cake flavor and cream cheese was the most popular icing flavor, only one person chose a chocolate cake with cream cheese icing.

It's not enough to look at the two answers in isolation. For example, if two cakes are chosen, chocolate cake with chocolate icing and carrot cake with cream cheese icing is much better than chocolate with cream cheese and carrot with chocolate. Looking at the relationships between answers helps to see which choices go well together.

Remarks

> Sometimes it's not enough to look at just one type of data. You need to look at how different types of data relate together. Today, we're going to look at one way that we can find relationships in data to help us solve problems.

Question of the Day: How can patterns in data help us make decisions?

Activity (35 minutes)

Group: Put students in groups of 2-3.

Distribute: Give each group a copy of the activity guide and data resource.

Teaching Tip

Even though each of these sheets is only one page, it's best to print them separately, so that students can look at the survey results while they fill in the chart.

Remarks

> For our cake and icing example, there were only eight results, so we could look at the answers and get a good idea of the relationships between them. In this survey, we have a lot more results, so we're going to use a chart to count them up.

Interpreting Data Activity Guide

Read the instructions as a class, then direct students to look at the first table on the activity guide.

Slides: Display the Finding Relationships Example slide then click-through the animations in the slide to model how to fill in the the chart with the class. For each row of the survey results, add one tally to the chart. After modeling the first five rows, allow students to complete the rest of the chart on their activity guide.

Prompt: If someone likes cats, what activity is probably their favorite? What is one more interesting relationship between favorite pet and favorite activity?

Share-Out: Allow students time to write down their answer, then check with their group before sharing out as a class.

Discussion Goal

Students should use the chart to find relationships between the preferences so that they can differentiate between subgroups. They may note that although people who chose cats tended to choose art, people who chose dogs tended to like music.

Make sure that the class produces examples of the predictions working in both directions (pet to activity and activity to pet). For example, people who like video games are likely to prefer dogs.

Do This: Direct students to complete the worksheet in their groups.

Teaching Tip

Students may be tempted to think of reasons that different preferences are related. Remind them that there is nothing in the survey that helps them to understand **why** a relationship is true, only that the relationship exists.

The next chart relates pets and sports. Students fill out the chart, then find two interesting relationships between pet preferences and sport preferences. The students repeat the activity for the last chart on activity and sport preferences.

Share Out: Before moving on to the reflection question, give students a chance to share out anything interesting that they learned about the relationships between the different preferences.

Prompt: How could knowing relationships between these types of preferences help you to address a real-world problem?

Give students time to answer this on their activity guide, then have students share their thoughts with the class.

Discussion Goal

Although there is no "right" answer to this question, students should realize that finding relationships between preferences may help them to predict one preference from knowing another. This could be for a recommendation engine, to place ads, or to promote particular social media posts.

Wrap Up (5 minutes)

Journal

Prompt:

Teaching Tip

This journal prompt looks forward to the end of chapter project, when students will use this process to solve a data problem of their choosing.

1. What's another data problem you could think of that you could use this method to help solve?
2. What questions would you ask?
3. What relationships would you look for?