CORRELATION

Carlos Alberto Álvarez García, Blanca Cecilia Cruz Salcedo, Hugo Mael Hernández Trevethan, Ciro Plata Monroy, Héctor Gabriel Rivera Vargas, and Ángel Sandoval Lemus
Universidad Nacional Autónoma De México, México
animal_estocastico@yahoo.com.mx

This poster describes an activity that uses a shareware software that can be downloaded from the Peanut Software Homepage, (http://math.exeter.edu/rparris). On this page there are nine different programs available for download, and each one of them simulates some mathematical topics. The program we used in our experience is related to statistics and is called Winstats.

The aim of our experience was to develop the ideas of correlation and least squares within high school senior students in statistics lectures. This shareware software contains a program that allows manipulating points on a scatter plot, and watching, at the same time, the changes on the line of fit and on the correlation coefficient. There is another program that shows the squares of differences from some scattered points to the line.

The students were asked to do some tasks with the programs and, at the same time, to give some intuitive ideas that should be proved, not demonstrated, with the software. The whole activity was oriented to inductive reasoning.

The part of the activity developed for the concept of least squares uses a program that displays the line defined by two points on a bidimensional plane. Using the mouse’s right button it is possible to create points on any part of the plane. Every time a point is settled, it appears with a yellow square with each side as length as the vertical distance from the point to the line; that is, the square of the difference. At the same time, on the bottom right side of the screen, a square with an area equal to the total of the areas of the whole squares generated through the whole points settled will appear.

It is possible to drag the points to or from the line, so that all the squares will decrease or increase its size. Furthermore, it is possible to move the line too, by dragging one of the two points that define it, and this will change the size of the squares as well.

All the conjectures that the students will make are about all the changes they may observe on the size of the squares through the dragging of the points and the line. The activity is designed to guide the students to the dragging needed for the proper observations.

The part of the activity developed for the concept of correlation uses a program that allows creating and manipulating points on the bi-dimensional plane. By clicking on any part of the plot with the mouse’s right button a point will appear. By the moment that two points have been generated, the correlation coefficient appears on the screen top left corner, and it is equal to one when just two points are on the scatter plot. As the user creates new points, these coefficients vary, depending on the way the user is scattering the points. It is also possible to show on the screen the least squares line and its equation, and the program will change the line and the equation parameters every time a new point is created or an old one is dragged.

By dragging the points in different ways, the students face different changes on the plot, the equation and the correlation coefficient and they are asked to make some conjectures about these changes.

The last step on the activity asks the students to erase all the points but two, by clicking on each point with the right button. After that, they should drag one of the points to change the slope of the line and verify the changes on the equation and on the coefficient as well.

At the end of all the processes of the activity, the students may discuss within the group the ideas developed through the exercise.