

Our Winning Submission by Amber Struthers, Tempe High School, Arizona

Lesson Topic: Data Science in Esports Length of Lesson: Four class periods
Course: Math, Computer Science, STEM Grade Level: High School
OBJECTIVE
Students will be able to generate and analyze graphs from an esports database to solve a problem.
STANDARDS
ISTE: 3-Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others. ISTE: 5-Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. ISTE: 6-Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. NGSS: HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. CC High School: Summarize, represent, and interpret data on a single count or measurement variable. CC High School: Summarize, represent, and interpret data on two categorical and quantitative variables. CC High School: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Introduction

Students will explore a database of the top 5 highest earning esports teams. The first part of the lesson leads the students in how to access and explore the data, the second part of the lesson has the students explore their own generated questions about the data and extrapolate meaning and recommendations. The third part of the lesson, students reflect on the data and what the concepts of esports have to do with data. The fourth and final part of the lesson has the students taking on different roles within an esports team and utilizing data to make decisions, in which they present the best way to communicate their findings to their audience.

This lesson is geared towards students who may be new to data analysis. This lesson was developed for use in an introductory computer programming course at a high need, extremely diverse high school. Many of the students experience learning differences and experience challenges with long term career planning. The course this lesson was developing for has a wide range of student abilities, from special needs to advanced and gifted, and not every student selected to participate in the course. Students who may struggle with math concepts associated with graphs will be able to use the resource in the lesson to quickly generate visualization to be able to make meaning and predictions from the database. Students with physical challenges can use the technology-based graphing resource to reach the data analysis aspects of the lesson easier than producing physical graphs are partnered to complete the tasks so they can support each other in the different aspects of this lesson as they are learning to use tools and make meaning of data. Assessment is done with the a pre/post assessment Google form quiz and a small presentation.

DATA SCIENCE AND ESPORTS!!!

How can esports statistics impact business making decisions?

Esports is one of the fastest-growing competitive sports in the world. Esports are expected to surpass \$1.5 billion by 2023. It has become a central form of entertainment and has increased in ad revenue over the last few years. In 2018, ad revenue in the US in esports was \$143 billion, and just 6 months into 2021, the ad revenue increased to \$226 million. Viewers of esports, which supports ad revenue, are increasing at about 9% per year. In 2017, the number of people in the audience was about 335 million while in 2019 the number increased to 454 million. Many factors have influenced the increase in esports engagement, including live streaming and merchandising. The amount of investment in esports has also increased, from \$490 billion in 2017 to \$4.5 billion in 2018. Asia-Pacific, North America, and Europe are the top esports markets, with 57% of the esports audience. All these numbers help present the value and growth that esports, but this information would not be available without data analysis. Data allows investors to determine possible growth potential and for players to identify areas they can grow and develop competitively. And data analysis in sports is keeping part understanding and improving player performance.

For this series of activities, you will be exploring and integrating real esports data from the top 5 highest-grossing teams and exploring different ways to utilize the data and making meaning out of the information. Working in groups of at least two students, you will work together to examine and explore the data to see what decisions and recommendations can be made in the world esports!

Reference: Reyes, M. (2021, Jan 5). Esports Ecosystem Report 2021. Retrieved from <https://www.businessinsider.com/esports-ecosystem-market-report>

Pre-Assessment: Please click this link and see what you know! [Data Science Assessment](#)

PART 1:

1. Below is a database of the top highest grossing esports teams in 2021. This database includes information such as team name, player ID, total in winnings, what games they competed in, and country of origin.

[Play with the Dataset](#)

2. The website is host by CODAP, an online data analysis tool.

3. Take a look at the graph on the right.

a. What patterns do you notice about the data? Record your observations below:

b. What surprises you about the data? Record your observations below:

c. What questions do you have about the data? Record your questions below:

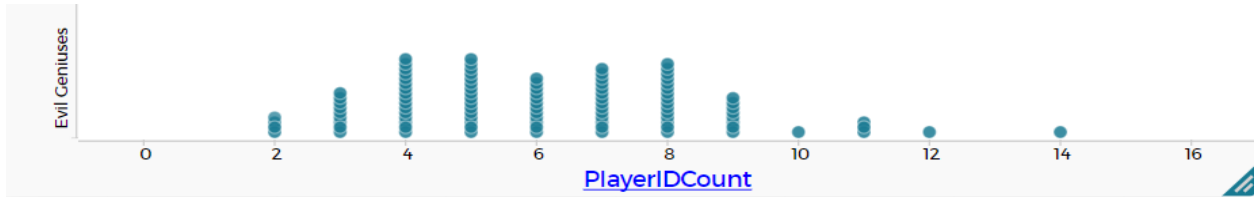
4. Now you will be guided through how to use the online tool for your own future analysis. On the table on the left, you will see the top of a column that says “Team Name”. You will click, hold, and drag it over to where it says “Total_Overall”. You will see the graph automatically change.


a. What countries have the highest representations on the top 5 teams? Record your observations below.

5. Next, you will take the same approach and explore the size of their player IDs/tags. Click on the top of the column that says “PlayerIDCount”, drag it and replace the “Country” value. Your graph will automatically change again.


a. What is the length of the longest player IDs? What is the length of the short player IDs? Record your observation below.

- Let continue to explore this data. On the graph, select all of the data on team “Evil Geniuses” by drawing a gray box around all the data points. When it is selected, it will look like this:



- There a tool bar with a ruler shape on the right of this graph which looks like this , click and check the boxes “mean” and “median”. A red line and a blue line should appear.
 - What is the mean for the player ID length for Team Evil Geniuses? What is the median? Record your observations below:

- Click the graph to remove your selection and clear the red and blue lines.
- Congrats! You have successfully analyzed esports team data! Now looking at this data, some questions may come to mind. Is there a number of characters a future player may want to aim to support success? Do players with names closer to the mean make more money? This is just a small sample of the hundreds of questions that can be developed from this database!

 ***Teacher Check Off! Please call the teacher over to show your work so it can be verified you've got this!***

PART 2:

- Below is a database of the top highest grossing esports teams in 2021. This database includes information such as team name, player ID, total in winnings, what games they competed in, and country of origin.

[Play with the Dataset](#)

- Using the database, answer the following questions:
 - What is one game that seems to have a high earn potential? Research this game and summarize the history of this game, how it is played, and it's possible earning potential with data from the database.

- b. What is a genre of game that seems to have the most earning potential? Using the database, identify at least three games fit within this genre, summarize history of that game as an esports, and describe its possible earning potential with data from the database.

- c. What is game that seems to have the least number of competitors among the highest earning teams? Using the database, identify at the game and research why there might be fewer players in this database for this game versus others and describe its possible earning potential with data from the database.

- d. What makes esports different from other ways we play video games? Using the database, describe the possible earning potential with data from the database with esports. Research the concepts of gamification and game-based learning and describe how they are different from esports.

PART 3:

1. Below is the same database of the top highest grossing esports teams in 2021. This database includes information such as team name, player ID, total in winnings, what games they competed in, and country of origin.


[Play with the Dataset](#)

2. Develop three questions you have about the data presented to you. Explore the graph to see what data is available that can be explored.
- a. Record your three questions below:

3. Focus on one of these questions and determine what variables you could use to examine your question.
- a. Record the variables you need to examine your question below:

4. Complete the following graphic organizer based on your observation. Be prepared to share:

<u>Claim:</u> what is the answer to your question	
<u>Evidence:</u> what in the data supports your answer	
<u>Reasoning:</u> why does that data support your answer	

5. Export your graph and paste on here. To do this, click the  icon, “Export Image”, select “Local File”, name the file, and save. Then copy/paste or insert the image into the document.
- a. Place your graph export image here:

PART 4:

You and a classmate will select ONE set of roles of different members of a professional esports team to make key decisions about the team and players. Use the database to help support recommendations for that member of an esports team and develop a way to communicate that recommendation.

Role 1: Team Manager and Sports Therapist

Burnout and stress have a huge impact on professional esports success. What kind of data, either in this database or needs to be collected, could a manager collect and analyze to encourage team success and earnings? Develop a way to communicate to team owners what kind of data needs to be collected to monitor burnout and stress within players with at least one possible strategy to help players deal with burnout and stress. You may communicate your recommendation as an email, a presentation, a video, a speech, or orally.

Role 2: Sports Team Recruiter and Prospective New Player

Professional esports is a growing field with a variety of different options. Based on your analysis of the data, which teams excel at which esports? As a team recruit, which team might be of interest for you to recruit for? Why would you select that team to recruit for? Develop a way to communicate to a possible team manager which team you would like to recruit for with at least one piece of evidence supporting your application. You may communicate your recommendation as an email, a presentation, a video, a speech, or orally.

Role 3: Seasoned Player and Communications Manager

As a member of an esports team, the ability to communicate clearly with team players is vital for competitive success. What kind of data, in the database or needs to be collected, could help members of the team examine and build their communication skills? Develop a way to describe to other team members what kind of data is needed to examine communication skills within the team as well as one possible strategy to help players improve their in-game team discussions. You may communicate your recommendation as an email, a presentation, a video, a speech, or orally.

REFLECTION:

Please complete the assessment again to see what you know now you are a data science in esports master!

Post Assessment:

Please click this link and reflect on what you know now! [Data Science Assessment](#)

PART 4 RUBRIC:

	1	2	3	4
Use of Data	Recommendation does not show insight into focus topic and does not introduce data concepts.	Recommendation is introduced but does not show insight into focus topic and does not introduce data concepts.	Recommendation maintains a reasonably consistent point of view and includes ideas relevant to role but only introduces data concepts.	Recommendation maintains clear, consistent point of view and ideas are relevant to role and utilizes data concepts.
Perspective	Recommendation wanders from topic; focus cannot be identified.	Central topic and purpose of the recommendation can be seen, but focus is inconsistent.	Recommendation stays largely on topic; its ideas are mostly supported.	Recommendation stays on topic, consistently and integrates data concepts. Details and information are included and directly support the purpose.
Presentation	Presentation of recommendation is unclear and has gaps or confusions. Recommendation has numerous errors.	Presentation of recommendation wanders or is unclear. Recommendation contains several errors and mistakes that may interfere with clarity of ideas.	Presentation of recommendation is clear and direct. Presentation contains some errors or mistakes.	Presentation of recommendation is fluent and interesting. Presentation contains few or no errors or mistakes. It engages and informs audience.