Box Plotter

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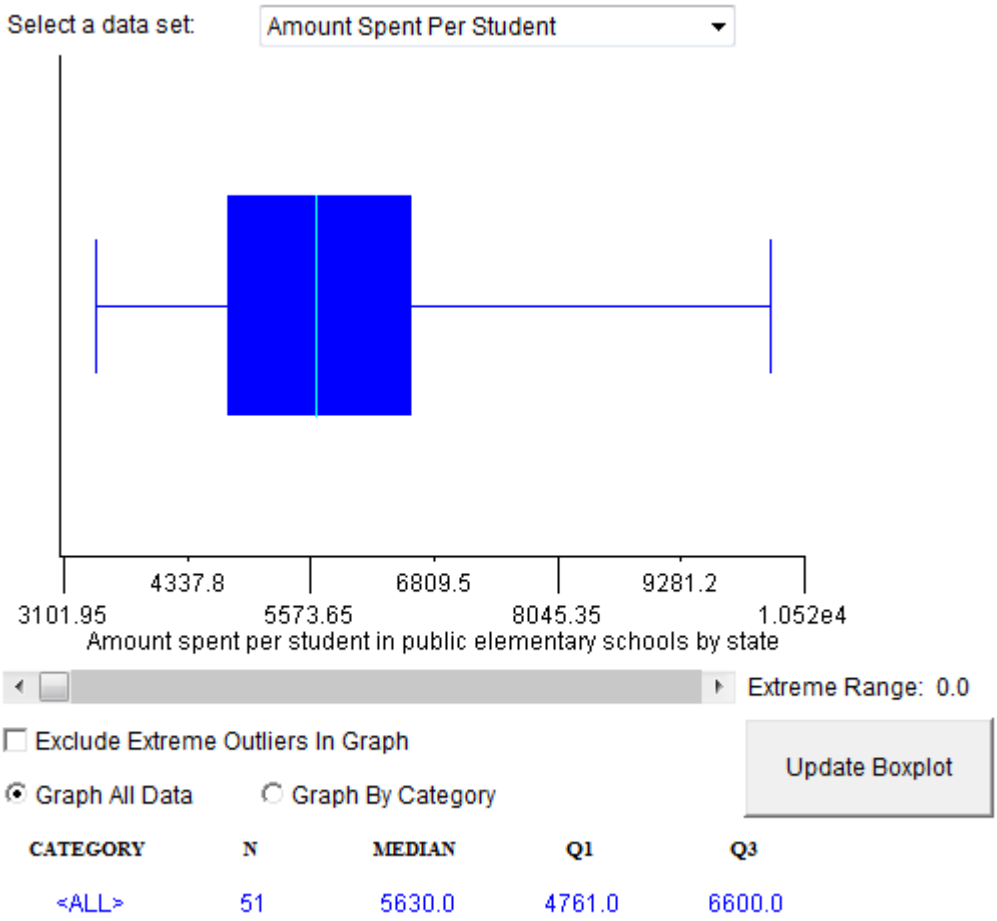

This application allows for students to quickly create box plots for various data sets. Students can choose from pre-existing data sets from the drop down menu or they can input their own data and a box plot is quickly created for them to view. The box plot is accompanied by the following values: median, Q1, Q3, range, number of data values, etc. Students can analyze the values and answer questions about the data using the box plot that is created.

Grade Level: Grades 8-12
PSSM Content Standard: Data Analysis & Probability: understand histograms, parallel box plots, and scatterplots and use them to display data
CCSSM Content Standard: CCSS.Math.Content.HSS-ID.A.1 and CCSS.Math.Content.HSS-ID.A.3
Math Content: median, outliers, quartiles, box plot, data analysis

Evaluation

What is being learned? What mathematics is the focus of the activity/technology? Is relational or instrumental understanding emphasized?

The mathematics that is at the focus of the activity is that of understanding boxplots and the various statistics that can be computed from looking at the display. Students learn how to input data points and how to interpret the various portions of a box plot including: median, quartile 1, quartile 3, and outliers. Students engage in both instrumental and relational understanding while using this technology. They instrumental choose data or input data values, and then the program constructs their box plot, while they relationally interpret the results of their box plot.

How does learning take place? What are the underlying assumptions (explicit or implicit) about the nature of learning?

Learning takes place in this technology when students interpret the results of their box plot. By analyzing the median and quartiles, students can interpret the data in various ways. Students can input their own data values in order to analyze data that is of greater interest to their individual lives. The assumption is that students will implicitly learn by using this technology. Students will use their mathematical reasoning and critical thinking skills to analyze the results of their data and then apply what they have learned to questions using their data.

What role does technology play? What advantages or disadvantages does the technology hold for this role? What unique contribution does the technology make in facilitating learning?

This technology allows for students to create a sleek box plot graph for the data they choose. It computes important statistical values for the data that is chosen. The advantage to using this technology is that little error in creating the box plot is involved unless an incorrect data value is inputted. The disadvantage to using this technology is that it does not force students to calculate the statistical values by hand. The program simply computes the values for users. The unique contribution that the technology makes in facilitating learning is that it has data already programmed into the activity. Students can use this data to create box plots and then answer questions using the data.

How does it fit within existing school curriculum? (e.g., is it intended to supplement or supplant existing curriculum? Is it intended to enhance the learning of something already central to the curriculum or some new set of understandings or competencies?)

This technology fits into our current curriculum because data and analysis currently a part of Algebra I and Algebra II curriculum. Box plot graphs allow for students to interpret data in an easy manner. It is intended to supplement existing curriculum by utilizing the technology to extend knowledge of data analysis.

How does the technology fit or interact with the social context of learning? (e.g., Are computers used by individuals or groups? Does the technology/activity support collaboration or individual work? What sorts of interaction does the technology facilitate or hinder?)

Students could use this technology in a collaborative manner if they collect data together after creating a survey of some sort. Students can use the technology to input their data so that a box plot can be created for them to analyze the data they have collected. By using this technology they can work together on computers to make informed decisions about the data they have collected. While students are working together they can engage in discussions regarding the statistics they are viewing and interpret their results to make informed decisions.

How are important differences among learners taken into account?

Those students who do not have graphing calculators can utilize this program to get the same type of graph that can be created using the calculators. Students can also view median, quartiles, and outliers just like those students who use graphing calculators. Thus students can easily use this program which allows for different learners to engage in the mathematics being learned.

What do teachers and learners need to know? What demands are placed on teachers and other "users"? What knowledge is needed? What knowledge supports does the innovation provide (e.g., skills in using particular kinds of technology)?

Teachers and learners need to know how to interpret box plots. They need to know the basics of box plots, specifically, the values of max, min, Q1, median, and Q3. Teachers can have students collect data and use the technology to create an individualized box plot or they can utilize the existing data values for class activities. The knowledge that is needed in order to use this program is that of basic statistical values and how they relate to the data they are computed from. This particular innovation increases the ability for students to be able to input data and create quality charts and graphs. Students will learn how to interpret the results of the data based upon using this technology.