**MATH221**

Data Collection Methods

Introduction

Data can be collected through a variety of methods, often depending on the nature of what is being studied. Four primary data methods are observational, experiment, simulation, and survey.

Observational

In an observational study, the researcher observes the experimental units in their natural settings and records the information of interest. For example, to determine how many students wear coats on fall days, the researcher could wait for a fall day and then sit near the entrance to campus and record whether each student is wearing a coat or not.

Experiment

Experiments are done when the researcher is trying to determine if there is a difference between two groups. Imagine if the researcher wanted to see if a new medicine was effective against the common cold. The researcher could find a bunch of people with the common cold and give half of them the new medicine and half of them sugar pills and then record each person’s symptoms each day. The results of the two groups could then be compared to determine if the new medicine was effective.

Simulation

If it is not possible to collect actual data, then a simulation might be the best method. This is where computer programs are run under different assumptions to see the results. For example, after 9/11 the city of Washington DC wanted to see what would be the best way to evacuate the city in an emergency. It was not possible to have people actually try to evacuate, so simulations were created. It was tried with closing different roads, not allowing vehicles in some areas, and various other assumptions. The result of these data was that it was not possible to evacuate the city in an orderly manner, but the simulation still provided officials with information and ideas.

Survey

A survey is where individuals are contacted by phone, mail, or in person, and they are asked a series of questions. The responses are recorded and then studied.