##### *Basics of Analysis: Ability to read graphs and reports*

|  |  |
| --- | --- |
| **VISUAL** | **VOICE OVER SCRIPT** |
|  | In our previous videos, we have often heard the word data. We understand that data is information usually in numbers that has been collected through observation.  It is important to understand what a given set of data contains and then based on that understanding we decide on how the data can be used, otherwise it becomes difficult to utilize this to our advantage.  *Have you heard of the term data visualization?*  ***(pause)***  Data visualization is the graphical representation of information and data. With the help of visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data.  *What comes to your mind when you hear the word report?*  ***(pause)***  Any document that presents information in an organized format for a specific purpose and the audience is called a report. It uses features like tables, graphs and charts to highlight and visualize information. |
| *Why is visual representation of data is important?*  *In today's world, images speak louder than words.* | *So, what do you think is the importance of data visualization?*  ***(pause)***  Data visualization makes it easier for the human brain to understand and remember big and small data.  It also makes it easier to detect patterns, trends, and outliers in large sets of information.  Let's look at an example of data visualization!  *What is the first thing that you notice when you see this visual?*  ***(pause)***  The first thing you notice might be different from what others notice, but you must have easily understood that this visual shows the daily schedules of famous creative people broken down by time and activity.  *Now imagine the same information was given to you without this visualization. Would you be able to get those same insights then?*  ***(pause)***  It would be a bit more difficult to get the same insights quickly without a proper visualization.  With the help of different colors used to highlight each activity, it is easy to understand how much time a person has spent on the various activities. |
| *Different Types of Visualization*  *Add visuals of different examples mentioned here* | When we think of data visualization, bar graphs and pie charts are some of the first elements that come to our mind. While these may be an integral part of visualizing data, the right visualization must be paired with the right set of information.  Some common general types of data visualization are:   * Charts * Tables * Graphs * Maps * Infographics * Dashboards |
|  | In this video, we will understand how to read two of the most common elements of data visualization that is - tables and graphs, with the help of reports that we generate after assessments.  We will be talking in detail about four kinds of reports here.  These reports are:   * Overall Performance reports * Skill-wise performance reports * Question-wise performance reports * School-wise performance reports   Now, let us discuss these reports in detail one by one. |
| *Overall Performance reports* | *What would be the first thing that comes to your mind on hearing ‘Overall Performance Reports’?*  ***(PAUSE)***  Overall performance reports tell us about the average performance percentage for a class and subject.  However, it also shares some other details related to the performance of students.  Let's understand these with the help of an example of an overall performance report.  The first part of an overall performance report is a table that is shown here.  *Look at the table carefully and see what all information can you deduce from this table.*  **(pause)**  As you can see in the table, for each of class 3 and 5 and for each subject Language and Maths, we can find:   * N which is the number of students that have taken the assessment, * Average percentage which is the average score of all students, * SD is the standard deviation * SE is the standard error * Zero scorer percentage which refers to the students scoring 0% in the test, * Low scorer percentage which refers to the students scoring less than 20% in the test, * Above average scorer percentage which refers to the students scoring more than or equal to the class average.   Let's try to find some information from this table!  *Can you find the percentage of low scorer students in class 5 Language?*  **(pause)**  In the table, first find the column labeled as Language, then go to the row for class 5. Under the column heading "low scorer percentage" we can see that 32.5% students were low scorer in class 5 language.  Similarly, we can find information for different classes and subjects.  Now, let's understand the second part of an overall performance report.  *Look at the graph shown here.*  **(pause)**  It shows the distribution of students in different performance percentage bands, which helps us understand the nature of students present in the assessment year for each class and subject.  *Let's discuss this in detail. How many performance percentage bands do you see here?*  **(pause)**  There are four performance percentage bands here.  The first one which is yellow in colour, contains all the students that have raw scores between 0 to 25%. This is the band that we want to minimize in our classrooms. The next band which is green in colour shows the percentage of students that have raw scores between 25 to 50%. Raw scores between 50 to 75% and between 75 to 100% are represented by blue and red colour bands respectively. Ideally, we want to maximize the number of students in blue and red bands in our classrooms.  Let's try reading the performance distribution graph and find some information!  *Can you tell how many percentage of students are scoring between 25-50% in class 3 Maths?*  **(Pause)**  As you can see, 44.2% students have scored between 25-50% in class 3 Maths.  We can see that the green colour band highlights the students who have scored 25-50% in the test. Under class 3, we look at the bar for subject Maths and find our answer on the green colour band.  *So do you think with the help of the overall performance report we can tell which class is performing better?*  **(Pause)**  Yes, from the graph it appears that class 3 students are performing better than class 5 students in both Language and Maths.  We were able to identify this from their average performance in both the papers. We can also see that class 3 students have a higher percentage of students in 50-75% and 75-100% performance bands in the performance distribution graph.  But we should keep in mind that is may not be completely true because the papers tested for both grades might be quite different. |
| *Skill-wise performance reports*  *(keep a similar bar graph, left with all the skill names and bars on the right as the script mentions so)* | Moving on to the next report.  Let’ say we have the performance of students in a particular subject.  *How do you think we can know which topic needs the most attention in that subject?*  **(pause)**  This is where a skill-wise performance report helps by highlighting the performance of students in each skill tested for that grade and subject. This helps in identifying the learning gaps and focusing more on those specific skills.  *Look at the graph shown here.*  **(pause)**  We can see that on the left side, different skills of Language are mentioned, and on the right side the performance percentage of students in each skill is shown with the help of bars.  *Do you remember where these skills are coming from?*  **(pause)**  Exactly! These are the same skills that are decided on while creating the blueprint.  Now let's come back to the graph and try to understand it in detail.  *Can you tell which skill are students performing lowest in Language?*  **(pause)**  We can see that only 20% of the students have performed in the skill "Analyses and infers hidden ideas in the passage"  *Now, what do you think in which skill are students performing the highest in Language?*  **(pause)**  From the graph, we can see that 62% of the students have performed in the skill "knows correct spellings and phonics in the words"  *So, do you think the performance in one skill will affect the performance in another skill?*  **(pause)**  Yes, performance on different skills can be interdependent and therefore a low performance in one skill may also affect the performance in another skill.  For example, the information in the graph shown suggests that a loose grasp on grammar concepts is leading to low performance in understanding written information, and inferring hidden ideas in the passage.  This is because if students don't have a proper understanding of grammar concepts, they might be unable to comprehend information in the passages.  *So, why do you think it is important to know the student's performance in different skills of a subject?*  **(pause)**  Students' performance levels can be improved by understanding their performance in different skills and addressing them. Skills with a low performance can be given more attention in the class to bring an overall improvement in the performance on that subject. At the same time, it is important to also know what we are doing right and which skills students are performing well on, so we can continue those best practices. |
| *Question-wise performance reports* | Now, we have students' overall performance and their performance in different skills. However, we know that questions themselves can vary in terms of their complexity.  *So why do you think it is important to look at students' performance at a question level?*  **(pause)**  As we know, skills are large umbrellas under which there are different types of questions. These questions could be mechanical, understanding, or application-based in nature. What children know and don't know actually depends even on the questions. We need to understand what questions the students are struggling with.  This is where a question-wise performance report helps us understand students' performance for each question tested.  It also helps us know the distribution of students’ responses across different options.  *Let's look at the performance of the students in the question shown here and understand what all information we can get from this table.*  **(pause)**  From this table:   * We can find what percentage of students selected Option A or Option B or Option C or Option D * We can find the percent of students answering the question correctly which is highlighted in green * We can find what percentage of students give an invalid answer such as selecting multiple options. * We can find the percentage of the students who did not attempt this question.   *You have the data present in front of you. Can you tell what percentage of students answered the question correctly?*  **(pause)**  Yes, 24.7% of the students were able to answer the question correctly. The correct option which is Option D is highlighted in green here.  *Now we can see that we also have the performance data of the students for the wrong options. Whatever could we do with the wrong options!*  *Should we just throw the data away?*  **(pause)**  NO, WAIT, hold on! That's extremely valuable data for us. The wrong answers tell us where exactly are the students making mistakes.  Let's try to understand this by the example of the question given here.  The performance of the students in the table show that many of the students are selecting the wrong option A and option C. This is because they are confusing the meaning of the word "tying" and the word "starting" with the word "creation".  Such insights, when collected from the questions, helps us understand why students might be misinterpreting other options as the correct answer.  Thus, the performance of students in the wrong options helps us highlight students' misconceptions. |
| *School-wise performance reports* | So far, we have only talked about the collective performance of all the schools tested.  *But, do you think the problems we see at an overall level would be the same for each school individually?*  **(pause)**  This really depends on the size of the data set. If there are a many schools, mostly the school level and overall level will have more similarities but if there are fewer schools then there will be a difference. However, we need to find student's performance at school level to diagnose problems and find remediation that are specific to that school.  This is where school-wise performance reports come into play. These would have the same overall, skill-wise, question-wise performance reports but specific to the school which helps us deep-dive and understand the data.  Let's see how are school-wise performance reports useful:   * It helps us identify which schools are performing better than the others. We can then figure out if the schools are doing something differently for their students and if yes, what are their effective intervention methods. * It also helps us identify schools that may not be performing well. More focus can be then given to these schools and help them come up with plans to increase students' learning levels. * It helps us find out if some schools have students who are performing exceptionally well. * It helps us identify the weakest and the strongest skills that are specific to the school. It is not necessary that these skills would be the same as the skills at an overall level.   By highlighting the issues at school-level, effective remediation strategies can be formed and change can be expected in the next assessment. |
|  | In this video, we understood that elements like tables and graphs help in highlighting important information in any report. It is important to read the data from the reports well and use them to answer our questions.  We understood the importance and ways to read an overall performance report, skill-wise performance report, question-wise performance report and school-wise performance report.  We can conclude by saying that the data visualization helps us understand where we need to look closer, but ultimately the details will drive our actions. The visualization provides an overview and a direction but our actions will come from delving into details which are equally important. |