

FROM TOMATOES TO CHOCOLATES

Teaching conservation students how to take a representative sample



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Background

The inspiration for this assignment came from the **International Summer School on Communication and Teaching Skills in Conservation and Science**, a two-week program organized by the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM). Through a series of engaging assignments and thought-provoking lectures, this workshop explores existing and alternative approaches to teaching and communicating conservation and science.

The author of the poster participated in the 2017 edition of the Summer School. One of the most entertaining and memorable assignments included in the program focused on the selection of representative samples. It was devised by José Luiz Pedersoli Jr., one of the workshop tutors, and Katriina Similä, workshop moderator. **The assignment served to illustrate teaching for conceptual understanding.**

The original assignment

The participants were taken to a fruit and vegetable market and divided into small groups. They were then asked the following questions: (1) What is the average weight of the tomatoes in the market? (2) What is their average pH?

Each group was given a small amount of money and 45 minutes to devise a sampling strategy and collect samples. The time and budget limits were intended to remind the participants that every project has constraints that affect its performance.

The groups were also asked to make an educated guess as to the results *before* and *after* seeing the tomatoes.



At the market, each group took a representative sample. This was not an easy task as there were many stalls, and a wide variety of tomatoes was offered. Purchasing one or two tomatoes of each type required good negotiation skills. Communication with the vendors, who mostly spoke only Italian (the workshop was taking place in Rome), was also a challenge.

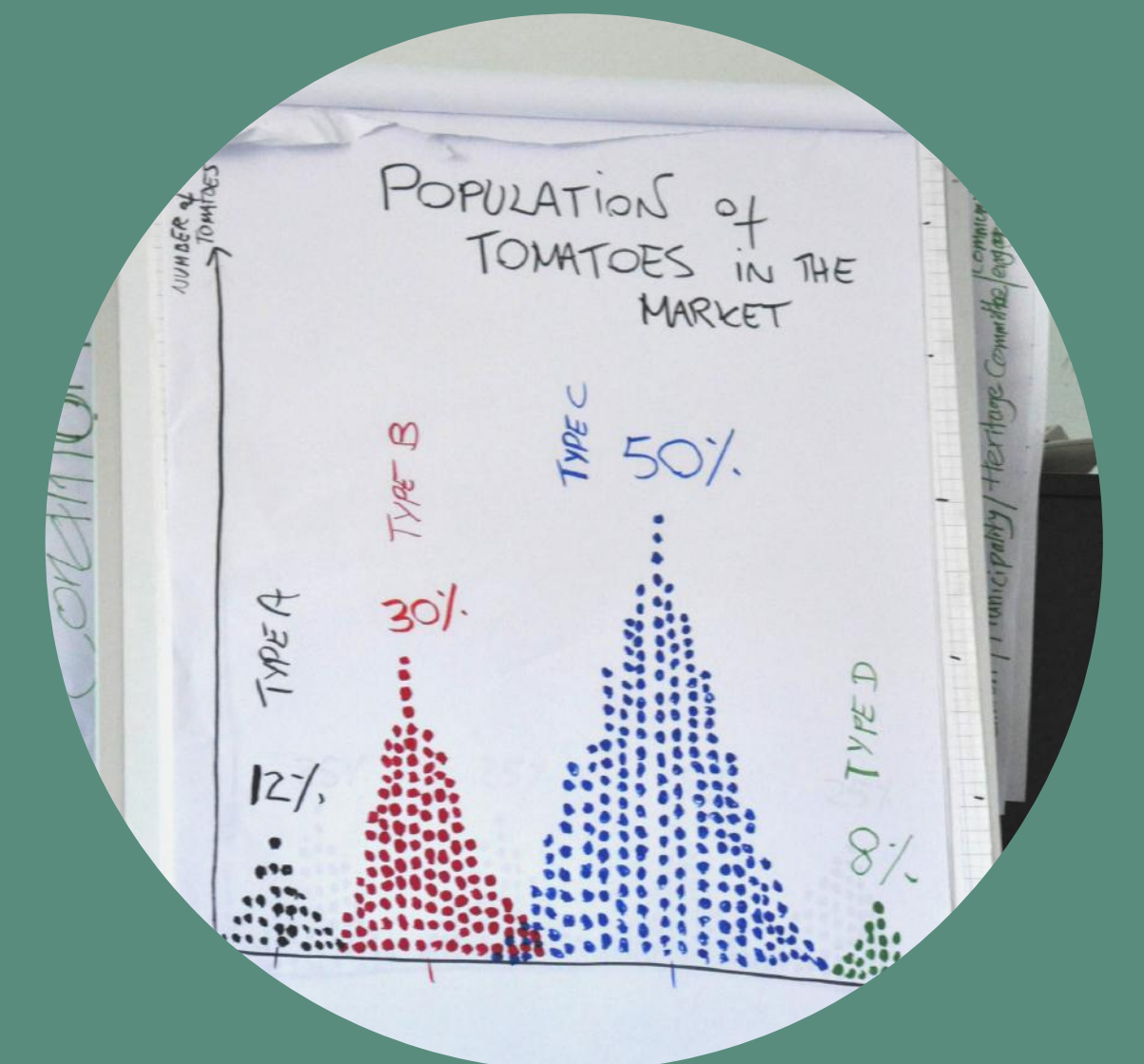


The measurements of weight and pH were carried out in the ICCROM laboratory. Each group weighted its samples on a laboratory balance, and recorded the readings on a report sheet. To measure the pH of the sampled specimens, pH-indicator strips were used. Those results were also recorded.



After making calculations to obtain an average of weight and pH of their representative sample, each group outlined its sampling method and results on flip charts.

The flip charts were posted to the classroom walls, and each group had a representative report its conclusions.



A lecture and a discussion followed on what constitutes a representative sample, and which sampling strategies could have been used. It was pointed out that there were different subgroups of tomatoes on the market and different relative amounts of each subgroup, and that those factors played an important role in stratified sampling.

The in-class version

The assignment has been adjusted to a classroom setting, and implemented in the first-year course Introduction to Conservation of Easel Paintings and Polychrome Wood taught at the conservation-restoration program at the Arts Academy in Split. It is used as **an introductory lesson to physical sampling and sample preparation.**

A wide array of sweet and salty snacks is laid out on a table, and a 'price' is displayed for each product. The inclusion of salty snacks is intended to test if the students are paying attention to the research question.

Students are divided into small groups. The groups are asked to determine the average weight of the sweets on the table. Each group is given a small amount of money to 'purchase' a representative sample. Groups have only ten minutes to come up with a strategy and perform the sampling.

On a few occasions, the students realised that they could see the information about certain items' weight on the packaging i.e., that they did not need to 'purchase' an item to include information about its weight in their calculation. Although salty snacks are not part of the targeted population (the research question refers to *sweets*), students are regularly tempted to include them in their representative sample as they usually have the smallest weight.

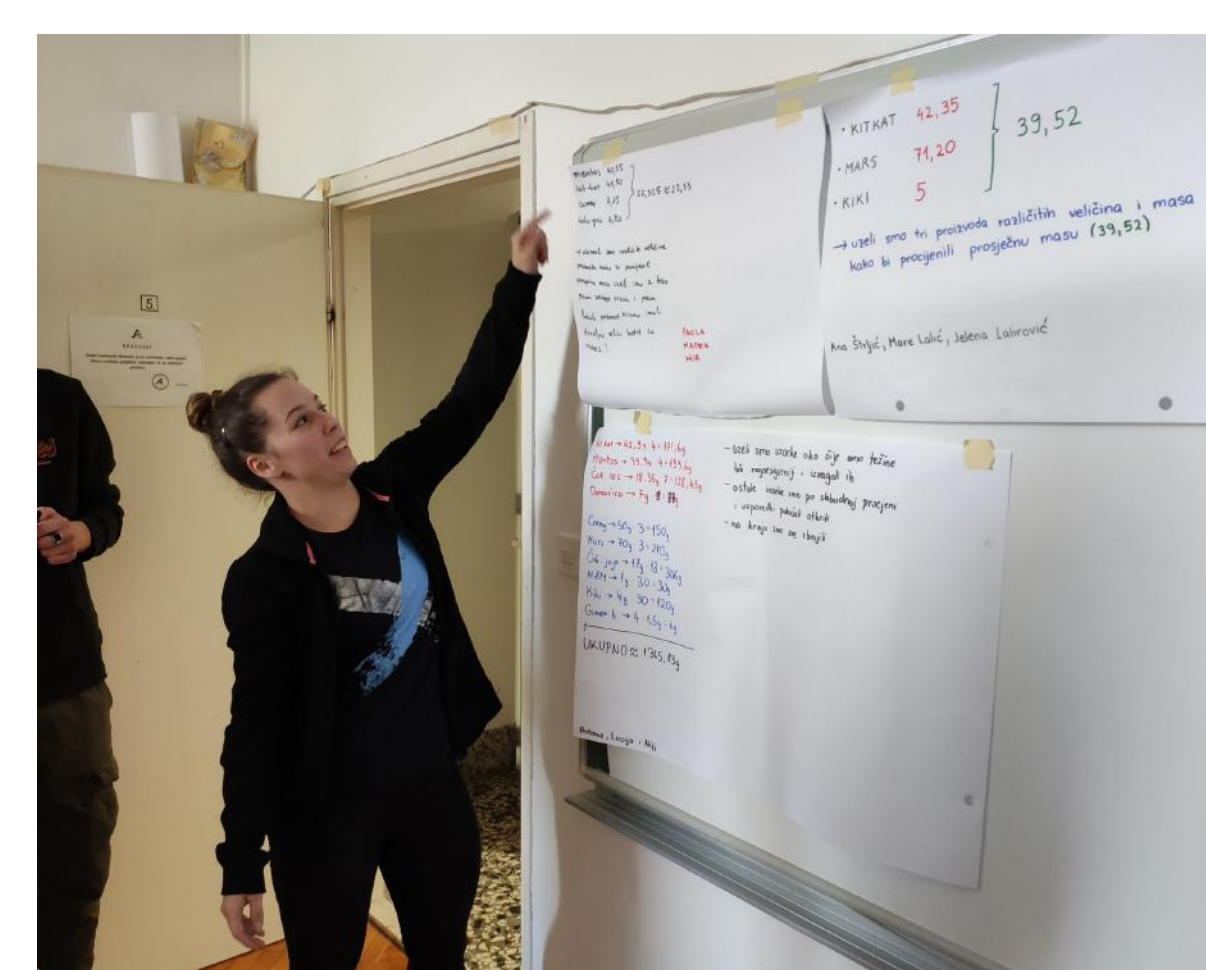
After measuring the 'purchased' items on a precision pocket scale and calculating the average weight of their representative sample, the groups outline their sampling method and measurement results on flip charts. This part of the assignment usually takes 20–30 minutes.

Next, a representative of each group briefly presents the sampling strategy and the measurement results to the rest of the class.

Students observe that each group took a different representative sample and, consequently, obtained different results. Through a moderated discussion **students learn that each sample tells us something, but that it does not necessarily speak for the whole.** At the end, students get to eat all the snacks.



Three representative samples taken from the items shown on the left image.



Students' comments on the assignment: fun, interesting, engaging