

Welcome to this session: Data Literacy and Analysis

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators
answering questions.





What is Safeguarding?

Safeguarding refers to actions and measures aimed at protecting the human rights of adults, particularly vulnerable individuals, from abuse, neglect, and harm.



To report a safeguarding concern reach out to us via email:
safeguarding@hyperiondev.com

Live Lecture Housekeeping:

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly.
- No question is daft or silly - ask them!
- For all non-academic questions, please submit a query:
www.hyperiondev.com/support
- To report a safeguarding concern reach out to us via email:
safeguarding@hyperiondev.com
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.



Lecture Overview

- Data Literacy
- Data Analysis



Learning Outcomes

- ❖ Define data literacy and explain why it's critical in today's digital world.
- ❖ Differentiate between different types of data and their applications.
- ❖ Collect, clean, and organize raw data for analysis.
- ❖ Perform basic data analysis using common tools like spreadsheets or Python.
- ❖ Interpret and present data using visualization techniques (charts, graphs, tables).
- ❖ Recognize ethical considerations in data handling (bias, privacy, security).
- ❖ Apply data analysis concepts to real-world scenarios in business and research.

Initial Poll

What is Data Literacy?

- ❖ Data literacy is the ability to read, understand, create, and communicate data as information.
- ❖ Why it matters across tech roles:
 - Developers need data for optimising code or testing.
 - Designers use user data for UX decisions.
 - Security experts rely on data to detect breaches.
 - Data can highlight trends that are not immediately obvious.

Poll question: On a scale of 1-5, how confident are you with analysing data?



Importance

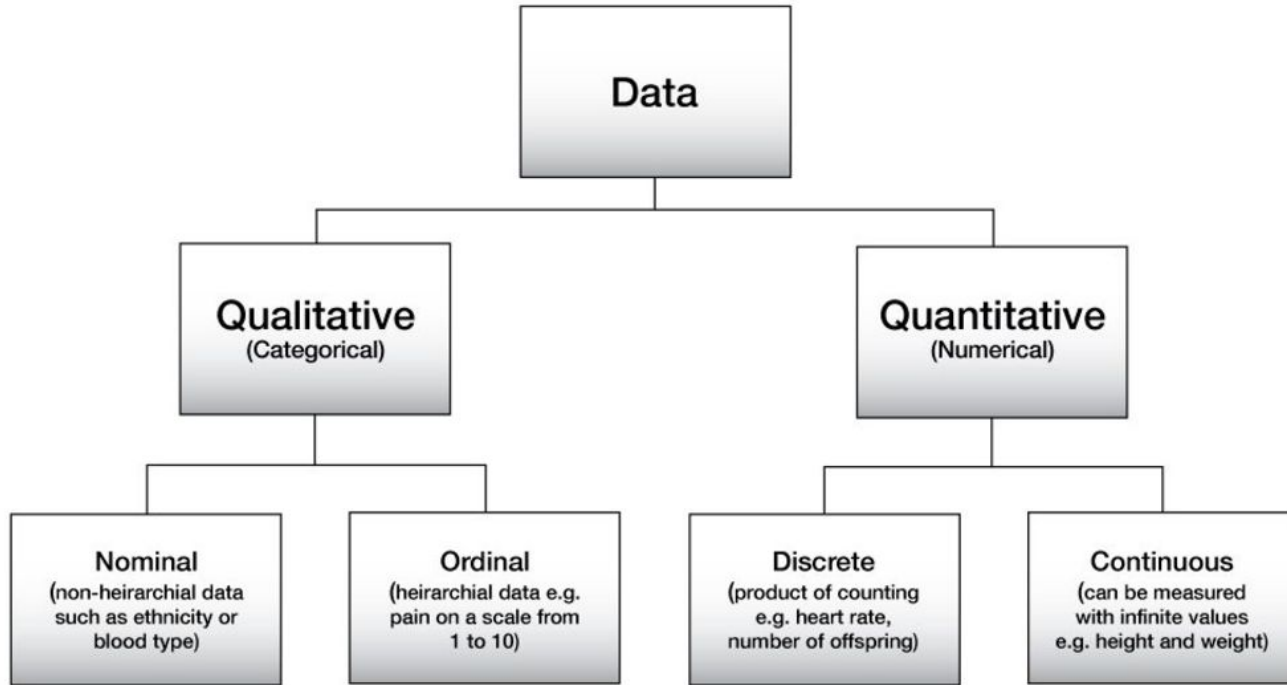
- ❖ Crucial in making informed decisions in business, science, government, etc.
- ❖ Helps in spotting trends, solving problems, and backing decisions with evidence.
- ❖ A key skill in the digital economy and modern workforce.



Key Competencies of Data-Literate Individuals:

- ❖ Interpreting data correctly
- ❖ Understanding how data is collected and used
- ❖ Making data-driven decisions
- ❖ Communicating data insights effectively

Types of Data



Source: <https://oercollective.caul.edu.au/foundations-of-biomedical-science/chapter/9-1-types-of-data/>

Types of Data

- ❖ By Nature:
 - Quantitative Data: Numerical (e.g., height, salary, temperature)
 - Qualitative Data: Descriptive (e.g., color, brand, satisfaction level)
- ❖ By Structure:
 - Structured Data: Organized into rows/columns (e.g., spreadsheets, databases)
 - Unstructured Data: Not pre-formatted (e.g., emails, videos, social media posts)
- ❖ By Measurement Scale:
 - Nominal, Ordinal, Interval, Ratio

Data Collection & Cleaning

- ❖ Data Collection Methods:
 - Surveys, sensors, web scraping, APIs, manual entry
 - Importance of sampling and avoiding bias
- ❖ Data Cleaning Techniques:
 - Handling missing values
 - Removing duplicates
 - Standardizing formats (e.g., dates, currency)
 - Filtering outliers
 - Correcting errors (e.g., typos)
- ❖ **Goal:**
 - Convert raw data into clean, usable datasets.

Overview of the Data Analysis Process

- ❖ **Define the problem.**
 - Tracking customer churn, quantifying success of marketing campaigns, fraud detection, inventory management, etc.
- ❖ **Collect data.**
 - Data collected could be structured (e.g., from a database) or unstructured (e.g., social media posts).
- ❖ **Clean and preprocess the data.**
 - Missing values, outliers, and inconsistencies are common issues that make a dataset messy and unreliable for analysis.
- ❖ **Analyse the data.**
 - Could involve using basic statistics or advanced modeling.
- ❖ **Communicate insights.**
 - Use the data to tell a story, utilising charts and visualisations.

Fundamentals of Data Analysis

- ❖ Core Steps in Analysis:
 - Define your question or problem
 - Collect relevant data
 - Clean and prepare the data
 - Analyze the data (patterns, trends, comparisons)
 - Draw conclusions and present findings

Fundamentals of Data Analysis

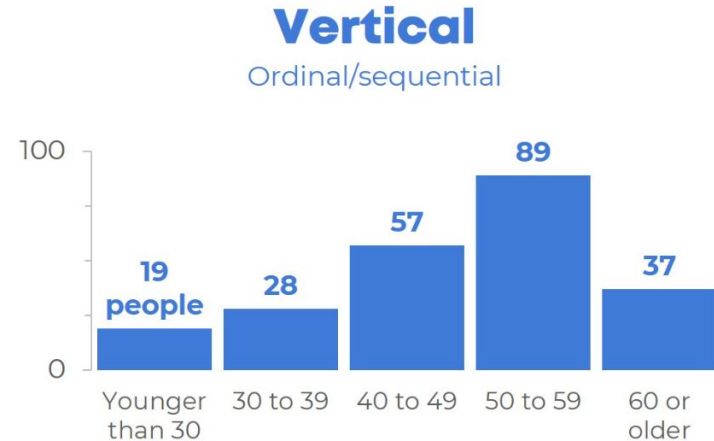
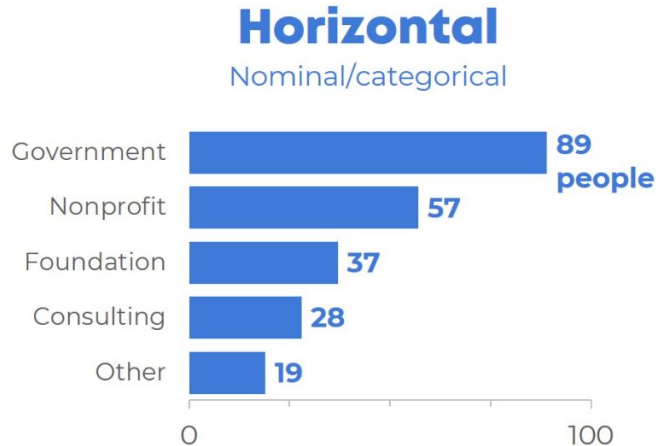
- ❖ Basic Techniques:
 - Descriptive statistics (mean, median, mode, range)
 - Sorting, filtering, grouping
 - Correlation and simple trends
- ❖ Common Tools:
 - Excel/Google Sheets
 - Python (pandas, NumPy)
 - R



Let's take a break

Data Visualization: Bar Charts

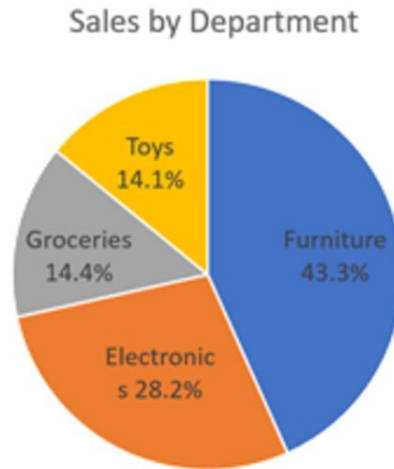
- ❖ **Bar charts** are used to compare quantities across different categories by representing each category with a bar, making it easy to see differences in values.



<https://depictdatastudio.com/when-to-use-horizontal-bar-charts-vs-vertical-column-charts/>

Data Visualization: Pie Charts

- ❖ **Pie charts** are used to show how a whole is divided into parts, with each slice representing a proportion of the total.



<https://www.spotfire.com/glossary/what-is-a-pie-chart>

Basic Data Visualization

- ❖ Purpose:
 - Turn complex data into easily understandable visuals.



Top 5 Types of Data Visualization Charts You Must Try

Types of Visuals:

- ❖ Bar Charts → Comparisons
- ❖ Line Graphs → Trends over time
- ❖ Pie Charts → Proportions
- ❖ Scatter Plots → Relationships
- ❖ Tables → Detailed values

Introduction to Tools

- ❖ Spreadsheets:
 - Excel/Google Sheets
 - Sorting, filtering, formulas, charts
- ❖ Python (for advanced students):
 - pandas for data manipulation
 - matplotlib and seaborn for plotting
- ❖ Online Platforms:
 - Tableau Public
 - Google Data Studio
 - Microsoft Power BI (basic)

Real-World Applications

- ❖ Business:
 - Customer segmentation
 - Sales forecasting
 - Marketing analytics
- ❖ Healthcare:
 - Patient data tracking
 - Disease prediction

Real-World Applications

- ❖ Government & Policy:
 - Census data analysis
 - Crime trend mapping
- ❖ Education:
 - Student performance tracking
 - Curriculum improvement
- ❖ Ethical Considerations:
 - Avoiding bias in data and algorithms
 - Protecting privacy (GDPR, data security)
 - Transparent methodologies

Final Poll

Q & A SECTION

**Please use this time to ask
any questions relating to the
topic, should you have any.**

**Thank you
for attending**



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