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***BUS 443: Business Analytics***

**Dashboard Assignment and Tutorial**

**Case Background:**

*Mobile Gadget Gurus is distributor that sells mobile technology devices to retailers across the country. Customers place orders and have the items shipped to their stores or distribution centers. The COO and middle management of Mobile Gadget Gurus needs a quick and easy way to track the operations of the business on a daily basis. They want you to design a dashboard for operational managers to use daily to manage their business.*

*Here are some various data analytics to help trigger your thinking on what a manager might need on a dashboard. Be sure to consider what types of graphs and other dashboard graphics are appropriate for each type of data. Include any other analytical measures not found in the data, but worthy of a data dashboard. You will be graded on the accuracy of the numbers and the creativity of the dashboard. Each person’s work is to be unique.*

* *Best and worst customers by total sales;*
* *Best and worst customers by total profits;*
* *Best and worst products by total sales;*
* *Best and worst products by total profits;*
* *Best and worst sales rep by total sales;*
* *Best sales rep’s best-selling and worst-selling products;*
* *Best sales rep’s best and worst customers.*

**Instructions:**

First, begin by doing some online research on data dashboards and their use in industry today. Find some examples online from which you want to model your dashboard. View several designs and study them carefully. Jot down your ideas from the online samples to see which parts of the dashboard may serve management well. For more assistance on designing dashboards in Excel, view the following videos: [video 1](https://www.youtube.com/watch?v=dI_axvl21J0) for a quick presentation on basic dashboard steps in Excel; and [video 2](https://www.youtube.com/watch?v=Qdkd0_NGcBE) for an in-depth viewing of a more professional look to your dashboard. There are also many other how-to videos on YouTube and books available to you for your learning. However, the best method is to simply practice with the tool yourself.

Second, download the Mobile Gadget Gurus spreadsheet from our Moodle class website. This online spreadsheet represents the current orders, products, customers, sales reps, and profits for Mobile Gadget Gurus. You will use the Excel PowerPivot tool with Slicers to summarize the data in a variety of different ways (e.g., sales by customer, profits by product, etc.) and save your answers for your data analysis. Using the data, you will then explore various ways to display the data with charts and other dashboard items.

Next, you will use PowerPivot to display various data visualization techniques. Why use PowerPivot? It has all of the advantages of pivot tables: it is fast, easy, and enables quick changes. It has relational database features inside Excel combined with the easy PivotTable user interface. It allows for you to import Big Data (millions of rows) into Excel. It also allows for calculated fields and Data Analysis Expression (DAX) Measures, which are formulas in a PowerPivot PivotTable. These are more powerful than regular formulas because they can be used in PivotTable reports. You may add new:

* 1. Calculated columns to tables with 81 functions. You can leverage relationships with functions like RELATED which replaces VLOOKUP; and
  2. Calculated fields/DAX Measures to apply a filter to source data before making a calculation and delivering a result. This result is delivered to the pivot table and can then be filtered by dragging and dropping fields.

**To create PowerPivot Pivot Tables in a Data Model:**

(Note: These instructions do not represent the exact steps you must take to complete every part of this project. They are only intended to summarize the basic procedure.)

1. Start with true raw data, not a report inside Excel. (The spreadsheet for this case on Moodle is an example of true raw data.) Convert the raw data to an Excel table and name the table, ***SALE***. To do so,
   1. Click anywhere inside the data.
   2. From the Home tab, click the Format as Table tool, select a format, and choose OK.
   3. From the Table Name Box in the upper left of the screen, type ***SALE***.
2. Import the Excel table into PowerPivot (PowerPivot tab, Add to Data Model). (Note: If you do not see the PowerPivot menu, you must select the add-in to Excel. To do so, choose File/Options/Add-Ins. From the Manage drop-down list box at the bottom, choose COM Add Ins and click the Go button. Check the Microsoft Office PowerPivot checkbox and choose OK.)
3. Download and save the Production Access Database on Moodle. (When you open the link on Moodle, choose Save As to store the database on your drive.) Now, back in PowerPivot, get three additional tables, the CUSTOMER table, the SALESREP table, and the PRODUCT table (Get External Data, From Database, From Access). Choose the CUSTOMER, SALESREP, and PRODUCT tables from the database and click Finish and Close. These tables will provide the extra data needed about customers, sales reps, and products.
4. Click Diagram View, then define a relationship over Customer Number between the Excel table and the Access CUSTOMER table. (Drag and drop from one customer number in the Customer table to the other customer number in the Excel table.) This action connects the two tables, allowing you to select data in one pivot table or chart from both sources. Connect the PRODUCT table in the same way over product number and the SALESREP table similarly over sales rep number.
5. Decide after several iterations which pivot tables and graphs you think will work best for this business, using the numbers from the spreadsheet data.
6. Select the Pivot Table tool within PowerPivot and create a pivot table (always storing the table on a separate worksheet) and format the table as needed. Create any pivot charts you need. Do this step as many times as you need until the data you will need to display on the dashboard is visually displayed.

**To create a Dashboard:**

1. Copy your pivot tables and graphs to a new worksheet tab, named ***Dashboard***. Once successfully copied, hide the spreadsheet from which you copied the pivot table or chart.
2. Add at least one slicer to a pivot table or chart. Adjust the color and shape of the slicers as needed. Your dashboard must have at least one slicer. (Insert, Slicer)To allow one slicer to control several pivot tables or pivot charts, click on the slicer and choose the Report Connections tool from the toolbar. (Alternatively, right-click on the slicer and choose Report Connections from the shortcut menu.) Check the checkbox beside the charts and pivot tables to which you want to connect the slicer.
3. Create at least one chart that shows information by year or month. Then, add at least one timeline to your dashboard to provide the ability to change the criteria by date. (Insert, Timeline)
4. Format your dashboard. Dashboards should have simplicity, navigation ability, segmentation, and the ability to change criteria selection (e.g., slicers). Consider color, white space, types of charts, and other design characteristics to make your dashboard professional, effective, and efficient. Use a variety of chart types. There is no one right solution for this assignment, so use your creativity and technical skills to produce accurate graphical reflections of the data.
5. Make a title and/or navigation bar for the Dashboard with the rounded shapes (Insert, Illustrations, Shapes). Build this one long rounded shape across several columns down to row 4 and lock it. Click on row 5. View, Freeze Panes.
6. Remove the formula bar, headings, gridlines, automatically hide the ribbon, etc. so that the dashboard doesn’t look like an Excel spreadsheet. (View menu, clear checkboxes for Gridlines, Headings, and Formula Bar.)
7. If you haven’t done so already, watch this [video](https://www.youtube.com/watch?v=Qdkd0_NGcBE) to see how to add segmentation and navigation ability to your dashboard.
8. There are many ways to create various gauges in Excel from scratch, by layering (compositing) digital assets or by using pre-made widgets from the web. Essentially, these gauges combine a couple of Excel charts with some graphics layered on top of them. To create a simple gauge (speedometer chart) on your dashboard, select one of these methods to create the charts for your gauge:
   1. Watch this video to create a simple gauge using a donut chart and a pie chart click: [here](https://www.youtube.com/watch?v=zean4MztvjM). To create a more visually appealing (but more complex) gauge, watch this video: [here (beginning at minute 10)](https://www.youtube.com/watch?v=BYFqVNKtzy8). Then, watch the video for next part which covers how to make the frame for the gauge: [here](https://www.youtube.com/watch?v=G2GkfLI54uA). To copy the layered object for this frame, complete with the donut chart and pie chart already embedded, see the Excel sheet called ***Gauge Settings*** in the Moodle Sales Data file.
   2. To use a layered (composite) gauge frame created by a NCSU student and made available on the web free to anyone as a digital asset, click the Moodle link. Once you download this digital asset, combine it with your Excel donut and pie charts. This is also on the Excel sheet called ***Gauge Settings***.

Connect your gauge to your dashboard data:

* 1. To connect your gauge to your dashboard data, remember to use a cell reference which calculates the data from the data tables in PowerPivot. For example, the cell reference resides as a formula in cell E11 of the *Gauge Settings* sheet and points to a hidden pivot table with the needed amount.
  2. To make the gauge pointer appear in front of the gauge color spectrum:
* Before layering the gauge frame around the combined chart, right-click on the gauge pointer (small pie chart slice) and choose Format Data Point.
* From the Plot Series On section of the pane, choose either Primary or Secondary axis, depending upon the option that places the pointer in front of the gauge color spectrum.

1. It is easy to use DAX to create new PowerPivot table fields at the summary level. You will create a new pivot table field to display profits by a specific customer. To do so, create a new field for just one customer, Stattons, using the DAX Calculate function. Name the new field, Stattons’ Profits. (PowerPivot, Calculated Fields, New Calculated Field). Use this expression and format it as currency with two decimals:

*=CALCULATE(sum(SALE[Profit]), SALE[CustomerID]=557)*

1. Create a second calculated summarized ***field*** for the Percentage of Profits From Stattons. Divide Stattons’ Profits by Total Profits to obtain this new percentage. Be sure to format the new number as a percentage. Hint: *Percentage of Profits from Stattons:*

*=[Stattons' Profits]/sum(SALE[Profit])*

Create a pivot chart displaying this information for Stattons and add it to your dashboard.

1. You can also easily create new ***columns*** of data in a PowerPivot table. Create a new calculated ***column*** in PowerPivot for the Order Profit. Use this calculation: *=([Profit]/[Total Sales])\*100*
2. Add any useful key performance indicators (KPIs) to your dashboard. To establish and show KPIs:
   1. To use KPIs, you must first have a calculated field in PowerPivot. We will use the Percentage of Profits from the Statton field (already established) as a KPI. To do so, right-click on the calculated field and select the Add KPI command.
   2. Select Absolute value and enter the value of 10 in the absolute value textbox. (Stattons is an important client to Mobile Gadget Gurus, and the goal is to have at least 10% of total revenue from this one customer.)
   3. Choose the icon style you like best and click OK.
   4. Create a new pivot table by expanding the ***SALE*** table and scrolling to the bottom to find the calculated fields. Click on the Percentage of Profits from Statton field and check Value, Goal, and Status check boxes. Copy the results onto your dashboard to view the KPI results.
   5. Create any other KPIs you think would be of value on your dashboard. For example, you could target revenues by year and compare to a given hypothetical projection.
3. Finalize your dashboard by checking all numbers and ensuring the presentation is professional and appealing.
   1. Hide all worksheets except the ones used by your main dashboard sheet as hyperlinked sheets. To do so, right-click on each sheet tab you wish to hide and choose Hide.
   2. Lock all of your worksheet objects so a user can’t make inadvertent changes. You’ll want to do so withoutpreventing the use of the slicers or timelines. To do so:
4. Right-click on each slicer or timeline. Select Size and Properties. Scroll down to Properties and uncheck Locked. Further, under the third option in same window "Properties", click on *Don't move or size with cells*. Under Position and Layout click on *Disable resizing and moving*. Close the Size and Properties panel.
5. Repeat step 1 for each slicer or timeline on the sheet.
6. Protect the Worksheet (*Note: There is more than one way to get to these options*.)
   * Right click on the tab showing the name of the worksheet and select Protect Sheet.
   * Uncheck all checkboxes except Select unlocked cells and Use PivotTable & PivotChart.
   * Enter a password if necessary. You do not need to enter a password for this to work. The password is only necessary if you don't want users to be able to unprotect the sheet. Click OK to close the dialog box.
   1. Autohide your ribbon, then save your work.
   2. Test your dashboard thoroughly and have at least one other person test it. Make changes to the data in the data sheet, then choose PowerPivot/Update All to see the changes ripple through the dashboard tables, charts, and other objects (e.g., gauges).
7. Upload your dashboard to Moodle by the due date.

Here are some additional tips you may need as you create your dashboard.

**To hide or remove the filter objects from a dashboard pivot chart:**

1. Right-click on the filter object itself and choose the appropriate Hide command on the short-cut menu (depending upon which filtering object you wish to remove.)

**To display a formerly hidden (or deleted) filter object from a dashboard pivot chart:**

1. Select the chart.
2. From the values quadrant (or other appropriate quadrant) of the Pivot Table Field panel on the right side of the screen, click the value you are trying to show.
3. Choose the appropriate Show command from the shortcut menu.

**In Summary:**

Remember, there is no one right dashboard. Each submission should reflect your own problem solving and critical thinking skills and should be unique. Iterate several times before your final submission and feel free to contact me with questions.

Lastly, enjoy this project! I really think you will have fun while learning a valuable skill for use in your career.