



*Evaluation data and information  
(Data literacy)*



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# Introduction

This course designed to give definition and core componenets of data literacy and help learners gain an understanding of evaluation of Data, learn about different types and attributes of data, and help them understand why this information is important in the world today.



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# Learning outcomes



Identify the definition of data literacy



Have basic understanding of levels and characteristics of data literacy



# Learning outcomes



Outline the basics of data analysis and its role in business



Explain the process and skills involved in using data analysis in the business



# Theory



## Data, information and knowledge?

**Data** is a fact, collected and stored for the purpose of future access. **Information** is a subjective, meaningful interpretation of the data. **Knowledge** is a skill or theoretical understanding of a subject.

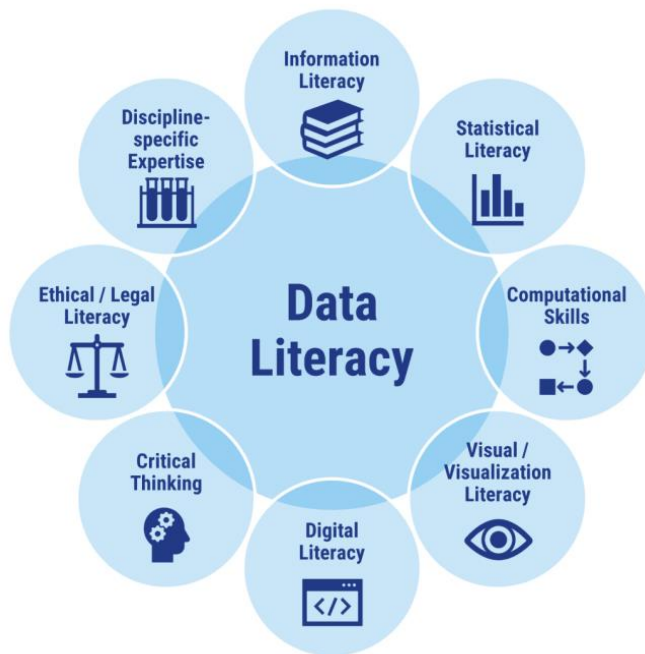
**Data** refers simply to raw facts and figures. Alone it tells you nothing. The real goal is to turn data into **information**. Data becomes information when it's presented in a context so that it can answer a question or support decision making. And it's when this information can be combined with a manager's **knowledge**—their insight from experience and expertise—that stronger decisions can be made.



# Data Literacy

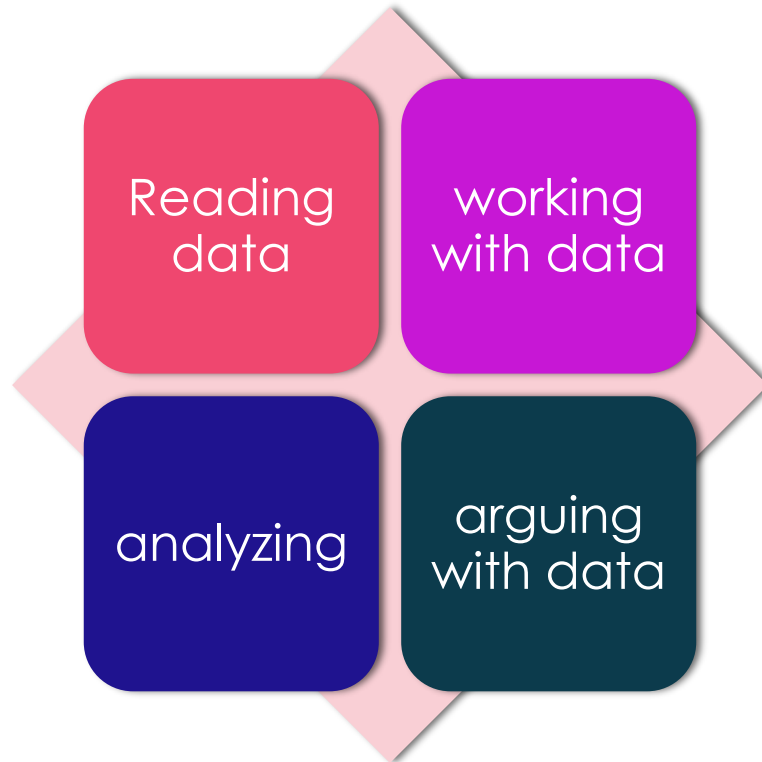
Data literacy is the ability to define any type of data, variable and scale types, and interpret data at the moment of contact with the data.

Using data effectively has advantages such as making the right decision and doing profitable business. Therefore, data literacy, defined as the ability to draw attention through data, should be seen as an important skill for everyone.



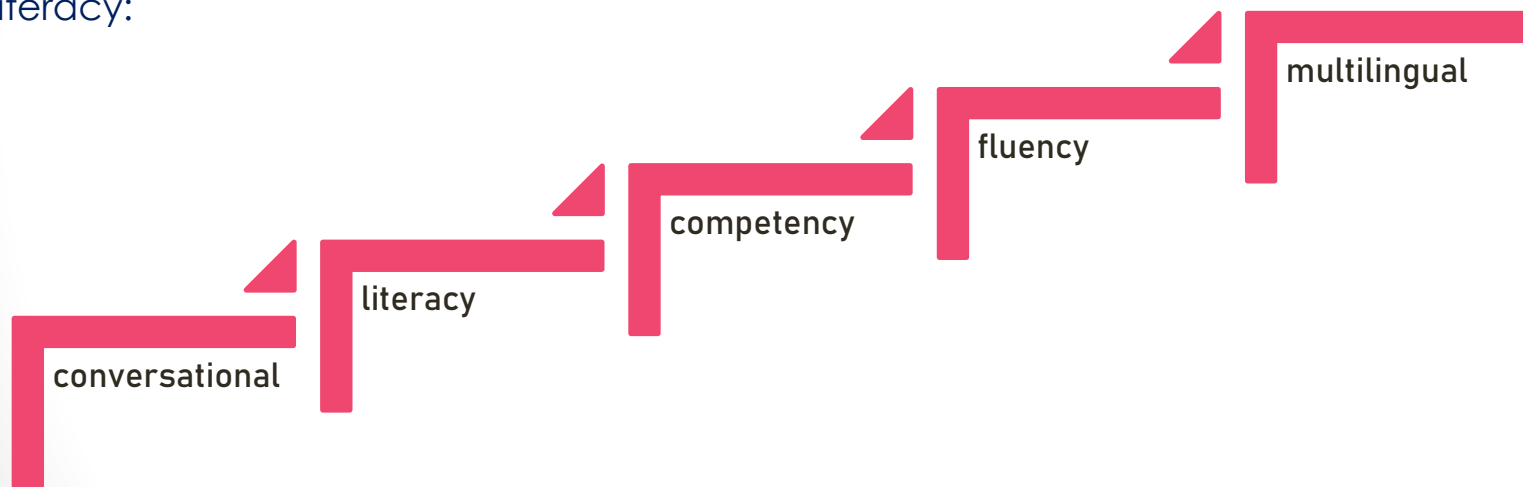


# 4 characteristics of data literacy



# LEVELS OF DATA LITERACY

Becoming data literate is important, but the required proficiency depends on the data role of the user. There are five levels of proficiency in data literacy:



Level	Definition	Example
Conversational	Basic understanding of the concepts of data, analytics and use cases; one who "gets it" but cannot explain it to others	A professional who has a basic understanding of an analytics value proposition and the ingredients involved
Literacy	Ability to speak, write and engage in data and analytics programs and use cases	A professional who can explain all aspects of an analytics use case, including the industry problem, business process moment/decision affected, data sources leveraged, and analytical methods applied
Competency	Competent of designing, developing and applying data and analytics programs	Experienced data and analytics program managers who have designed and delivered analytical projects from concept through outcome
Fluency	Fluent in all three elements of information language across most business domains within an industry vertical	A smart meter registers kW demand. Over time it creates kWh averages and peak demand. That is interpreted by billing far differently than generation or distribution planning. Fluent speakers can explain all of these use cases
Multilingual	Fluency across all three elements of the information language across multiple business domains, industries and ecosystems	An experienced data analytics strategy consultant who has designed and delivered analytical solutions across multiple industries and business domains, and can explain them to non-native speakers



# DATA ANALYSIS PROCESS

The **Data Analysis Process** is nothing but gathering information by using a proper application or tool which allows you to explore the data and find a pattern in it. Based on that information and data, you can make decisions, or you can get ultimate conclusions.

Data Analysis consists of the following phases:

- Data Requirement Gathering
- Data Collection
- Data Cleaning
- Data Analysis
- Data Interpretation
- Data Visualization

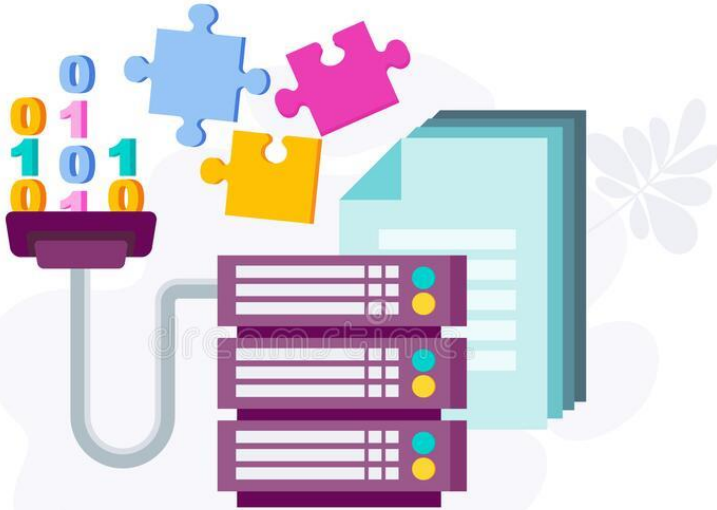


# Data Requirement Gathering

At first, you have to think about why you want to carry out this data analysis?  
All you need to find out the purpose or aim of doing the Analysis of data.  
You have to decide which type of data analysis you wanted to complete!  
In this phase, you have to decide what to analyze and how to measure it,  
you have to understand why you are investigating and what measures you have to use to do this Analysis.



# Data Collection



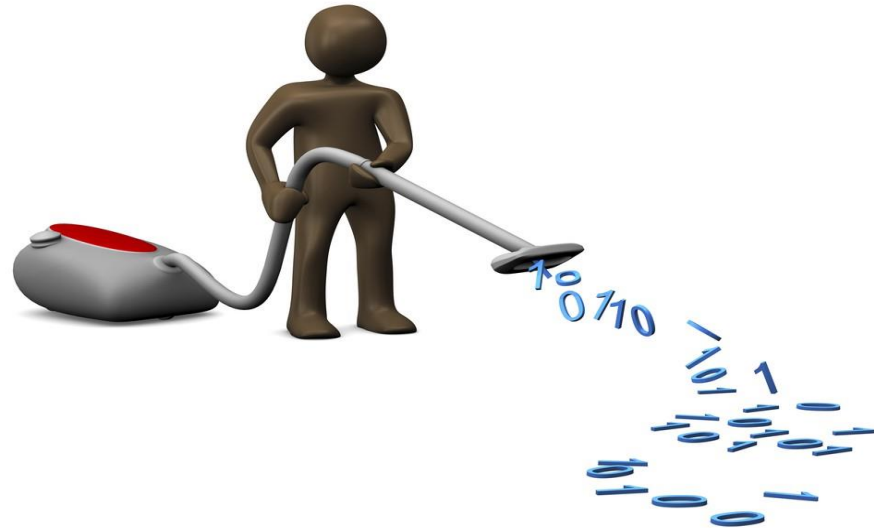
## DATA COLLECTION

After requirement gathering, you will get a clear idea about what things you have to measure and what should be your findings. Now it's time to collect your data based on requirements. Once you collect your data, remember that the collected data must be processed or organized for Analysis. As you collected data from various sources, you must have to keep a log with a collection date and source of the data.



# Data Cleaning

Now whatever data is collected may not be useful or relevant to your aim of Analysis, hence it should be cleaned. The data which is collected may contain duplicate records, white spaces or errors. The data should be cleaned and error free. This phase must be done before Analysis because based on data cleaning, your output of Analysis will be closer to your expected outcome.



# Data Analysis

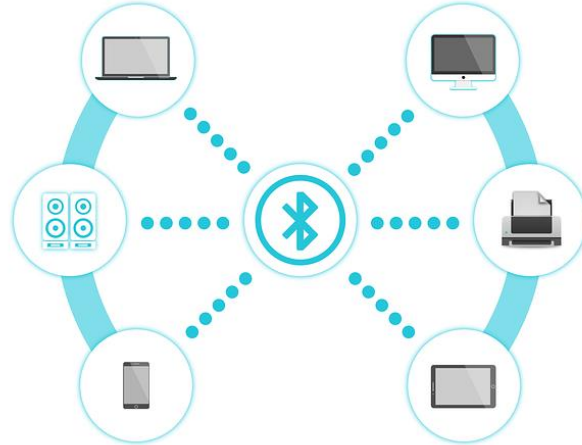
Once the data is collected, cleaned, and processed, it is ready for Analysis. As you manipulate data, you may find you have the exact information you need, or you might need to collect more data. During this phase, you can use data analysis tools and software which will help you to understand, interpret, and derive conclusions based on the requirements.





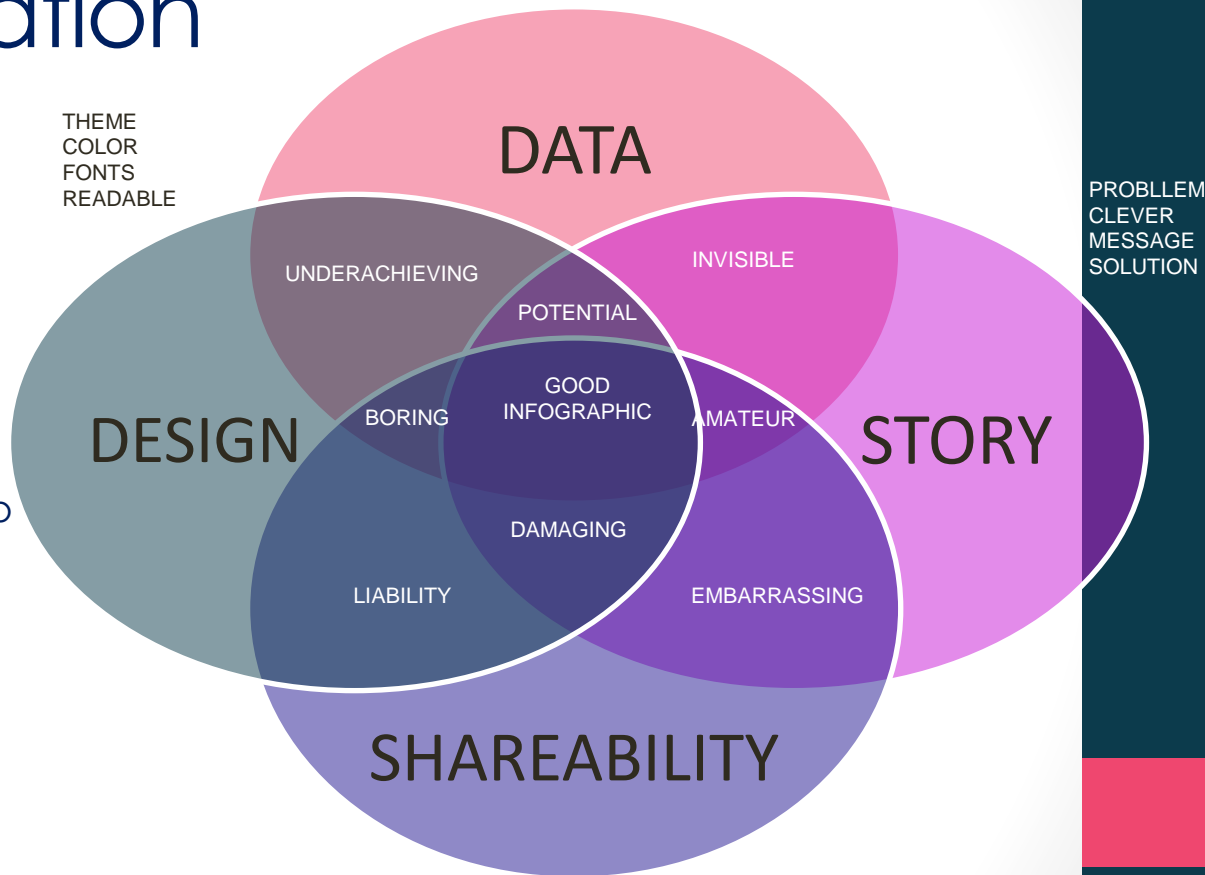
# Data Interpretation

After analyzing your data, it's finally time to interpret your results. You can choose the way to express or communicate your data analysis either you can use simply in words or maybe a table or chart. Then use the results of your data analysis process to decide your best course of action.

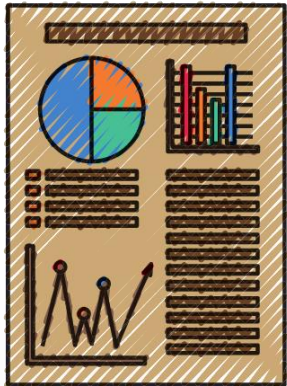


# Data Visualization

Data visualization is very common in your day to day life; they often appear in the form of charts and graphs. In other words, data shown graphically so that it will be easier for the human brain to understand and process it. Data visualization often used to discover unknown facts and trends. By observing relationships and comparing datasets, you can find a way to find out meaningful information



# Use Visual Features to Show the Data Properly

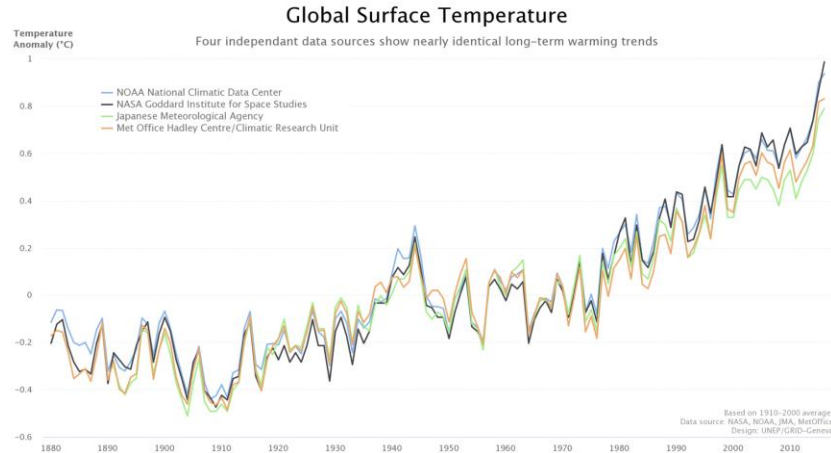


There are so many different types of charts. Deciding what type is best for visualizing the data being presented is an art unto itself. The right chart will not only make the data easier to understand, but also present it in the most accurate light. To make the right choice, consider what type of data you need to convey, and to whom it is being conveyed.



# Types of Charts for Data Visualization:

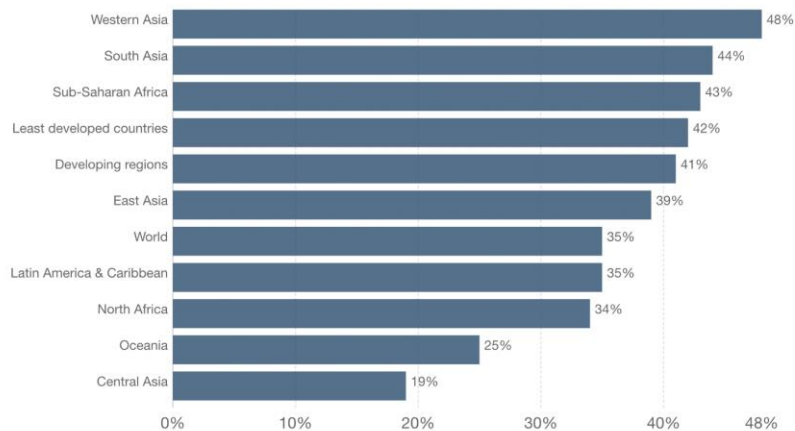
**Line Charts:** Line charts should be used to compare values over time, and are excellent for displaying both large and small changes. They can also be used to compare changes to more than one group of data.



**Bar Charts:** Bar charts should be used to compare quantitative data from several categories. They can be used to track changes over time as well, but are best used only when those changes are significant

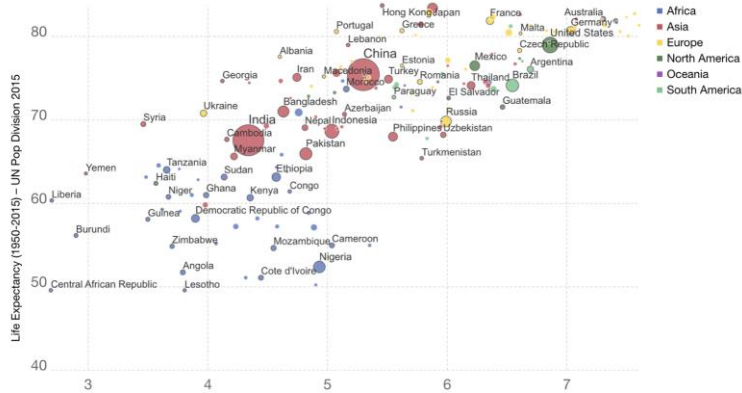
Share of population who gained access to improved water sources since 1990

The percentage of the 2015 population of a given region or country grouping who gained access to improved water sources since 1990. Note this does not represent the percentage of the population with access in 2015, but instead the share who have gained access over this period.



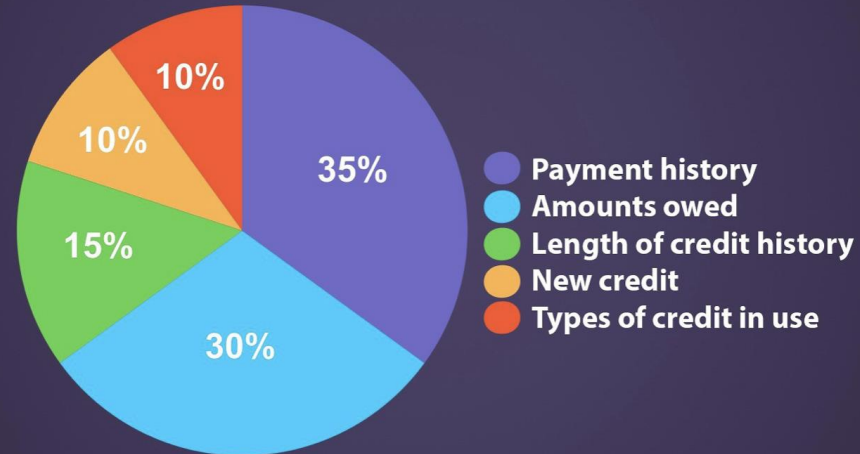
## Life satisfaction vs Life expectancy, 2015

The vertical axis shows life expectancy at birth. The horizontal axis shows self-reported life satisfaction in the Cantril Ladder (0-10 point scale with higher values representing higher life satisfaction).



**Scatter Plots:** Scatter plots should be used to display values for two variables for a set of data. They're excellent for exploring the relationships between the two sets.

**Pie Charts:** Pie charts should be used to show parts of a whole. They can't display things like changes over time.



# Data Analysis Methods

## a) Descriptive analysis - What happened

The descriptive analysis method is the starting point to any analytic reflection, and it aims to answer the question of what happened? It does this by ordering, manipulating, and interpreting raw data from various sources to turn it into valuable insights for your organization.

## b) Exploratory analysis - How to explore data relationships

As its name suggests, the main aim of the exploratory analysis is to explore. Prior to it, there was still no notion of the relationship between the data and the variables. Once the data is investigated, the exploratory analysis enables you to find connections and generate hypotheses and solutions for specific problems. A typical area of application for it is data mining.

## c) Diagnostic analysis - Why it happened

Diagnostic data analytics empowers analysts and executives by helping them gain a firm contextual understanding of why something happened. If you know why something happened as well as how it happened, you will be able to pinpoint the exact ways of tackling the issue or challenge.

## d) Predictive analysis - What will happen

The predictive method allows you to look into the future to answer the question: what will happen? In order to do this, it uses the results of the previously mentioned descriptive, exploratory, and diagnostic analysis, in addition to machine learning (ML) and artificial intelligence (AI). Like this, you can uncover future trends, potential problems or inefficiencies, connections, and casualties in your data.

## e) Prescriptive analysis - How will it happen

Prescriptive data techniques cross over from predictive analysis in the way that it revolves around using patterns or trends to develop responsive, practical business strategies. By drilling down into prescriptive analysis, you will play an active role in the data consumption process by taking well-arranged sets of visual data and using it as a powerful fix to emerging issues in a number of key areas, including marketing, sales, customer experience, HR, fulfillment, finance, logistics analytics, and others.



# Data Analysis Tools

There are several data analysis tools available in the market, each with its own set of functions. The selection of tools should always be based on the type of analysis performed and the type of data worked. Here is a list of a few compelling tools for Data Analysis.

## Data Analysis Tools





# Importance of Data Literacy

Increasingly, data-driven organizations will produce data literate employees that contribute more to their roles and help businesses sharpen their competitive edge in an aggressive global economy.

It's a strategy that can transform your business, while building loyalty with a workforce that's energized and empowered by your investment in their professional development.



To be a Data-Driven organization, their people need to be data literate first.

Promoting data literacy is more than just a numbers. Business leaders need to change people's behavior, mindset, and how they assess information and use technology to process it.

Cultural and creative organisations need to understand how visitors use technology and evaluate the impact of the different digital initiatives they implement. Moreover, the volume of data generated in the digital space represents a huge opportunity for them to learn more about their audiences and therefore, improve their experience. But cultural organisations needs to adapt changing environment to measure the digital engagement of their audiences



Cultural institutions embrace digital media and use it as a means to communicate and promote their activities, and also to interact and engage with their audiences. Digital Analytics can help to understand the users and their behaviors on the organization's website, social media and mobile apps

They also must find ways to collect the evidence for the impact their work has on their constituents, analyze the data, and effectively tell their stories.

There is no standardized set of impact indicators appropriate for any given organization, an organization should institute a set of indicators specific to their mission, goals, and its target audiences' needs. Furthermore, the actual data collection requires intentional design. Important elements of the data collection process are:

1. Define the purpose
2. Establish a collection plan
3. Build trust through communication
4. Use a mix of collection methods
5. Make the process continuous



Data literacy has the potential to play a fundamental role in almost any kind of role within a business. By analysing data and drawing conclusions, employees can:

- Ask the right questions
- Test out hypotheses
- Identify opportunities or areas of concern
- More effectively mitigate risks
- Create meaningful visualisations to communicate data-driven insights in an easy to understand format for leaders and stakeholders



# Automate when possible...

During the pandemic, 42% of arts organizations had to decrease staff, but 65% were still delivering content. The arts industry must adopt some form of technology for administrative tasks and distribution in order to stay afloat in an increasingly digital world.

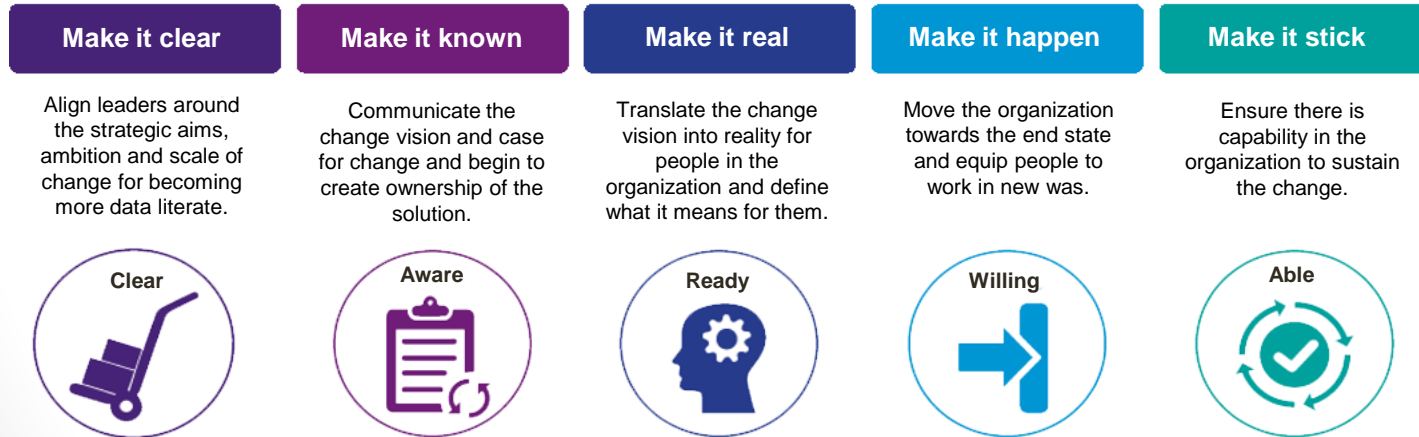
Business automation tasks include the following:

- Responding to emails: When it comes to customer feedback, develop a system to automatically sort and respond to any correspondence an organization receives.
- Data management functionalities: Depending on the data collection and storage methods used by an organization, data “pulls” and back-ups can be easily automated using out-of-the-box software systems.
- Customer engagement: Social media posts, emails, and other promotions can be scheduled in advanced so that employee time is not taken up by maintaining a customer engagement schedule.



# How To Become Data-literate?

The key question for organizations now is on how to become more data-literate and support the creation of a data-driven culture. A data-driven culture determines how an organization operates and gets things done with data, as an answer to internal and external challenges. While cultures in organizations are usually focused on creating a certain mindset and daily work, the technicalities of data also require an individual capability improvement based on the data roles to gain the required level of data literacy.



# What skills are required for data literacy?

To be data literate you need to have the ability to derive meaning from data and communicate that meaning to others.

Data literacy competencies include the knowledge and skills to read, analyze, interpret, visualize and communicate data as well as to understand the use of data in decision-making.

Data literacy also means having the knowledge and skills to be a good data steward, including the ability to assess the quality of data, protect and secure data, and take responsibility for its ethical use. The ethics part of this should be non-negotiable.

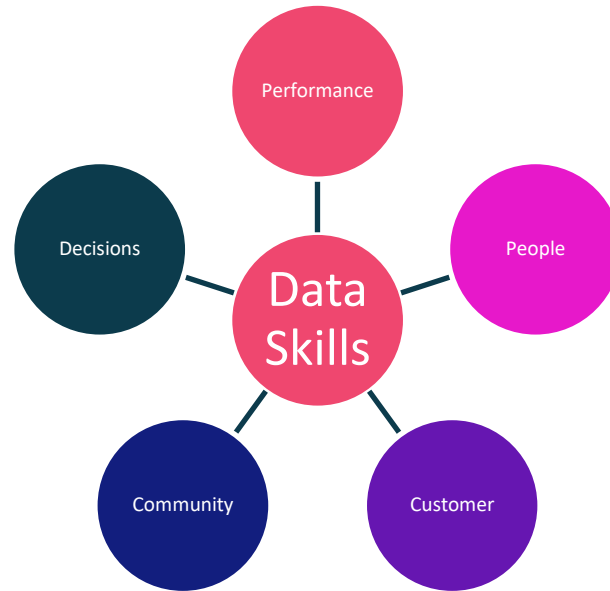


# What does data literacy do for you?

If your organization has a digital transformation strategy, data literacy will be a critical competency that your people will need to develop. The ability to read, understand, create, and communicate data are the key skills required for data literacy. Indeed, data and information is a critical asset of any business..

Five areas data skills:

- Improve business performance
- Better serve customers
- Enable the success of our people
- Create a positive impact on society
- Inform sound decisions





# 4 simple ways to improve data literacy across your organization

Make sure there is a clear owner

- There should be clarity around who's in charge of data at every level of your organization. To figure out who should have ownership, start having conversations with people and figuring out who has what expertise. Then start documenting it, so team members with questions can easily find out who to seek answers from.

Choose tools your team understands

- Mode analytics let you customize all your visualizations and make data clearer, so your team members have an easier time understanding the story data is telling. This is a great example of making data work for you, rather than wrestling with tools that display data in a less-than-intuitive way. Naming things in a way that makes sense can also make all the difference.

Teach

- Whether you host a talk at lunch or send out valuable information in a Slack message, teaching data literacy at your company as a regular practice will have big benefits. Ideally, you should make it a part of your onboarding process, by telling new team members what they need to know to be data-capable at your company, and how they can gain the necessary skills.

Encourage questions about data interpretation

- Getting a wider variety of perspectives can strengthen your data and the validity of what you take away from it. Data is human and therefore flawed, so the more humans you have involved in interpreting it, the better. Questions like, "What are we missing?", "How does this help us get closer to our goals?" and "Is everyone looking at the same thing?" can be valuable conversation starters that help you discover more about the story your data is telling.



# Examples/Good Practices



## USE ART ITSELF



Data literacy is intimately intertwined with increased use of visualizations to communicate results. To generate change within an organization or inspire people to action, visualizations are often the best way to captivate an audience

Visualizations appeal to a wide range of emotions (similar to art), and often provide information to viewers that would be lost in traditional reports



# DATA STORY TELLING



Data-driven storytelling is the process of transforming a data-based analysis into easily accessible visual forms that influence the business decisions of your target audience. You need to use the right analytical facts that intrigue your potential customers enough that they want to take immediate action on your offerings.

How well you do data storytelling depends on the stories, subjects, visuals, and creativity that you use. When you use cutting-edge tools and technologies to stitch together different metrics and reveal the relationships between them, you are virtually building an entire world of narratives.

**Watch the video for:** [8 powerful examples in data story telling](#)



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# EXERCISE



You have a dataset, but you aren't sure what to do with it. What attributes and what categories does it include? Think about what you can learn from it -what would you like to find out?

--> ***What data do I have to work with?***

--> ***What do I want to find out?***

- Something about variability or consistency within a group?
- How similar or different are two or more groups?
- What is the relationship between two numeric attributes?
- How does something change through time?
- What is the composition of a group?
- How is something geographically distributed

> ***Which attributes (or subsets of data) do I need to answer the question?***

> ***What kind of graph should I use (based on my kind of question)?***

> ***What patterns or relationships do I see in the graph?***

> ***What do the patterns or relationships suggest about the question?***

> ***What does the evidence mean in terms of a general scientific process or a wider context?***



# Quizzes



1 - **Data** is a fact, collected and stored for the purpose of future access

True

False

2- Data literacy is the ability to define any type of data, variable and scale types, and interpret data at the moment of contact with the data.

True

False



# Quizzes



3 - Once the data is collected, cleaned, and processed, it is ready for.....

- A. Analysis
- B. Interpretation
- C. Visualization
- D. Collection

4-What is the first step of data analysis process?

- A. Data Collection
- B. Data Cleaning
- C. Data Gathering
- D. Data Analysis

# Quizzes



5- The key skills required for data literacy is the ability to read, understand, create, and communicate data.

True  
False





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