edTPA General Lesson Plan Template

Grade Level: Junior/Senior **Number of Students:** 13 **Instructional Location:** Probability and Statistics (Hybrid) **Date:** 11/17/2020

Lesson Goals

Central Focus of Lesson:
To further build on the learners ability to understand and describe a scatter plot.
To recognize the correlation coefficient (r) as a measure of the strength and direction of a linear relationship between two quantitative variables.
To understand the properties of the correlation coefficient (r).
To connect this understanding to a real world application in nature.

Standard(s) Addressed:
New Jersey Student Learning Standards for Mathematics | High School—Statistics and Probability
   (SID) Interpreting Categorical and Quantitative Data: (C) Interpret linear models
     8. Compute (using technology) and interpret the correlation coefficient of a linear fit.
     9. Distinguish between correlation and causation.

Lesson Objectives and Demands

Content Objectives:
Learners will be able to recognize the correlation coefficient r as a measure of the strength and direction of a linear relationship between two quantitative variables by assessing a real-world data set with a linear relationship.

Learners will be able to understand the properties of r by using technology that interactively demonstrates the possible values of r and by writing in a graphic organizer.

Learners will be able to understand how to use r to interpret the strength of a linear relationship by looking at scatterplots of data sets with different values of r.

Learners will be able to calculate r for data sets by using a graphing calculator.

Learners will be able to distinguish that a strong correlation does not imply causation by assessing a real-world data set.

Language Objectives:
Learners will recall and employ terms related to the correlation coefficient to identify, describe and analyze scatterplots by explaining these concepts in our general discussion and completing an exit ticket on Google Forms.

Key Vocabulary in Lesson:
correlation, correlation coefficient (r), scatterplot, linear relationship, regression line, explanatory variable, response variable, causation, interpolation, extrapolation, least squares regression line, coefficient of determination (r^2)

Lesson Considerations

Materials:
Access to youtube video on manatees played without sound.
Access to Desmos Activity Builder for the Correlation Coefficient (r) activity.
Google Forms (To collect answers from learners for the Exit Ticket)
TI-Smartview CE Software (PC Emulation of the TI-CE 84 Calculator)
SMART Notebook with Wacom Pencil (For real-time problem solving on whiteboard)
Whiteboard (Backup if Wacom Pencil fails)
Google Slides for access to the class presentation.

Prior Academic Learning and Prerequisite Skills:
To understand that the slope of a horizontal line is 0 and a vertical line is undefined.
To understand that when there are two points in a data set, there is a unique line connecting them.
To use a graphing calculator (i.e., TI-84 calculator) to identify the regression line for a distribution.
To read a scatterplot to understand the relationship between two quantitative variables measured on the same individuals.
To understand the explanatory variable is the x-axis and explains the response variable, the y-axis.
To describe the direction, form and strength of a relationship displayed in a scatterplot and identify outliers.

Misconceptions:
Learners might attempt to calculate r for a horizontal or vertical line.

Lesson Plan Details

Lesson Introduction/Anticipatory Set:
- *Review of prior week's concepts* – A facilitated classroom discussion guided by a Google Slides presentation to confirm our understanding of scatterplots, the explanatory and response variables, and how to describe scatterplots.
- *Discussion of applications of scatterplots in nature* – The discussion will surface what the learners see as being representable by scatterplots in the world around us. The discussion will lead us to our distribution set on the manatee, an example of a scatterplot that we will describe and calculate the correlation coefficient (r) for.

Learning Activities/Procedures - "During":
- *Desmos Activity* – An interactive set of scatterplots that allow the learner to drag points on a scatterplot and understand their impact on the correlation coefficient (r).
- *Manatee Activity* – Using a distribution set on manatees provided by Annenberg and the Florida Fish and Wildlife Conservation, the learners will use a graphing calculator to calculate the correlation coefficient (r). The learners will deliberate on causation and whether the explanatory variable, the boats, have a direct causation on the response variable, the manatees demise. As the students consider explanations for manatee deaths, a video will be silently played in the background showing their habitat and its interplay with boating.

Lesson Closure - "After":
- *Google Forms Exit Ticket*– 5 brief questions to verify the learners' understanding of the correlation coefficient (r) considering a simple scatterplot comparing sets of twins with equal heights.
- *Voice of the Learner* – Ask if on a scale of -1 to +1 how well do the learners understand the correlation coefficient (r).

Rubric as the Assessment Component

	0 = No Mastery	2 = Partial Mastery	4 = Complete Mastery
I understand the properties of the correlation coefficient (r), the possible values, that it is affected by outliers, and that it is not affected by a change in units of measure.	I have difficulty understanding the correlation coefficient (r) and its properties.	I understand the possible values of the correlation efficient (r) but need guidance with its other properties.	I describe to a peer the correlation coefficient (r), its properties and how they are applied when analyzing a linear distribution.
I use the correlation coefficient (r) sign to interpret the direction and magnitude to interpret the strength of a linear relationship between two variables.	I can identify and interpret the components if provided with guidance or provided a key.	I identify and interpret the components of the correlation coefficient (r).	I explain to a peer how the components of the correlation coefficient are used to interpret strength and direction of a linear distribution.
I distinguish between strong correlation and causation when assessing scatterplots.	I have difficulty understanding the difference of what is correlation and what is causation.	I understand that correlation does not imply causation but sometimes have trouble explaining why for two variables.	I explain to a peer how there is correlation but not causation between the explanatory and response variables.
I calculate the correlation coefficient using a graphing calculator.	I can attain when provided guidance, such as what to input into a graphing calculator.	I identify the values to input but do not always use the correct formula or values.	I consistently solve for the correlation coefficient using a graphing calculator.