History of the Powerful Free Excel Gradebook for Teachers

Anybody who has ever made a piece of software knows that it is always a work in progress…

Starting in January, 2011, I volunteered through the MIT Public Service Center for a month helping a first year Teach for America teacher. The teacher was very busy, but he knew he wanted to use data to know how his students were doing. Although he spent precious hours entering data into an Excel spreadsheet, the rigidity and design of his template-based workbook prevented him from the real benefits of data analysis.

So I remade his workbook. His workbook originally tracked "mastery" or standard benchmark scores 1-5 where the primary goal is have all students reach the standard of a 3 or higher for all learning goals. Over the time, I developed a way to convert mastery scores to grades – saving him time – and I added a table layout, pivot tables, and student demographics.

About a year later, I was contacted by his school's science department to 1) come back and teach an Excel workshop and 2) improve the tracker to match the needs of other teachers. Between Christmas vacation and free time during January, I remade the gradebook making it prettier and a little more user-friendly (although in retrospect it was rather overwhelming for teachers).

During the summer of 2012, I made an effort to put the gradebook online and I also spent considerable time searching for what gradebooks online were available. What I found was saddening. The resources for teachers were extremely scattered and quality significantly varied. Some gradebooks simply didn't work. Some were extremely simple. Most were entirely inflexible. Unfortunately Google had little sense about this.

For a while, I almost attempted making a running list of reviews: it helps Google know what's best and it helps teachers to find what they are looking for. It is probably still a good idea, but there were so few good resources (in my opinion) that I decided to simply recommend what I believed was best. I originally made the website first show my recommendations for if you are "new to Excel" and then the gradebook I made.

With time, the gradebook I have made has undergone significant change. Over Christmas break 2012-2013, I added built instructions in handy shapes like other reputable gradebooks, and I began a series of video tutorials. By this time, I added a novel way to have grade printouts (there isn't a great way [yet], but this works for the meantime).

In February, 2013, I broke the gradebook into version 1.1a (by points) and 1.1b (by percentages) as I've realized the need for teachers who grade differently to be able to get exactly what they are using as fast as possible.

In March, 2013, I simplified the gradebook (v 1.2). I hid the absences sheet and put an option to unhide it in the options. I deleted all but one of the premade Pivot Tables (except the distribution sheet) and I renamed the one extra sheet Explore.

However, I still felt the gradebook was too complicated. There was too many instructions and things to learn. So in late March, I decided to see how much I could simplify everything. I deleted mastery scoring. I cleaned up the colors and I removed most of the instructions (1. Ideally they are not needed and 2. Who reads instructions?). I put some of the instructions in the options sheet as a "checklist for when you're ready." Finally I added the ability to show max points and weight to the grade printouts. After struggling with an Excel cache bug, I copied/reproduced the whole workbook into versions 1.2c and 1.2d. I also cleaned up the website, removing the Microsoft links and semi-outdated video instructions. I kept the old workbooks up for those who want mastery.

At the very end of March I boosted the formatting a little. I made the absences sheet cleaner. I correctly formatted the date header rows. I also put the date into the grade printout and cleaned up the grade printout instructions some. I called this 1.2.2c and 1.2.2d.

On April 6th, I tested the workbook in Excel 2007. The grade distribution and data validation techniques seemed to all be working. I noticed one bug in the options that didn't have the colors change due to copying values instead of formulas. I fixed the simple versions, making 1.2.3c and 1.2.3d.

In May, I decided to release a newer version that took advantage of one of the benefits of Excel 2010: sparklines. I experimented with different "intuitive" formulas for histograms like "frequency" but ironically array formulas do not fill. (That's a bug if you ask me). As such, I made the new version using just a couple of bins and countif/countifs statements. I then used one row for the sparklines. I was worried about the processing time overall, especially with so many more formulas. I felt the overall number of assignment columns was excessive (over 200), so I cut it back to slightly under 30 and modified the end with hash marks / insert before here description as even if the table expands, not all the formulas do. I am hoping the sparklines will make it easier for teachers to see their data without needing pivottables. I wanted a version compatible with Excel 2007, but even conditional formatted bars (especially with Excel 2007 gradient) are simply not good enough. These new versions is call 1.2.3c and 1.2.3d. Never settled on a great naming convention. Also added instructions in the options things to try for hiding the ribbon and editing the ranges

Also in May, I found one formatting bug in the points workbook for which the points were formatted as dates. This has been fixed in the older simply points workbook (1.2.3c2). I decided to limit the size of the older simple workbooks to ~30 assignments (1.2.3c2 and 1.2.3d2). I also found that inserting columns and rows does not insert the formulas for the countif statements for the sparklines. This isn't terrible, but could create confusion if there is a blank sparkline. I thought formulas used to copy. Perhaps this is a new 2013 "feature"? To find out later. I also updated the new weighted 1.2.3d to graph the sparklines right to left as the bins are then more intuitive.

In June 2013, I read the book *Design of Everyday Things* which emphasized user testing and concepts like "constraints" and "conceptual models." The main idea for user testing is that engineers fundamentally cannot properly design things for nonengineers without doing testing with nonengineers. The constraint idea is that the number of options should be limited so that only what

should happen remains and the conceptual model is that the user should be able to use a scheme or past worldly understanding of a topic to easily jump right in. I very much wanted to apply these concepts to the gradebook.

So in June I also met with two teachers in England and had them walk through just the main page of the gradebook. Much that I thought was obvious and clear was not. For instance, "Grade" has a very different meaning in England than in the states. The British equivalent is "Mark." To be more universal I changed the "overall grade" to "running average." Also confusing was the term "tardies" which is more commonly accepted as "lates."

The teachers were also very interested in the sparkline graphs, but since the graphs lacked an explanation, they were not immediately obvious as I had hoped. So I added a nice picture that labels what the graphs mean and avoids technical terms such as histogram and bin.

Additionally, the teachers had wanted to put grades in the summary columns. So I put a big warning that says these columns are not for entering in scores. The teachers also did not see the + boxes (nor notice hidden rows). So I directly mentioned this – although this costs a little space for another text box. Lastly, the teachers (who I had use the weighted average 2010 workbook) did not notice the conditional formatting warning that filled in the box for the weight orange if you start marking points for an assignment. To help this problem, I decided not to give a verbal warning but instead make the "constraint" easier to see. I changed the conditional formatting to color the whole assignment orange and the weight (or point) cell orange, but with a red border. Hopefully it is sufficiently obvious.

Regrettably, there was one small bug in the absences sheet. I had added more dates for the summer, but unfortunately did not expand the ranges for summing absences and tardies. It is a secondary problem that most teachers will never get to and perhaps it will be obvious for any teacher starting during the summer. This bug has been fixed. The new versions are Points 2010: 1.2.5c WeightedAvg 2010: 1.2.5d. Points 2007: 1.2.5a, WeightedAvg 2007: 1.2.5b

In November of 2014, I took the 2010 points version of the gradebook and made an "assessment type" version. I figured this would be useful, based on the questions I received from time to time. I also replaced the confusing grade printouts with a new transposed version that is much easier to use (and to customize!). I experimented with even showing the point breakdowns for each assessment type, but it was too difficult to show and have the gradebook calculate accurately. There were many updates to things like data validation (removed it from the "class" numbers) and then added in many helpful hints. I also removed the distribution sheet, adding a letter grade distribution on the options sheet. This could be confusing. I also made a letter grade lookup (and then made this work with the sparklines), and made this work with the sparklines. I called this version 1.3apoints (for assessment types and points). I found I could use the info functions to make the gradebook show different text to Excel 2007 users. This will prevent so many versions. I plan on maybe making a short video on how to work the printouts that are easier to use. The other derived versions are 1.3dpoints (for directly by points), 1.3dpercent (for directly by percents), and 1.3apercent (for by assessment type by percent).

In late December of 2014 I fixed a few smaller bugs with the gradebooks. One bug was that I had added a line of text that would only show up for Excel 2007 where the sparkline charts would appear. Unfortunatly excel put the version number as text instead of a number and so it did not evaluate the formula as desired. This was fixed. Additionally, I had run into Mac not correctly opening the excel files (closing unexpectedly). So I removed the pivotchart on the explore sheet as I figured this might be causing the compatibility headache for Excel. I also updated some text for better grammer. The new versions are all 1.4a-dpoints/percents.

For 1.5a-dpoints/percents I added the ability to have a third color (red in addition to green and yellow) for grades. I also fixed a problem where deleting the last column of the assessment types would cause a #ref error. This was fixed by changing the table structured references to basic cell references. I also removed an odd conditional formatting rule that had wanted to make 100.0% 100%. It was oddly applied to just a few cells. I also added a last date updated to the options sheet, which in this case was July 15th, 2015.

Fast forward a few years and Microsoft decided to change their formula engine. In 2020, Microsoft announced dynamic arrays which – which useful – breaks a lot of the nifty array formulas I had used for conditional formatting. In Aug 2020 I uploaded rev 1.6a-d that should be both forwards and backwards compatible. It avoids many of the sumproduct formulas that had array input. I also revamped the absences sheet.

What makes sense? What doesn't? What parts are overwhelming? What do teachers most find beneficial? Let me know your thoughts. Thanks! Jonathan Abbott, jabbott.mit (at) gmail.com.