


The Other Part of the Job: Rapid Data Analysis with Excel and Sheets

General Music Today
2020, Vol. 33(2) 83–86
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Music Education 2019
DOI:10.1177/1048371319880873
journals.sagepub.com/home/gmt


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Abstract

This article will show a few quick and easy techniques to analyze data sets using Microsoft Excel and Google Sheets.

Keywords

data analysis, elementary general music, Microsoft Excel, music education, secondary general music, technology

There are many platforms that allow music teachers to input and maintain an electronic gradebook with ease. Because music educators have so many students, the gradebook and other data warehouses can become an overwhelming source of information; there are so many data available, but what can be done with them? This article will show a few quick and easy techniques to distill the data collected into useful information using Microsoft Excel and Google Sheets.

Why Stop at the Gradebook?

School districts are increasingly data-driven machines. Data can be used in a variety of ways, but all data tell a story. When collecting data, it is easy to stop looking at the information after inputting them into the gradebook. Looking at one data set from an assessment can show what students know and help determine what students need to work on next. However, there is typically a need to see improvement over time. It can be helpful to compare results over classes or buildings in the case of common assessments across buildings. Analyzing larger data sets requires tools so the information can be interpreted quickly and efficiently. Exporting a comma-separated values or Excel file from an electronic gradebook is the first step in discovering a story told through data points.

Helpful Formulas

Both Microsoft Excel and Google Sheets are spreadsheet programs. Spreadsheet programs ensure that every cell in the sheet can be interacted with separately. Therefore, it is possible to select specific cells as needed to extract information. Depending on what the user would like to know about the data set, there are several

helpful formulas that can be used for quick analysis. Formulas are mathematical processes the software completes on command. Both Microsoft Excel and Google Sheets use formulas in similar ways, as there are many formulas preprogrammed into the software. Typing an equal sign (=) into a cell means the user would like to use a formula. The desktop version of Excel and Sheets will suggest a range of cells the user may want to manipulate. On mobile devices, Excel will allow a user to select cells after typing the formula. It is more efficient to select a range of cells first for the mobile version of Sheets. To select cells, click on the first cell that should be part of the formula; click the bottom right corner of the selected cell and drag to the last cell that should be part of the formula. Below are the common formulas that can help with data interpretation:

- SUM: Typing =SUM in a cell will provide the sum of selected cells.
- AVERAGE: Typing =AVERAGE in a cell will provide the average of selected cells.
- STDEV: Typing =STDEV in a cell will provide the standard deviation of selected cells.
- COUNTIF: Typing =COUNTIF into a cell will provide the count of how many times the chosen criteria occurred. For example, if the user would like to know how many times a student scored a 3 on an assessment, COUNTIF will look for any “3”s in the range of cells and calculate how many

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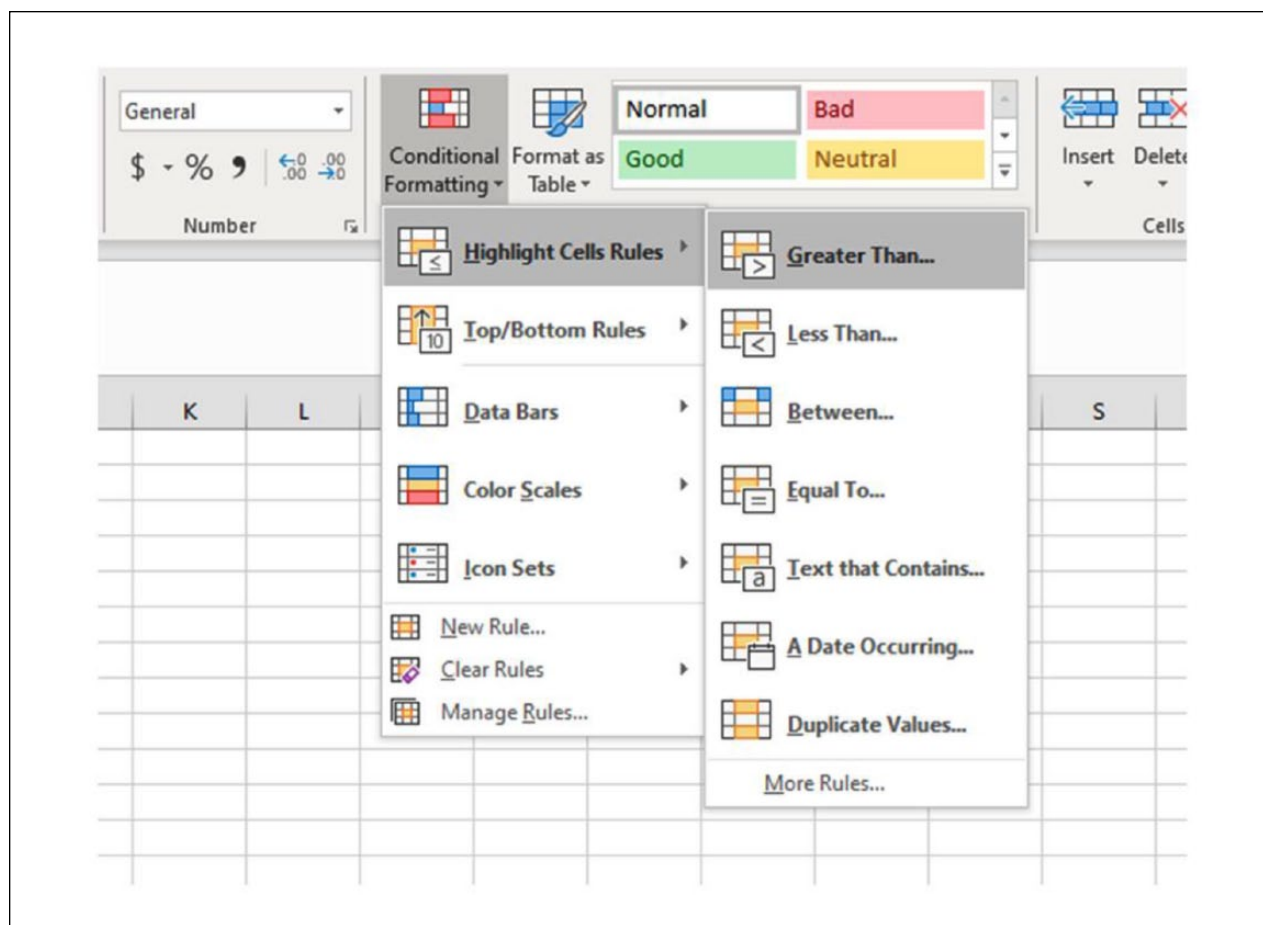


Figure 1. Conditional formatting menu.

times students scored a 3. It is also possible to add additional layers to the criteria. For example, `=COUNTIF (A1:A11, "<3")` will count all the cells less than 3. However, this formula does not function as well using the mobile version of Sheets.

If the same formula will be used across multiple rows or columns, move the cursor to the bottom right-hand corner of the cell containing the formula. The cursor will change into a solid cross. Click and drag the formula across the cells. Once the cursor is released, the cells will autofill with the values appropriate to each row or column.

Filters and Conditional Formatting

For those who want to visually glance through a large amount of data, the "Filter" and "Sort" tools are very helpful. The "Filter" tool is located on the "Data" menu in both applications. It allows the user to select the information wanted by filtering it out of the remaining data. Select the column to be filtered and click the "Filter" button. A down

arrow will appear at the top of the row. Click the arrow and select the data that is wanted (i.e., select "1" to see all rows that have a 1 in it) from the newly opened Filter menu. Click "OK." The only rows that will be seen will be the rows with "1" in the selected column. Click the down arrow to continue filtering or click the "Select all" checkbox to see all the rows again; the undo button can also be used to see the complete data set again.

A similar tool located next to the "Filter" button in Excel is the "Sort" button. Sorting the data will arrange them from highest to lowest or alphabetically from A to Z or Z to A. Because all cells are independent in spreadsheet programs, it is very important to select the entire sheet before using the "Sort" button. Excel typically warns the user the selected column will be the only column sorted unless more is selected. Sheets does not have a warning, but the "Sort" feature provides the option of sorting the entire sheet or only sorting the selected column. To quickly select the entire sheet in Excel, click the arrow in the top left-hand corner of the sheet at the top of the row numbers. The same box should be clicked in Sheets to select all, but the box is

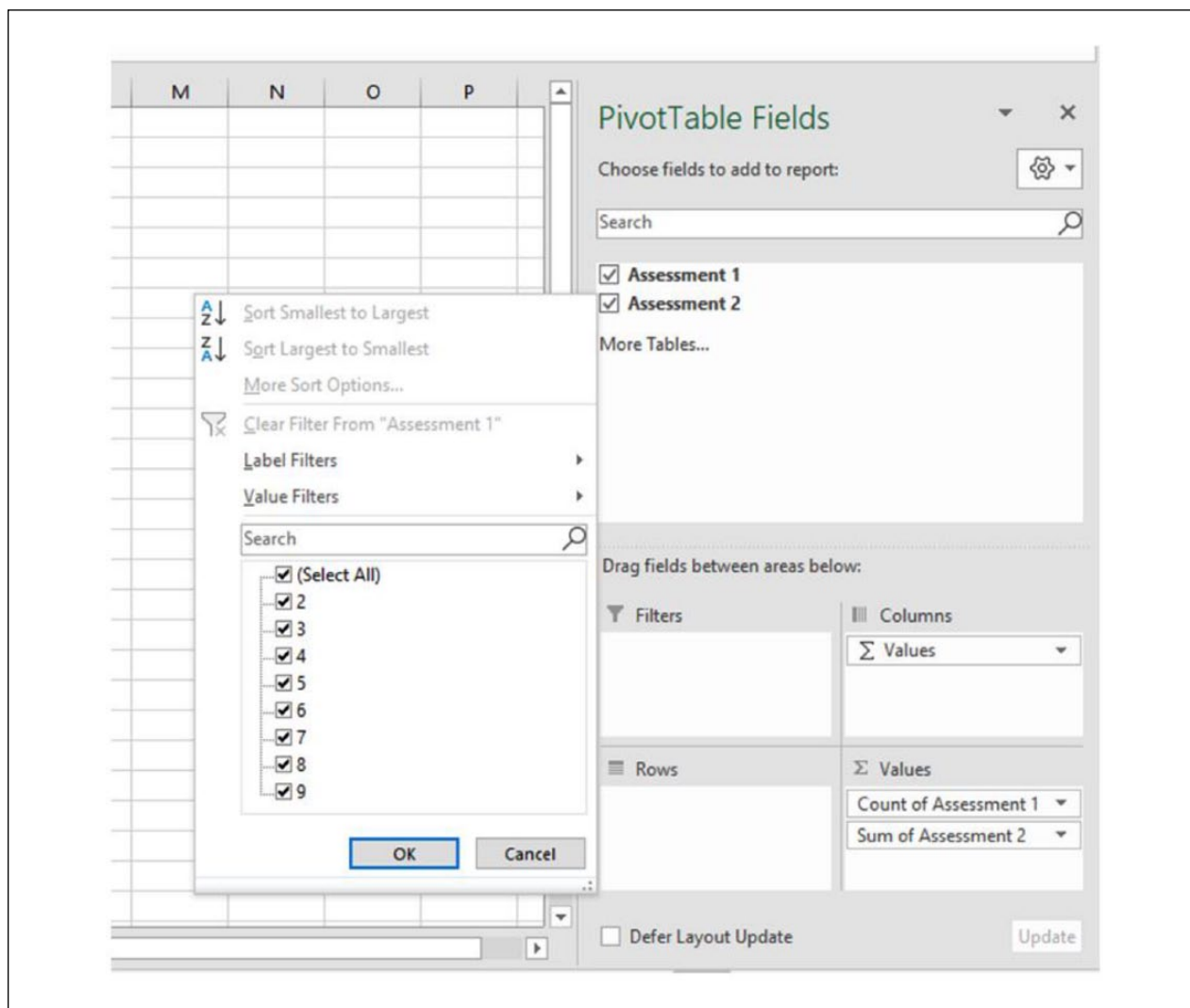


Figure 2. Pivot Table menu.

empty in Sheets. Once the entire sheet is selected, all the data in the row will move as the first column is sorted. To select a different column, use the “Sort” button in Excel (some versions may state as “Advanced Sort”) or “Sort Range” in Sheets.

Another tool that allows the user to visually analyze data is the “Conditional Formatting” button in Excel, which is located on the “Home” menu; Conditional Formatting is located in the “Format” menu on Google Sheets. Conditional Formatting is available only in the desktop version of both applications; it allows the user to set up conditions (i.e., greater than, less than, etc.) and choose what the cells will look like if that condition is met (see Figure 1). For example, if a teacher would like to see which students scored below 5 on a quiz, Conditional Formatting could be used to highlight the cells with numbers less than 5 in red. Conditional Formatting can also color-code all possible answers on a gradient—for

example, as the numbers get higher, the color gets darker. Conditional formatting allows the user to glance quickly at the data to determine what happened in assessment and what might be needed next.

Pivot Tables

Pivot Tables recently came into my life, and it has changed the way I use Excel. This tool is only available on the desktop versions of Excel and Sheets. Pivot Tables allow the user to flip data around by determining what data should be seen and how they should be calculated. It is the ultimate combination of filters and formulas. The user can import all the data on the sheet into a Pivot Table. Once the information has been imported, the user can select which information to manipulate. The information can be from the entire sheet (“Select All”) or filtered through subcategories (see Figure 2). Once the

information has been selected and/or filtered, the user decides which formula would be the best to see the data. All COUNTIF formulas discussed above can be done simultaneously, showing how many of each result are present by clicking checkboxes. SUM or AVERAGE can be used to calculate any of the data selected. If the user does not want to see the data in columns, a click and drag can make the data flip into rows. There are more Pivot Table options in Excel, but the Pivot Tables are available on the “Data” menu in Sheets. In Excel, the Pivot Table is located on the “Insert” menu.

So Much Data, So Little Time

School districts and administrators continue to ask teachers for data to show their students are learning. When you are working with so many students, it can be a challenge to find quick and easy ways to see so much data at a glance. Hopefully this column has provided a few ways to see data quickly using both Microsoft Excel and Google Sheets. Data can be an excellent way to tell at least part of the story to show the great work completed in the music classroom.


Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

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Author Biography

Laura Dunbar has taught 10 years in public schools, beginning her career as a band director teaching instrumental music to grades 5 -12 at Elmwood Local Schools in Ohio. When her family relocated to Arizona, she accepted a K -8 position in Sedona, Arizona, where she taught general, instrumental, vocal, and steel drum music for seven years. Laura completed a PhD in Music Education at the University of Arizona; she is currently the Elementary Music Specialist and the Music Education Coordinator for the University of Wisconsin -Eau Claire.