**Ask Question to Make Data-Driven Decisions**

**Structured Thinking:**

“Structured thinking is the process of recognizing the current problem or situation, organizing available information, revealing gaps and opportunities, and identifying the options.”

**6 Basic Problem types of Data Analysts typically face:**

1. **Making Predictions**

* Using data to make an informed decision about how things may be in the future.

**Problem: How to determine the best advertising method for a target audience?**

* A company that wants to know the best advertising method to bring in new customers is an example of a problem requiring analysts to make predictions. Analysts with data on location, type of media, and number of new customers acquired as a result of past ads can't guarantee future results, but they can help predict the best placement of advertising to reach the target audience.

1. **Categorizing things**

* Assigning information to different groups or clusters based on common features.

**Problem: How to improve customer satisfaction levels?**

* Analysts might classify customer service calls based on certain keywords or scores. This could help identify top-performing customer service representatives or help correlate certain actions taken with higher customer satisfaction scores.

1. **Spotting something unusual**

* Identifying data that is different from the normal.
* A company that sells smart watches that help people monitor their health would be interested in designing their software to spot something unusual. Analysts who have analyzed aggregated health data can help product developers determine the right algorithms to spot and set off alarms when certain data doesn't trend normally.

1. **Identifying themes**

* Grouping categorized information into broader concepts.

**Problem: How to improve user experience**

* User experience (UX) designers might rely on analysts to analyze user interaction data. Similar to problems that require analysts to categorize things, usability improvement projects might require analysts to identify themes to help prioritize the right product features for improvement. Themes are most often used to help researchers explore certain aspects of data. In a user study, user beliefs, practices, and needs are examples of themes.
* By now you might be wondering if there is a difference between categorizing things and identifying themes. The best way to think about it is: categorizing things involves assigning items to categories; identifying themes takes those categories a step further by grouping them into broader themes.

1. **Discovering Connections**

* Finding similar challenges faced by different entities and combining data and insights to address them.

**Problem: How to reduce wait time**

* A third-party logistics company working with another company to get shipments delivered to customers on time is a problem requiring analysts to discover connections. By analyzing the wait times at shipping hubs, analysts can determine the appropriate schedule changes to increase the number of on-time deliveries.

1. **Finding Patterns**

* Using historical data to understand what happened in the past and is therefore likely to happen again.

**Problem: How to stop machine to breaking down**

* Minimizing downtime caused by machine failure is an example of a problem requiring analysts to find patterns in data. For example, by analyzing maintenance data, they might discover that most failures happen if regular maintenance is delayed by more than a 15-day window.

**SMART Questions/ SMART Methodology:**

A too for determining a question’s effectiveness based on whether it is:

**S=Specific:**

* A question that is simple, significant, and focused on a single topic or a few closely related ideas.
* Is the question specific? Does it address the problem? Does it have context? Will it uncover a lot of the information you need?

**M=Measurable:**

* A question whose answers can be quantified and assessed
* Will the question give you answers that you can measure?

**A=Action-oriented:**

* A question whose answers lead to change
* Will the answers provide information that helps you devise some type of plan?

**R=Relevant:**

* A question that has significance to the problem to be solved
* Is the question about the particular problem you are trying to solve?

**T=Time-bond:**

* A question that specifies a timeframe to be studied
* Are the answers relevant to the specific time being studied?

Things to avoid when asking questions:

1. **Leading Questions:** A question that steers people toward a certain response

Questions that only have a particular response.

* + **Example:** This product is too expensive, isn’t it?

This is a leading question because it suggests an answer as part of the question. A better question might be, “What is your opinion of this product?” There are tons of answers to that question.

1. **Close-ended Questions:** Questions that ask for one word or brief response only
   * **Example:** Were you satisfied with the customer trial?

This is a closed-ended question because it doesn’t encourage people to expand on their answer. It is really easy for them to give one-word responses that aren’t very informative. A better question might be, “What did you learn about customer experience from the trial.” This encourages people to provide more detail besides “It went well.”

1. **Vague Questions:** Questions that aren’t specific or don’t provide context
   * **Example:** Does the tool work for you?

This question is too vague because there is no context. Is it about comparing the new tool to the one it replaces? You just don’t know. A better inquiry might be, “When it comes to data entry, is the new tool faster, slower, or about the same as the old tool? If faster, how much time is saved? If slower, how much time is lost?” These questions give context (data entry) and help frame responses that are measurable (time).

1. **Unfair Question:** A question that makes assumptions or is difficult to answer honestly.

**Data-Driven Decision and Data-inspired Decision- making**

**Data-Driven Decision-making:** Means using facts to guide business strategy.

The phrase “data-driven decisions” means exactly that: Data is used to arrive at a decision. This approach is limited by the quantity and quality of readily-available data. If the quality and quantity of the data is sufficient, this approach can far improve decision-making. But if the data is insufficient or biased, this can create problems for decision-makers. Potential dangers of relying entirely on data-driven decision-making can include overreliance on historical data, a tendency to ignore qualitative insights, and potential biases in data collection and analysis.

Example: A/B testing is a simple example of collecting data for data-driven decision-making.

**Data-inspired Decision-making:** The process of exploring different data sources to find out what they have in common.

Data-inspired decisions include the same considerations as data-driven decisions while adding another layer of complexity. They create space for people using data to consider a broader range of ideas: drawing on comparisons to related concepts, giving weight to feelings and experiences, and considering other qualities that may be more difficult to measure. Data-inspired decision-making can avoid some of the pitfalls that data-driven decisions might be prone to.

**Algorithm:** A process or set of rules to be followed for a specific task.

**Qualitative and Quantitative Data**

**Quantitative Data:** Specific and objective measures of numerical facts or things can be measured. With quantitative data we can see numbers visualized as Charts or Graphs.

* The What?
* How many?
* How often?

**Qualitative Data:** Subjective or explanatory measures of qualities and characteristics or things can’t be measured.

* Helping answer **WHY** questions.
* Add context to a problem.

**Data Representation Tools**

**Reports:** Static collection of data given to stakeholders periodically

**Pros:** **Cons:**

* High-level historical data - Continual maintenance
* Easy to design - Less visually appealing.
* Pre-cleaned and sorted data - Static

**Dashboards:** Monitors live, incoming data

* Dynamic, automatic, and interactive - Labor-intensive design
* More stakeholder access - Can be confusing.
* Low maintenance - Potentially uncleaned data

The following table summarizes the benefits of using a dashboard for both data analysts and their stakeholders.

|  |  |  |
| --- | --- | --- |
| **Benefits** | **For data analysts** | **For stakeholders** |
| **Centralization** | Share a single source of data with all stakeholders | Work with a comprehensive view of data, initiatives, objectives, projects, processes, and more |
| **Visualization** | Show and update live, incoming data in real time\* | Spot changing trends and patterns more quickly |
| **Insightfulness** | Pull relevant information from different datasets | Understand the story behind the numbers to keep track of goals and make data-driven decisions |
| **Customization** | Create custom views dedicated to a specific person, project, or presentation of the data | Drill down to more specific areas of specialized interest or concern |

Create a dashboard:

1. Identify the stakeholders who need to see the data and how they will use it.

<https://s3.amazonaws.com/looker-elearning-resources/Requirements+Gathering+Worksheet.pdf>

1. Design the dashboard (what should be displayed)

Use clear headers, add short text descriptions, and show the most important information at the top.

1. Create a mockups if desired
2. Select the visualizations. <https://blog.hubspot.com/marketing/types-of-graphs-for-data-visualization>
3. Create filters as needed. <https://help.tableau.com/current/pro/desktop/en-us/actions_filter.htm>

**Pivot table:**

A data summarization tool that is used in data processing. Pivot tables are used to summarize, sort, reorganize, group, count, total or average data stored in a database.

**Metric:** A metric is a Single, quantifiable type of data that can be used for measurement.

**Metric Goal:** A measurable goal set by a company and evaluated using metrics.

**Return on Investment (ROI): =** Net Profit / Cost of Investment

**Mathematical Thinking:** is a powerful skill you can use to help you solve problems and see new solutions. It means looking at a problem and logically breaking it down step-by-step, so you can see the relationship of patterns in your data and use that to analyze your problem.

**Small Data: (use excel) Big Data: (use sql)**

* Specific - Large and less-specific
* Short time-period - Long time-period
* Day-to-day decisions - Big decisions

|  |  |
| --- | --- |
| **Small data** | **Big data** |
| Describes a dataset made up of specific metrics over a short, well-defined time period. | Describes large, less-specific datasets that cover a long time period. |
| Usually organized and analyzed in spreadsheets | Usually kept in a database and queried |
| Likely to be used by small and midsize businesses | Likely to be used by large organizations |
| Simple to collect, store, manage, sort, and visually represent | Takes a lot of effort to collect, store, manage, sort, and visually represent |
| Usually already a manageable size for analysis | Usually needs to be broken into smaller pieces in order to be organized and analyzed effectively for decision-making |

**The Three (or four) V words for big data**

**Volume:** Describe the amount of data.

**Variety:** Describe the different kinds of data.

**Velocity:** Describe how fast the data can be processed.

**Veracity:** refers to the quality and reliability of the data

**Module 03:**

**Spreadsheet Tasks:**

* Organize your data.
* Pivot Table
  + Sorting and Filtering
* Calculate your data.
* Formula
* Functions

Spreadsheet and data life cycle:

* **Plan** who will work within a spreadsheet, Means formatting, heading, highlights & colors.
* **Capture** data by the source by the connecting spreadsheet to other data sources, such as online survey applications or database.
* **Manage** different kind of data with a spreadsheet, this can involve storing, organizing, filtering, and updating information.
* **Analyze** data in a spreadsheet to help make better decision, tools include formulas to aggregate data or create reports and pivot tables for clear, easy to visualize.
* **Archive** spreadsheets that don’t use often but might need to reference late.
* **Destroy** your spreadsheets when you are certain that you will never need it again.

**Function:** A present command that automatically performs a specific process or task using the data.

**Problem Domain:** The specific area of analysis that encompass every activity affecting or affected the problem.

**Structured Thinking:** The process of recognizing the current problem or situation organizing available information, revealing gap and opportunities, and identifying the options.

**Scope of Work (SOW):** A scope of work is an agreed-upon outline of the work you’re going to perform on a project.

**Context** is the condition in which something exist or happens. The fact is, data has little value if it is not paired with context. Context can turn raw data into meaningful information. Giving the data perspective by defining it. To do this, you need to identify:

* Who: The person or organization that created, collected, and/or funded the data collection.
* What: The things in the world that the data could have an impact on
* Where: The origin of the data.
* When: The time when the data was created or collected.
* Why: The method used to create or collect it.

**Module 04:**

**Stakeholders:** People that have invested time, interest, and resources into the projects you’ll be working on as a data analyst.

**Working effectively with stakeholders:** Use the following tips to communicate clearly, establish trust, and deliver you findings across groups.

* Discuss goals: Ask about the kind of results the stakeholder wants.
* Feel empowered to say “no”: Maybe you realize it will take more time and effort to perform the analysis than estimated. Whatever the case may be, don’t be afraid to push back when you need to. Have the confidence to say “no” and provide a respectful explanation.
* Plan for the unexpected: Before you start a project, make a list of potential roadblocks.
* Know your project: Keep track of your discussions about the project over email or reports, and be ready to answer questions about how certain aspects are important for your organization.
* Start with words and visuals: Start with a description and a quick visual of what you are trying to convey.
* Communicate often: Share notes about project milestones, setbacks and changes to stakeholders.

**Turnover Rate:** The rate at which employees leave a company

**3 Thinks you can focus that help you stay on task**

1. Who are the primary and secondary stakeholders?
2. Who is managing the data?
3. Where can you go for help?

**Clear Communication is Key:**

Before you communicate, think about

1. Who your audience is
2. What they already know
3. What they need to know
4. How you can communicate that effectively to them

**Tips for effective communication:**