Students First
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Dear IMC:

Since 2000, the numbers of students enrolled in the US public school system has been increasing. The growth in the student population has mirrored the growth of the US population in general. To keep pace with this growth, the number of teachers in the US has grown. The goal of this growth is to insure that the number of students per teacher remains at a manageable level. Too many students in a classroom is not conducive to the individual attention many students require.

Ideally, every student should have their own teacher. This level of student-teacher interaction is not economically feasible. Public education is publically. We need to insure that the ratio of students to teachers is sufficient to maintain education standards at a cost that is reasonable. The National Education Association (NEA) recommends a student to teacher ratio of 15 students per teacher.

Shown below are graphs of the numbers of students and teachers over the academic years 2000 through 2006.
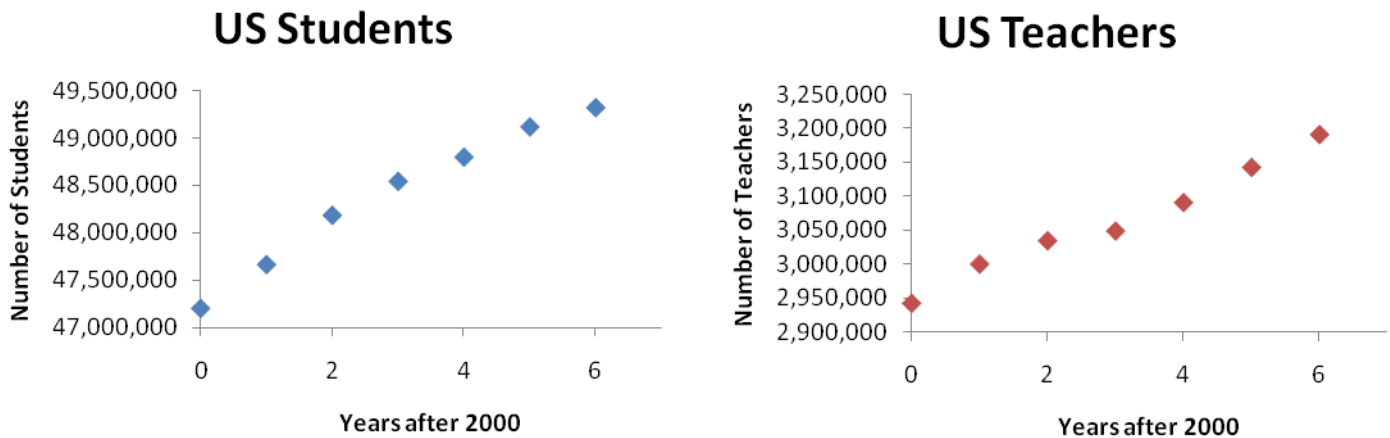
You might expect the student to teacher ratio to increase with the large and growing student population, but a graph of the ratio quickly dispels this notion.

Student to Teacher Ratio
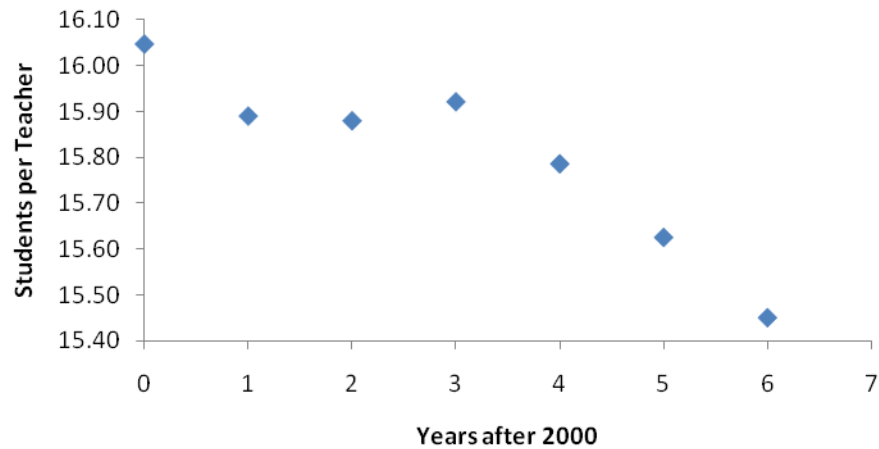
Even though the number of students is growing, the number of students per teacher is decreasing because the growth in teachers is keeping up with the students. Note that even though the ratio is decreasing, it has not reached the NEA recommended level.

For this project, I would like you to model the student to teacher ratio in the state you have been assigned. I am interested in knowing if you state has or is going to attain the ideal ratio of 15 students per teacher. In addition, I would like to know if the student tot teacher ratio in your state will ever stabilize. To help you, I suggest following the strategy outlined below.

1. Make a scatter plot of the number of students as a function of time.
2. Find an appropriate regression model for the scatter plot in 1.
3. Make a scatter plot of the number of teachers as a function of time.
4. Find an appropriate regression model for the scatter plot in 3.
5. Use the two regression models from 2 and 4 to create a function that models the student to teacher ratio as a function of time.
6. Use your function from 5 to predict the year in which the student to teacher ratio was or will be 15 to 1.
7. If the trend in your model from step 5 holds true in the long term, at what value will the student to teacher ratio stabilize?

We expect that the report will be in technical memo format. This means that you should report your results and explain the steps you followed to get those results. A scientific expert (your instructor) is available to answer any questions that you might have in the course of your investigations. He has assigned several assignments to help you learn how to use the technology and concepts you need for this project. This expert will not be available to assist on this project over the weekend before it is due. You should plan on consulting with this expert as soon as possible.

Warmest regards,

Vargas Weatherbee, Project Director