Developing a climate change survey for use in a Native American community

Lesson overview: While climate change is impacting communities across the globe, some are facing more hardships that others. Many Native American communities, for example, are facing severe impacts to their cultures and economies in addition to their natural resources. With impacts likely to continue, many tribes agree that it is imperative to develop and implement long-term climate change adaptation strategies for their communities. A necessary early step in planning processes is to gauge community perspectives to ensure that policy actions will be supported by the people they affect. A community survey is the ideal way to accomplish this.

In this activity, students will learn about basic survey design and methodology using the issue of climate change and Native American communities. Students will become familiar with basic social science concepts and will develop their own "mock survey". At the end of the activity, the class will compare their climate change survey to one that has been recently conducted in a Native American community.

Learning outcomes: After completing this lesson, students will be able to:

- Discuss climate change-related issues affecting Native American communities
- Describe elements of basic survey questionnaire design
- Explain concepts related to population sampling

This lesson requires previous instruction related to climate change. Before implementing this activity, instructors must ensure that students have an adequate understanding of basic climate change concepts and relevant current issues. Students will also need to read supporting materials in advance to be aware of climate change impacts specifically related to Native American communities.

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Introduction: We've spent several class sessions discussing climate change, and recently we've learned how it is affecting Native American communities. Many tribes today are taking steps to develop and implement long-term climate change adaptation plans. Before doing so, wouldn't it be wise for leaders to know what community members think? Policy experts agree that government leaders need to understand the perspectives of "the people" if they hope for policy actions to be supported. A community survey is an ideal way to gauge community perspectives, but there are several important considerations for a survey to be reliable. In this activity we're going to learn some basic techniques related to survey design and then create questions for a climate change survey to be conducted in our community.

Review: For this activity, you should have examined the following assigned readings:

- Regional climate trends and scenarios for the US – National Climate Assessment Part 3: Climate of the Midwest (NOAA, 2013)
- Facing the Storm: Indian Tribes, Climate-Induced Weather Extremes and the Future for Indian Country (National Wildlife Federation, 2011)
- Potential Consequences of Climate Variability and Change for Native Peoples and Homelands (Houser et.al., 2011)

Part One: Impacts from climate change. Working in pairs, think about the following questions based on our readings and discussions, write a short response for each:

1. What environmental impacts from climate change are expected to occur in the Great Lakes region?

2. How could Native American communities in the Great Lakes region be specifically affected by climate change? Describe two examples for each of the following:

   a. Environmental impacts

   b. Cultural impacts

   c. Economic impacts

3. Thinking specifically about the Keweenaw Bay Indian Community (KBIC), identify three more climate-related concerns that you would expect to exist here.

Part Two: Translating expected issues into useful survey questions. A well-designed survey will include questions that, when answered, will allow us to test research hypotheses. We've already learned how to create testable hypotheses. Let's start by making a list of factors that we think could be related to climate change concerns among KBIC members. Describe three factors below. For now, don't worry about demographic factors, which we'll discuss later.

   Factor 1:

   Factor 2:

   Factor 3:

Each of the factors you listed above can be considered "subject areas" that your survey will examine. Now let's come up with a list of related questions in each subject area that we'll test relationships with climate change concerns.

> **Example:** Let's say you listed one of your factors as "interactions with the environment" (or something similar). If you did, you would be suggesting that a person's engagement with the outdoors could be related to climate change concern. How would you then phrase that as a hypothesis? What questions would you ask about a person's interactions with the environment to be able to test the hypothesis?

Before you come up with a list of potential survey questions, let's talk about how to structure survey questions. Let's try to avoid "yes/no" questions because answers do not provide a lot of depth. We not only want to know that a respondent feels a certain way, we want to know *to what extent* they feel that way.

A common way of formatting survey questions is the *Likert scale*. You've probably seen surveys formatted this way. Using the Likert scale, we can provide statements and then ask respondents to indicate the extent to which they agree (or disagree) with the statement. We can also attach numerical values to each possible answer to allow advanced statistical analysis later. Here's an example:

> Climate change could negatively affect my outdoor recreation.
> 1. Strongly disagree
> 2. Somewhat disagree
> 3. Neither agree nor disagree
> 4. Somewhat agree
> 5. Strongly agree

Using this formatting, create <u>five</u> survey questions under each subject area you described above. When all groups are ready, we'll share ideas and offer each other suggestions.

Part three: Sampling and survey reliability. Now that we have a list of survey questions, we need to think about how to effectively implement the survey. Currently there are about 800 enrolled KBIC Tribal members living in the Baraga County area. Would it be realistic to survey them all? If not, how would we choose who to survey?

Just like in biological studies, social scientists can conduct a **sample** of the population to draw conclusions about the population as a whole. Election polls are a good example of a sample. *If conducted properly*, a sample of the population could effectively represent the whole community.

However, for any sample to be accurate it must be **representative.** For example, if you want to know what people in the area think about a certain subject, you wouldn't want to ask only your friends. Characteristics of the sample must reflect characteristics of the entire population. Below, identify three examples of poor sampling techniques that could lead to inaccurate conclusions:

Sampling error #1:

Sampling error #2:

Sampling error #3:

Ultimately, the best way to ensure a sample is representative is that it be **random.** In a random sample, all people in the population have an equal chance of being surveyed. A truly random sample would be like putting all 800 names in a fishbowl and drawing names. Could there be an easier way to generate a sample? Write an idea below and we'll discuss everyone's ideas as a group.

My sampling idea:

What about sample size? This can be a subjective question, but the larger the sample size the more likely the sample is to be representative. Larger sample sizes result in greater **statistical power.** However, there are reasons that survey sample sizes must be limited. Below, name three reasons why we may be limited with how many people to survey:

Reason #1:

Reason #2:

Reason #3:

Reflection questions from this activity:

Now that you have a survey ready to go, discuss how you would distribute it to the community (keeping in mind everything you just learned about sampling). Think about the benefits and drawbacks of survey methods that you're familiar with.

What response rate would you think is acceptable? What steps could you take to increase the response rate?

How would you effectively share the findings from the survey? Keep in mind that an important reason for conducting a survey is to uncover valuable information and share it with those who would benefit.