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DEPARTMENT OF EDUCATION

Empowerment Technologies

12

Advanced Spreadsheet Skills

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Empowerment Technologies

12

MODULE

7

Advanced Spreadsheet Skills

Introductory Message

For the Facilitator:

Welcome to the <u>Empowerment Technologies with Grade 12</u> Self-Learning Module on <u>Advanced Spreadsheet Skills</u>!

This Self-Learning Module was collaboratively designed, developed and reviewed by educators from the Schools Division Office of Pasig City headed by its Officer-in-Charge Schools Division Superintendent, Ma. Evalou Concepcion A. Agustin, in partnership with the City Government of Pasig through its mayor, Honorable Victor Ma. Regis N. Sotto. The writers utilized the standards set by the K to 12 Curriculum using the Most Essential Learning Competencies (MELC) in developing this instructional resource.

This learning material hopes to engage the learners in guided and independent learning activities at their own pace and time. Further, this also aims to help learners acquire the needed 21st century skills especially the 5 Cs, namely: Communication, Collaboration, Creativity, Critical Thinking, and Character while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Moreover, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the Learner:

Welcome to the <u>Empowerment Technologies with Grade 12</u> Self-Learning Module on <u>Advanced Spreadsheet Skills</u>!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning material while being an active learner.

This module has the following parts and corresponding icons:

Expectations - This points to the set of knowledge and skills that you will learn after completing the module.

Pretest - This measures your prior knowledge about the lesson at hand.

Recap - This part of the module provides a review of concepts and skills that you already know about a previous lesson.

Lesson - This section discusses the topic in the module.

Activities - This is a set of activities that you need to perform.

Wrap-Up - This section summarizes the concepts and application of the lesson.

Valuing - This part integrates a desirable moral value in the lesson.

Posttest - This measures how much you have learned from the entire module.

🎯 EXPECTATIONS

At the end of this module, learners should be able to:

- be familiar with the commonly used functions in Microsoft Excel;
- use several conditional functions available in Microsoft Excel; and
- use Microsoft Excel as a viable tool in market research and product development.

✅ PRETEST

Directions: Read carefully the following questions. Choose the letter of the best answer and write it on your notebook.

1. What application program is designed to create spreadsheets which can later be used to analyze statistical data?
   A. Microsoft Excel
   B. Microsoft Publisher
   C. Microsoft Word
   D. Microsoft OneNote
2. Which of the following Microsoft Excel functions can be used to add range of cells?
   A. Add   B. Plus   C. Sum   D. Total
3. Which tab in the formal cells dialog box can be used to change the orientation of the text?
   A. Alignment   B. Orientation   C. File   D. View
4. Which of the following is NOT part of the syntax for AVERAGEIF?
   A. Average range B. Range   C. Logical test   D. Criteria
5. Which of the following shortcut keys in Microsoft Excel can be used to show the format cells dialog box?
   A. Ctrl + F   B. Shift + F   C. Ctrl + 1   D. Alt + 1
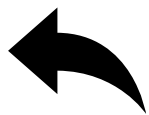
← RECAP

In the previous module, you learned about the **"Advanced Word Processing Skills".** At this point, you are now familiar of its features and functions that can make you work efficiently.

Microsoft Word is an application which can be used economically by maximizing its full capabilities. Mail Merge, being one of its features, allows you to create a single template which can be sent to multiple recipients.

In addition to that, integrating images and external materials can have rich-content media and improve the overall appearance of the document. It can help a company improve its expenditures. All of these, you were made aware from the previous module.

LESSON

Whether you work in the field of accounting or not, the truth is whatever you do should be accounted for. This is because the resources you use cost you expenses. If you become a scientist, an engineer, a yoga instructor, a bartender or an airline pilot, it is important to understand how a company spends to be able to deliver products or services. These factors could easily be computed using spreadsheet programs like Microsoft Excel or Google Sheets.

Let us start by forming a product or service that you can sell or offer around the campus. It can be sweets like *polvoron or yema,* small souvenirs like keychains or bag tags, or services like foot spa or *harana* (serenade) for hire.

Add a personal twist to your product which could be something marketable to your target community. You may add *malunggay* to your polvoron. The keychain may contain caricature of the buyer. Also, you can create artworks and sell them as a product or service.

On a sheet of paper, fill out the information of your product. A sample is shown in the next page.

Product Information

Product or Service Name: _____

Company Name: _____

Name of Owner: _____

Product Description:

_____
_____
_____

Ingredients/Materials:

_____
_____

Estimated Sale Price: _____ per _____

Estimating the Product Cost Using Microsoft Excel

Let us assume that we are going to sell milk tea with the following information.

Product Information

Product Name: Starbuko Organic Milk Tea
Company Name: Starbuko Foods Corporation

Product descrition:
Starbuko Milk Tea is a special tea using organic ingredients especially made for Filipinos.

Ingrdients/Materials: tea, water, condensed milk, ice and special sweetenner

Estimated Sale Price: PHP 25 per cup

We will use Microsoft Excel to find out if our estimated sale price is reasonable considering the actual price of the ingredients.

1. Copy the information below:

	A	B	C
1		Starbuko Organic Milk Tea	
2		Cost of Ingredient	
3	No.	Ingredients	Price/Glass
4	1	Organic Tea (1 sachet)	PHP 12.00
5	2	Pure Drinking Water	PHP 0.20
6	3	Sweetened Condensed Milk	PHP 13.00
7	4	Cup	PHP 2.00
8		Total	

Tips: To get the values with PHP or Philippine peso sign use the **Accounting Number Format**. You can use the shortcut key **CTRL + 1** to show the **Format Cells** dialog box, click the **Accounting** in the category where you see options for the currency you need.

The default currency is dollar symbol ($). To change this, click the drop-down arrow at the currency button then select **More Accounting Formats**, then change the symbol to PHP.

To help you understand, how the **SUM** formula in Microsoft Excel works, this is the simple way to do it. Take note that the position of the image with a data in the next page is in a horizontal position. You will get the sum of **100**, **200** and **300** using the **SUM** function or formula. In cell **F4**, you type **= (equal sign) then type SUM followed by open parenthesis, place or drag your computer mouse or cursor to cell C4 up to cell E4 then close parenthesis** to end your formula then press enter. Your formula will look like this **=SUM(C4:E4)** as shown in the image. You will get **600** as your answer. In arithmetic calculation using your knowledge in General Mathematics, you are adding 100 + 200 + 300 = 600 but this time you will add it using Microsoft Excel application, you will use **SUM** as the formula or function to use in this case. Remember that when you add two addends, you call the answer SUM in mathematical sense. This closely related to our ongoing activity.

This time, let's try to use SUM function of Microsoft Excel in vertical image with a data inside it as shown below. How are you going to use it? Simply, in cell **C6**, **type = (equal sign) then type SUM followed by open parenthesis, drag your computer mouse or cursor to cell C3 down to cell C5 then type close parenthesis and hit enter key**. The answer will be **600**. It is simply adding the range of cells with given values. The formula you created is **=SUM(C3:C5)**. There must be no spaces in between these characters in any formulas that you use in Microsoft Excel. Otherwise, it will be a formula error.

	A	B	C	D	E
1					
2			Vertical		
3		C3	100		
4		C4	200		
5		C5	300		
6		C6	600	=SUM(C3:C5)	
7					

2. Use the sum formula to get the summation of the values for C4 to C7. The SUM formula is =SUM(C4:C7). Type this on cell C8 as shown below:

	A	B	C
1		Starbuko Organic Milk Tea	
2		Cost of Ingredient	
3	No.	Ingredients	Price/Glass
4	1	Organic Tea (1 sachet)	PHP 12.00
5	2	Pure Drinking Water	PHP 0.20
6	3	Sweetened Condensed Milk	PHP 13.00
7	4	Cup	PHP 2.00
8		Total	=SUM(C4:C7)
14			

3. Check if our estimated price will earn us profit. Type the additional format of information shown below then apply the arithmetic formula for subtraction. The formula now will be =C9-C8 or total minus estimated price.

	A	B	C
1		Starbuko Organic Milk Tea	
2		Cost of Ingredient	
3	No.	Ingredients	Price/Glass
4	1	Organic Tea (1 sachet)	PHP 12.00
5	2	Pure Drinking Water	PHP 0.20
6	3	Sweetened Condensed Milk	PHP 13.00
7	4	Cup	PHP 2.00
8		Total	PHP 27.20
9		Estimated Price	PHP 25.00
10		Profit	=C9-C8

4. The result if PHP 2.20. Our estimated price is not profitable. Let us make an adjustment. Include the information below and deduct the total from the New Sale Price.

	A	B	C
1		Starbuko Organic Milk Tea	
2		Cost of Ingredient	
3	No.	Ingredients	Price/Glass
4	1	Organic Tea (1 sachet)	PHP 12.00
5	2	Pure Drinking Water	PHP 0.20
6	3	Sweetened Condensed Milk	PHP 13.00
7	4	Cup	PHP 2.00
8		Total	PHP 27.20
9		Estimated Price	PHP 25.00
10		Profit	PHP (2.20)
11			
12		Adjusted Sale Price	PHP 35.00
13		Profit	=C12-C8
14			

5. The result is PHP 7.80. This is definitely profitable at this price. However, this does not guarantee our product's success.
6. Save your file as Cost of Ingredients.xlsx.

Remember to research on the ingredients price if applicable, divide the quantity of a certain ingredient so that its cost will only cover one serving.

Analyzing Data Using Microsoft Excel

In reality, researchers would come up with a survey (questions) before releasing a new product. The data gathered would help them determine if the product has any chance to succeed in the target market. This will also determine how your product will be perceived by your target market. Let us take the sample survey below showing the people in your school (teachers, students, personnel) as the target market.

Add more questions that fit to your product. If your product is not a food product replace the "taste" rate with durability or function. Have this survey approved by your teacher then produce 15 copies of these as your survey form. You must produce product samples good for 15-20 people for food testing. You can start in your school by letting students and teachers taste/test your product.

Sample Survey (for food product)

Name: _____ Age: _____

Income/day: _____ (Optional)

Instructions: Circle the letter of your answer.

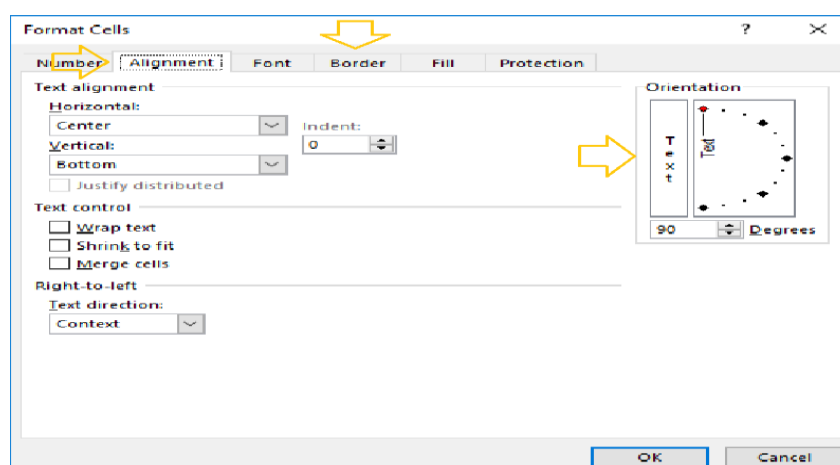1. On the scale of 1-5, how would you rate the product's quality?
    A. 1   B. 2   C. 3   D. 4   E. 5
2. On the scale of 1-5, how would you rate the product's taste?
    A. 1   B. 2   C. 3   D. 4   E. 5
3. On the scale of 1-5, how would you rate the product's presentation?
    A. 1   B. 2   C. 3   D. 4   E. 5
4. On the scale of 1-5, how would you rate the product's itself?
    A. 1   B. 2   C. 3   D. 4   E. 5
5. Are you satisfied with the product?
    A. Yes   B. No
6. Would you recommend the product to a friend?
    A. Yes   B. No
7. How much are you willing to pay for this product?
    A. PHP 15 and below
    B. PHP 16-25
    C. PHP 26-35
    D. PHP 36-45
    E. PHP 46-55

Suggestions or Comments:
_____
_____
_____

When your respondents are done with the survey form you distributed to them. You will now gather the data and encode (place) them in Microsoft Excel. A sample of these spreadsheet is on the next page using the Starbuko Organic Milk Tea as an example.

TIPS: * To change the orientation of a text, use shortcut key **Ctrl + 1**. It will open the **Format Cells** dialog box > **Alignment** tab > under **Orientation**, specify the degrees you want.

* To add and make borders to the cells, use shortcut key **Ctrl + 1**. It will open the **Format Cells** dialog box > **Border** tab, specify the border that you will use, you can also add line color and select a line style you need. Alternatively, on **Home** tab > **Font** group > select borders.

No.	Last Name	First Name	Age	Student/Teacher	In a Scale of 1-5				Yes/No		Price				
					Quality	Taste	Presentation	Product	Satisfied?	Recommended?	PHP 15 Below	PHP 16-25	PHP 26-35	PHP 36-45	PHP 46-55
1	Dela Cruz	Ninna	16	Student	5	4	3	4	YES	YES			X		
2	Magcamit	Hyannis	16	Student	4	3	2	5	YES	YES		X			
3	Zeta	Dia	14	Student	3	4	3	4	YES	YES			X		
4	Paras	Odeine	14	Student	3	5	3	4	YES	YES		X			
5	Del Rosario	Vea	17	Student	4	3	3	4	YES	YES		X			
6	Antonio	Nate	18	Student	2	4	3	4	YES	YES		X			
7	Mengullo	Jules	26	Teacher	5	5	3	4	YES	YES		X			
8	Low	Jesy Claire	43	Teacher	4	4	4	4	YES	YES		X			
9	Angeles	Emiko	43	Teacher	5	3	2	4	NO	YES			X		
10	Binondo	Patricia	42	Teacher	3	4	3	5	YES	YES		X			
11	Etpison	Christine	44	Student	3	5	3	5	YES	YES		X			
12	Sta. Mara	Julia	14	Student	4	4	3	5	YES	YES	X				
13	Espela	Bea	15	Student	3	5	3	5	YES	YES				X	
14	Hilario	Suzie	15	Student	5	4	3	5	YES	YES	X				
15	Lapis	Adrian	57	Teacher	4	4	3	5	YES	YES					X
				Teacher Average	4.20	4.00	3.00	4.40	14	15	2	8	3	1	1
				Student Average	3.60	4.10	2.90	4.50							
				Combined Average	3.80	4.07	2.93	4.47							

This data is raw. If we have a huge sample, we will apply several formulas to easily analyze the result of this survey.

Using the *Average* and *Averageif* Formula

The syntax are **=average(cell involved)** and **=averageif(range,criteria,[average range])**

Notice that the data above showed the result of teacher, student and combined average. You can simply analyze the result of your survey with what you can see from the data presented above.

- To get the combined average, this is the formula employed for quality: **=AVERAGE(F5:F19)**. It means that to get the combined average for taste, presentation and product, simply change the cells involved in the file. It is a simple averaging of the respondent's response.

- To get the result of the average for quality based on the survey of the teachers, this is the formula used: **=AVERAGEIF(E5:E19,"Teacher",F5:F19).** This means that to get the average for student about quality, you will just replace the criteria **"Teacher"** to **"Student"**. The same steps apply to get the teacher average and student average for taste, presentation and product. You will need to follow the same formulation but this time just change the **average range**.

criteria

= sign

=AVERAGEIF(E5:E19,"Teacher",F5:F19)

function name

range   **average range**
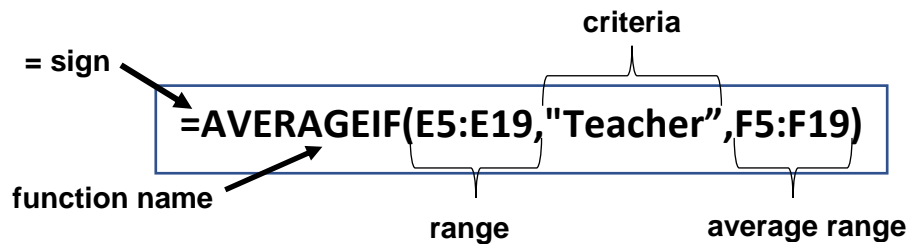
Using *Countif* Formula

The syntax is **=countif(range,criteria)**.

Using the **=countif** function will allow us to count the number of cells that contains something. However, in this case we will only count the ones that have **YES** in them.

- To get the number of respondents who answered YES for satisfied, the formula is **=COUNTIF(J5:J19,"yes")** while for recommended, you will need to adjust the range to get it while the criteria is still the same. The same formula will be used to get the values for the prices by changing the range and the criteria from **"yes"** to **"x"** since x entails to the responses of the respondents in the survey made for the price options.

criteria

= sign

=COUNTIF(E5:E19,"yes")

function name
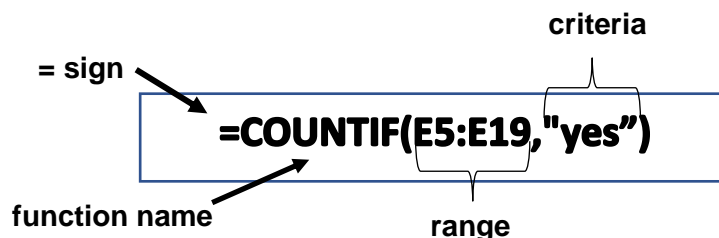
range

The following are key terms that you need to understand:

- **Range** – the range of cells where you want to look for the criteria.
- **Criteria** – a value or label that determines if a cell is part of the range to be averaged or counted.

- **Average/count range *(optional)*** – the actual range of the cells that will be averaged or counted, if omitted the range will be used instead.

To make a generalization about the values in the table above. The result garnered for teacher average is 3.00, student average got 2.90 while combined average was 2.93 which will be our basis for interpretation, you can say that the presentation of the product needs improvement because it is below the average. Data interpretation will be discussed further in the next module using graph.

▶ ACTIVITIES

Copy and complete the table being shown below using Microsoft Excel. You will need to make your own file to complete this activity. Use the formulas ***average***, ***averageif*** and ***countif*** to get the result in the shaded part of this table.

Survey Result															
						In a Scale of 1-5				Yes/No		Price				
No.	Last Name	First Name	Age	Student/Teacher	Quality	Taste	Presentation	Product	Satisfied?	Recommended?	PHP 15 Below	PHP 16-25	PHP 26-35	PHP 36-45	PHP 46-55
1	Dela Cruz	Ninna	16	Student	5	4	3	4	YES	YES			X		
2	Magcamit	Hyannis	16	Student	4	3	2	5	YES	YES		X			
3	Zeta	Dia	14	Student	3	4	3	4	YES	YES			X		
4	Paras	Odeine	14	Student	3	5	3	4	YES	YES		X			
5	Del Rosario	Vea	17	Student	4	3	3	4	YES	YES		X			
6	Antonio	Nate	18	Student	2	4	3	4	YES	YES		X			
7	Mengullo	Jules	26	Teacher	5	5	3	4	YES	YES		X			
8	Low	Jesy Claire	43	Teacher	4	4	4	4	YES	YES		X			
9	Angeles	Emiko	43	Teacher	5	3	2	4	NO	YES			X		
10	Binondo	Patricia	42	Teacher	3	4	3	5	YES	YES		X			
11	Etpison	Christine	44	Student	3	5	3	5	YES	YES		X			
12	Sta. Mara	Julia	14	Student	4	4	3	5	YES	YES	X				
13	Espela	Bea	15	Student	3	5	3	5	YES	YES				X	
14	Hilario	Suzie	15	Student	5	4	3	5	YES	YES	X				
15	Lapis	Adrian	57	Teacher	4	4	3	5	YES	YES					X
16	Nena	Ramos	43	Teacher	5	4	5	4	YES	NO					X
17	Arman	Lau	16	Student	4	4	5	4	YES	NO	X				
18	Reynan	Santos	17	Student	4	4	4	4	YES	NO		X			
19	Rannie	Reyes	16	Student	4	3	2	3	NO	YES		X			
20	Manni	Culiat	51	Teacher	3	3	4	4	NO	NO				X	
				Teacher Average											
				Student Average											
				Combined Average											

Submit a softcopy of your output to your teacher to record your grade performance. The rubrics in the next page will be used for this activity.

Category	Exemplary (4)	Accomplished (3)	Developing (2)	Beginning (1)	SCORE
Skills	All skills in Advanced Spreadsheet Processing are applied.	Most skills in Advanced Spreadsheet Processing are applied.	Some skills in Advanced Spreadsheet Processing are applied.	Few or no skills from Advanced Spreadsheet Processing are applied.	
Content	The output exceeds the expectations.	The output is complete.	The output is somewhat complete.	The output is incomplete.	
Accuracy	The output is free from errors.	The output contains minimal errors.	The output has several errors.	The output contains many errors.	
Efficiency	Finished the task in the most efficient way without wasting time and effort.	Finished the task in the projected amount of time.	Completed the task but used methods that consumed more time or sources.	Used the least efficient method in finishing task.	

WRAP-UP

This module talked about some basic and advanced features and functions of Microsoft Excel. It can be used to efficiently create a report that can help you to support your research or studies. It is used to record financial transaction to easily monitor financial flow where its feature can be used to make an accurate reporting.

As learners, what particular scenarios in school, do you think you can apply your knowledge obtained in this module? Which subjects, do you think it is more applicable for you to use? You can write you answer using the blank spaces provided below.

_____
_____
_____
_____
_____
_____
_____
_____

◆ VALUING

Stephen Few said, *"Numbers have an important story to tell. They rely on you to give them a clear and convincing voice"*, so learning this platform and its features is an opportunity for you to tell a story of a good research output or study made which is worthy to share to others

Microsoft Excel provides an automated way of displaying any statistical data. It can be used to automatically compute for several factors that are not easy to notice especially when faced with a large data. Microsoft Excel includes several arithmetic and basic functions that help you compute faster.

Containing over 1,048,576 rows and 16,384 columns each in the spreadsheet, with hundreds of them, or even more if your computer is capable, in single file. You can import data from other spreadsheets and create other objects making it easy to pull data you collected in various files in one place. You can also make an automated way of generating a report that can help you maximize your time when you are working for a company or simply making a research.

Nowadays, most of the companies requires an advanced knowledge in Microsoft Excel functions because it is less expensive since when you buy a computer, it comes with Microsoft Office application package. With this basic knowledge you obtained in this module, do you think, you can achieve accuracy with the proper use of the functions and features of Microsoft Excel? Also, do you think, you can prepare yourself for this demand since soon enough you will be part of the professional world? How will you deal with it?

Use the space provide below to answer the questions mentioned above.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

POSTTEST

Directions: Select the letter that correspond to the correct answer. Write your answer on your notebook.

1. This function is used to count the number of cells that contains something in them with the correct criteria in place.
   A. Count   B. CountNow   C. Counting   D. Countif
2. A number format that puts a dollar symbol before its value by default.
   A. Percent   B. Accounting   C. Comma   D. Date/Time
3. A function in Microsoft Excel which is used to get the average of a range of cells?
   A. Average   B. Sum   C. Mean   D. Median
4. A syntax in the AVERGAEIF function that includes the value or label which determines if the cell is part of the range to be averaged.
   A. Range   B. Criteria   C. Average Range D. Logical Test
5. What function in Microsoft Excel is used to add a certain range of cells when condition is met?
   A. Sumif   B. Addif   C. Totalif   D. Plusif

KEY TO CORRECTION

References

- Innovative Training Works, Inc. *Empowerment Technologies: 5th edition* (2016), Rex Publishing, Manila.
- BDykes. *"31 Essential Quotes on Analytics and Data"*. Accessed last June 21, 2020 from https://tinyurl.com/yce7x2m7