Designing Samples

The Student Government at Central High School wants to determine which activity students would most enjoy: a dance, an ice cream social, a carnival, or a movie night. The SGA has one week to survey students and gather the input it needs to make a decision. Because Central High has a large student body of over 2,000, contacting each student is not reasonable, so members of the SGA agree to contact a sample of students.

1. Several students have ideas on how to gather this information. Consider each of the following suggestions. Comment on the advantages and disadvantages of each method.

      a.   Sally suggests that the thirty Student Government members should vote on which activity is most favorable.

      b.   Anthony suggests that each member ask five friends which activity they prefer. Therefore, 150 students would be sampled.

      c.   Jae Hi suggests placing a comment box in the cafeteria, so that any student can participate in the sample.

      d.   Antoine thinks that the SGA should select several teachers at random and survey students in their homeroom.

      e.   Melanie knows that the computer in the main office can select students at random who can be included in the sample.

2.   Describe a *different* method that could be used to generate a sample of Central High students to vote on which activity they prefer.   Use what you know about sampling to justify your answer.

3.   For each of the following sampling methods, identify the groups in the population that are *underrepresented*.

   a.   To obtain a sample of households, a consumer reporter dials numbers taken at random from a telephone directory.

   b.   A car manufacturer wishes to survey a sample of drivers, so he randomly selects the names of car owners from a list of vehicle registrations.

   c.   A college professor wants to know what percentage of young adults, ages 18 to 22, consider education a top priority. He obtains a list of all students on campus from the registrar and randomly selects names from the list.

   d.   A radio station wishes to examine the proportion of its listeners who voted in the last presidential election. They conduct a poll by asking listeners to call the station.

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Answer Key

1.   a.   The opinions of the Student Government members do not necessarily reflect the opinions of the entire student body, so the sample would most likely under-represent many groups of students in the school. Although the members could make a decision quickly by casting their own votes, this technique may not fairly reflect the views of all students.

         b.   Selecting 150 students will certainly generate a large enough sample, but again, the sampling design may systematically favor the views of certain groups of students. This technique may not fairly reflect the views of all students.

         c.   To include in a sample only those that volunteer, the student government may get only the opinions of those who feel very strongly about certain activities. This technique may not fairly reflect the views of all students, although it is a very convenient method for collecting data.

         d.   Antoine's idea to select teachers at random is a good one. However, not all groups of students will have the same opportunity to be included in the sample. For example, it's possible that all of the school's gym teachers are selected, therefore only students taking gym will get to vote. This technique may not fairly reflect the views of all students.

         e.   Selecting students randomly is the best technique because it gives each student an equal chance of being selected. However, random samples are often very difficult to obtain without the use of a computer or other random device.

2.   Answers will vary. Samples should be large and selected randomly. For example, each student could receive a raffle ticket or other type of ticket stub with unique numbers. Place all tickets in a box a mix them thoroughly. Draw a handful of tickets (between thirty and fifty should be plenty) and ask the students with these ticket numbers to participate in the survey.

3.   a.   Not all phone numbers are listed in a telephone directory, so households with unlisted numbers will not be included in the sample. Also, households without phones will not be included. Some households have multiple phone lines, which increases the chances of being included in a sample.

         b.   Not all drivers own vehicles or have vehicles registered in their names. These drivers (for instance, teenagers) would be excluded from the sample.

         c.   The professor is only selecting the young adults at his university. Young adults not attending school or attending other colleges are excluded from his survey.

         d.   Not all of the station's listeners will be listening at the time of the poll. These listeners won't have the opportunity to be included in the sample. Voluntary response samples often exclude listeners with moderate views or opinions.