MODULE 01

STRUCTURED THINKING: The process of recognizing the current problem or situation, organizing available information, revealing gaps and opportunities, and identifying the options.

From issue to action: The six data analysis phases

Step 1: Ask

It's impossible to solve a problem if you don't know what it is. These are some things to consider:

- Define the problem you're trying to solve
- Make sure you fully understand the stakeholder's expectations
- Focus on the actual problem and avoid any distractions
- Collaborate with stakeholders and keep an open line of communication
- Take a step back and see the whole situation in context

Questions to ask yourself in this step:

1. What are my stakeholders saying their problems are?
2. Now that I've identified the issues, how can I help the stakeholders resolve their questions?

Step 2: Prepare

You will decide what data you need to collect in order to answer your questions and how to organize it so that it is useful. You might use your business task to decide:

- What metrics to measure
- Locate data in your database
- Create security measures to protect that data

Questions to ask yourself in this step:

1. What do I need to figure out how to solve this problem?
2. What research do I need to do?

Step 3: Process

Clean data is the best data and you will need to clean up your data to get rid of any possible errors, inaccuracies, or inconsistencies. This might mean:

- Using spreadsheet functions to find incorrectly entered data
- Using SQL functions to check for extra spaces
- Removing repeated entries
- Checking as much as possible for bias in the data

Questions to ask yourself in this step:

1. What data errors or inaccuracies might get in my way of getting the best possible answer to the problem I am trying to solve?
2. How can I clean my data so the information I have is more consistent?

Step 4: Analyze

You will want to think analytically about your data. At this stage, you might sort and format your data to make it easier to:

- Perform calculations
- Combine data from multiple sources
- Create tables with your results

Questions to ask yourself in this step:

1. What story is my data telling me?
2. How will my data help me solve this problem?
3. Who needs my company's product or service? What type of person is most likely to use it?

Step 5: Share

Everyone shares their results differently so be sure to summarize your results with clear and enticing visuals of your analysis using data via tools like graphs or dashboards. This is your chance to show the stakeholders you have solved their problem and how you got there. Sharing will certainly help your team:

- Make better decisions
- Make more informed decisions
- Lead to stronger outcomes
- Successfully communicate your findings

Questions to ask yourself in this step:

1. How can I make what I present to the stakeholders engaging and easy to understand?
2. What would help me understand this if I were the listener?

Step 6: Act

Now it's time to act on your data. You will take everything you have learned from your data analysis and put it to use. This could mean providing your stakeholders with recommendations based on your findings so they can make data-driven decisions.

Questions to ask yourself in this step:

1. How can I use the feedback I received during the share phase (step 5) to actually meet the stakeholder's needs and expectations?

These six steps can help you to break the data analysis process into smaller, manageable parts, which is called **structured thinking**. This process involves four basic activities:

1. Recognizing the current problem or situation
2. Organizing available information
3. Revealing gaps and opportunities
4. Identifying your options

Data analysts typically work with six problem types

1. Making predictions2. Categorizing things3. Spotting something unusual4. Identifying themes5. Discovering connections6. Finding patterns

Making predictions

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.

Categorizing things

An example of a problem requiring analysts to categorize things is a company's goal to improve customer satisfaction. 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.

Spotting something unusual

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.

Identifying themes

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.

Discovering connections

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.

Finding patterns

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.

Highly effective questions are SMART questions:

Specific: Is the question specific? Does it address the problem? Does it have context? Will it uncover a lot of the information you need?	**Measurable:** Will the question give you answers that you can measure?	**Action-oriented:** Will the answers provide information that helps you devise some type of plan?	**Relevant:** Is the question about the particular problem you are trying to solve?	**Time-bound:** Are the answers relevant to the specific time being studied?

Examples of SMART questions

Here's an example that breaks down the thought process of turning a problem question into one or more SMART questions using the SMART method: **What features do people look for when buying a new car?**

- **Specific**: Does the question focus on a particular car feature?
- **Measurable**: Does the question include a feature rating system?
- **Action-oriented**: Does the question influence creation of different or new feature packages?
- **Relevant**: Does the question identify which features make or break a potential car purchase?
- **Time-bound**: Does the question validate data on the most popular features from the last three years?

Questions should be **open-ended.** This is the best way to get responses that will help you accurately qualify or disqualify potential solutions to your specific problem. So, based on the thought process, possible SMART questions might be:

- On a scale of 1-10 (with 10 being the most important) how important is your car having four-wheel drive? Explain.
- What are the top five features you would like to see in a car package?
- What features, if included with four-wheel drive, would make you more inclined to buy the car?
- How does a car having four-wheel drive contribute to its value, in your opinion?

Things to avoid when asking questions

Leading questions: 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, and they could include information about usability, features, accessories, color, reliability, and popularity, on top of price. Now, if your problem is actually focused on pricing, you could ask a question like "What price (or price range) would make you consider purchasing this product?" This question would provide a lot of different measurable responses.
Closed-ended questions: questions that ask for a 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."

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)