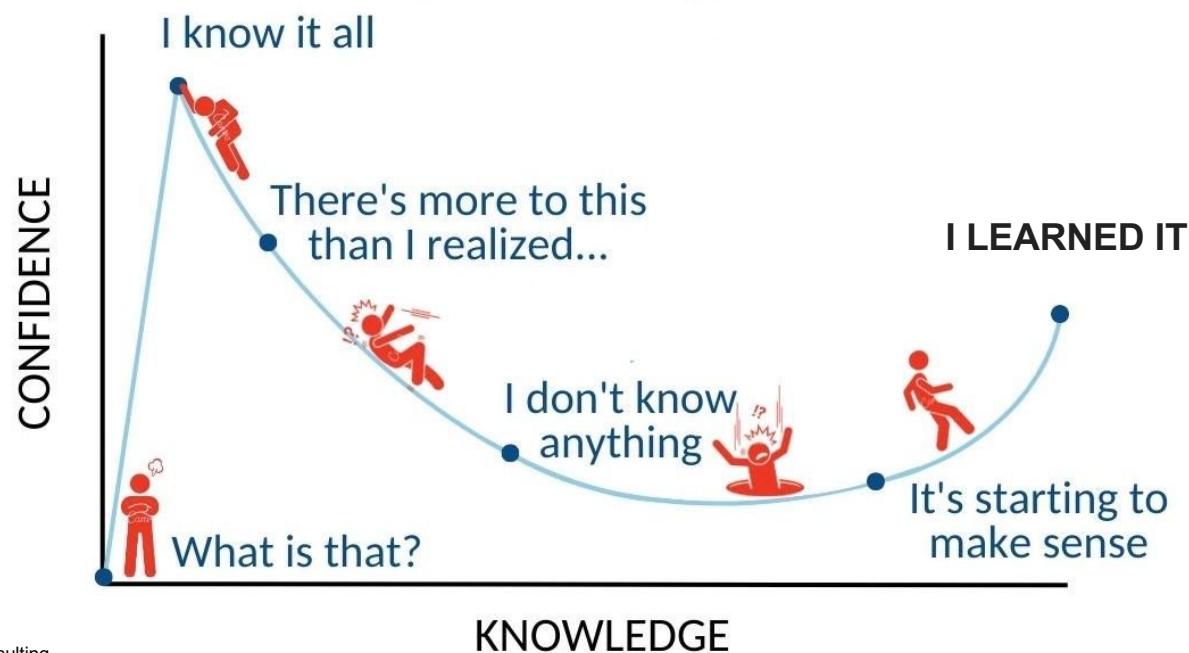


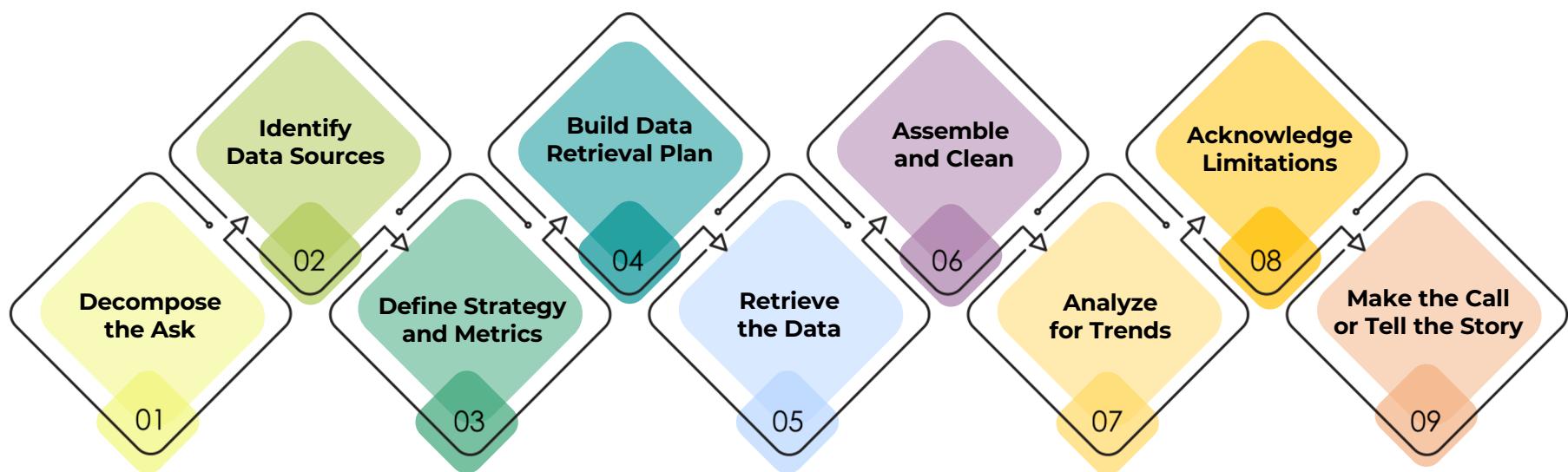
correlation.[•]one
TECH FOR JOBS

DUNNING-KRUGER Effect



Analytics Paradigm

Regardless of type or industry, this paradigm provides a repeatable pathway for effective data problem solving.



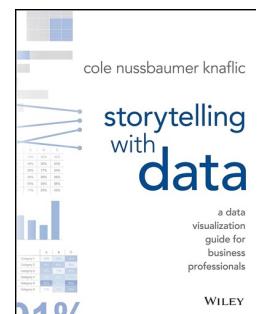
“

Data storytelling is the art of **presenting** complex data and analytics in a compelling narrative that helps **tell a story** and **influence** and **inform** a particular audience

Microsoft

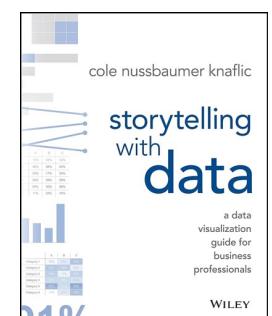
Storytelling with Data

- **Understand the context:** Before creating a data story, it is essential to understand the context of the data, including the audience, the purpose of the story, and the message that needs to be conveyed
- **Choose an effective visual display:** Selecting the right visual display is crucial to ensure that the data is presented in a clear and understandable way. The choice of visual display should be based on the type of data and the message that needs to be conveyed
- **Eliminate clutter:** Clutter can distract the audience from the message and make the data story difficult to understand. It is essential to eliminate unnecessary elements and simplify the visual display to ensure that the message is clear
-



Storytelling with Data

- **Direct the audience's attention:** Highlighting the most important parts of the data and directing the audience's attention to them is crucial to ensure that the message is understood. This can be achieved through the use of color, size, and other visual cues
- **Think like a designer:** Design thinking involves considering the audience's needs and preferences when creating a data story. It is essential to create a story that is visually appealing, easy to understand, and engaging
- **Leverage the power of storytelling:** Storytelling is a powerful tool that can help make data more relatable and memorable. By incorporating a narrative into the data story, it is possible to create a more engaging and impactful message



Data Puke

"**Data puke**" is a term used in the data visualization field to describe charts, graphs, or dashboards that present an overwhelming amount of data without clear organization, focus, or meaningful interpretation.

Essentially, it's when a visualization offers a lot of data but little to no insight or clarity.

Data Puke

Here are a few characteristics often associated with data puke:

- **Overwhelming Information:** Too many data points, metrics, or dimensions are presented all at once without clear categorization or prioritization.
- **Lack of Clarity:** The visualization may lack a clear message or key takeaway, making it difficult for the audience to understand the main point or action item.
- **Poor Design:** This might involve using too many colors, overly complex charts, or cluttered layouts, which can distract from the data and make it hard to discern any meaningful patterns or trends.
- **No Narrative or Context:** Data puke often lacks a storyline or context to guide the viewer through the data and to understand its relevance or importance.
- **Inaccessibility:** It might be difficult for a wide range of audiences to understand due to jargon, complex data representations, or lack of explanatory text.

Mockups

Mockups are visual guides that represent the skeletal framework of a dashboard or visualization, often used to plan layout and user interactions without detailed design or data integration

Components

- **Layout:** The arrangement of various elements like charts, graphs, and controls.
- **Content Placement:** Indicating where text, images, and data visualizations will be placed.
- **User Interaction:** Representing how users will interact with the dashboard, including click, scroll, and hover actions.

Significance of Mockups

Avoiding Pitfalls:

- **Minimizing Revisions:** Mockups allow for early feedback, reducing the need for revisions after development has begun.
- **Clarifying Vision:** They ensure that all stakeholders have a clear and unified vision of the final product, minimizing miscommunications or misaligned expectations.

Enhancing Collaboration:

- **Stakeholder Involvement:** Engaging stakeholders in the mockup phase can ensure their needs and expectations are considered from the start.
- **Interdepartmental Communication:** Facilitates better understanding and communication between design, development, and business teams.

Mockups

User Experience (UX) Planning:

- User Journey: Mockups help plan and visualize the user's journey and interactions with the dashboard.
- Accessibility: Ensures that considerations for user accessibility and usability are planned from the outset.

Efficient Resource Utilization:

- Time and Cost: Identifying and addressing issues in the mockup phase is generally quicker and more cost-effective than during development.
- Prioritization: Helps in prioritizing features and elements, ensuring that key components are focused upon during development.

DASHBOARD DESIGN

Business Context

You are a member of the business analytics team of **Simply Music**, a Florida-based musical instrument store that has been growing at a fast pace over the last few years.

Management is keen to find out what the **most popular items** are and **which locations** are the most profitable in order to adjust their marketing strategies and their stock logistics to increase sales and revenue.

They also want to learn about the **number of deliveries** made outside Florida since they are contemplating opening a new branch in another state.

Business Problem

You are tasked with creating a sales dashboard for management to use. This dashboard must display sales, revenue, and profit over time and allow for queries across product, location, and customer age. From your previous meetings with the management, you know that they are interested in having these three broad questions answered:

1. How have our sales, revenue, and profits evolved over time?
2. What are the locations with the highest numbers of sales and profit?
3. What are the items with the highest numbers of sales, profit, and revenue across product description, product type, product line, location, customer age group, and state of delivery?

Business Problem

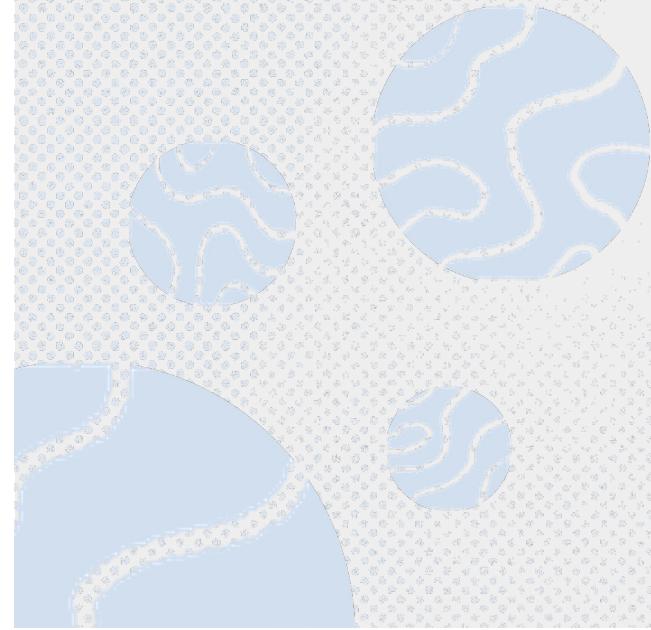
You have been given a sample dataset of 5,000 sales records from Simply Music corresponding to the years 2018 and 2019. They ask you to create the dashboard with this sample data, and after this is done, and your dashboard receives approval, your team will have to connect it to an online database to feed it the real-time data that comes from the company's sales tracking software. The sample table and the database share the same structure, so you don't have to worry about database management or creation.

Dashboards

Dashboards organize and display all relevant business information along with various **filters** that users might want to have, while being fully extensible if required in the future. When you create dashboards, you define a set of **relevant variables** and feed them into **interactive** visualizations that the users can then filter at will to explore relationships among the variables

A dashboard is a **visual interface** that provides a **consolidated, interactive** view of various data points, metrics, and key performance indicators (**KPIs**), typically designed to enable quick analysis and decision-making.

PROJECT PORTFOLIO MANAGEMENT



Project Management Dashboard As of: 30th July, 2020

creo technologies

Project Management Dashboard

Total No. of Projects: 27 | No. of Delayed: 7 | No. of On Track: 12 | # of Ahead of time: 8

CONSTRUCTIONS

Total No. of Projects: 9 | No. of Delayed: 2 | No. of On Track: 4 | # of Ahead of time: 3

MODIFICATIONS

Total No. of Projects: 13 | No. of Delayed: 4 | No. of On Track: 6 | # of Ahead of time: 3

BIOMEDICAL

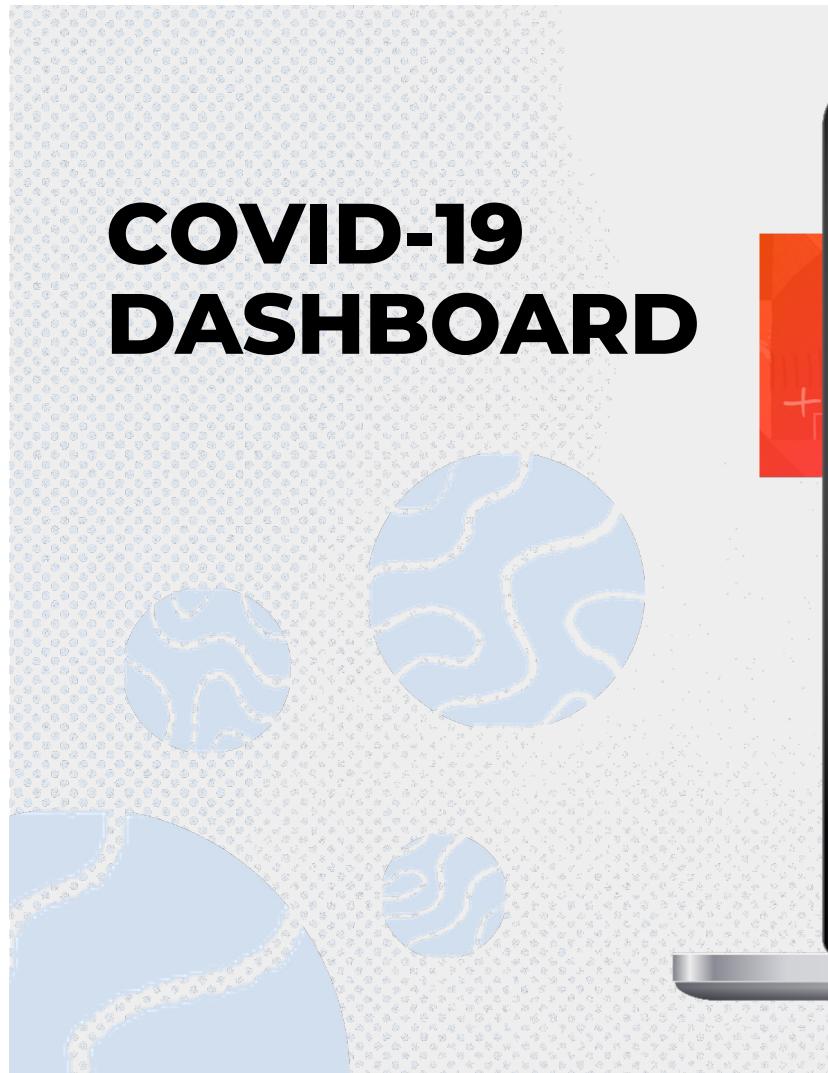
Total No. of Projects: 5 | No. of Delayed: 1 | No. of On Track: 2 | # of Ahead of time: 2

Budget (Construction) Overrun % / Underrun %: 142% | Yearly Budget Utilization %: 87% | Budget %

Executive Summary **Dashboard Reports**

Proprietary and confidential

COVID-19 DASHBOARD



COVID 19 - School Investigation Details Dashboard

creo technologies

COVID 19 - School Investigation Details Dashboard

Total # of Cases 245

Total # Schools Affected 99

By Occupation # Cases

Occupation	# Cases
Student	185
Support Staff	45
Administration	9
Teacher/Teaching Assistant	6

Cases Trend Occupation Group

Date	Staff	Total Cases	Students
Nov 24	16	24	11
Nov 25	24	40	25
Nov 26	49	60	26
Nov 27	9	41	27
Dec 04	4	13	-
Dec 13	13	-	-
Dec 27	9	27	-

By Gender # Cases

Gender	# Cases
Male	107
Female	135
Undefined	3

Institution Details

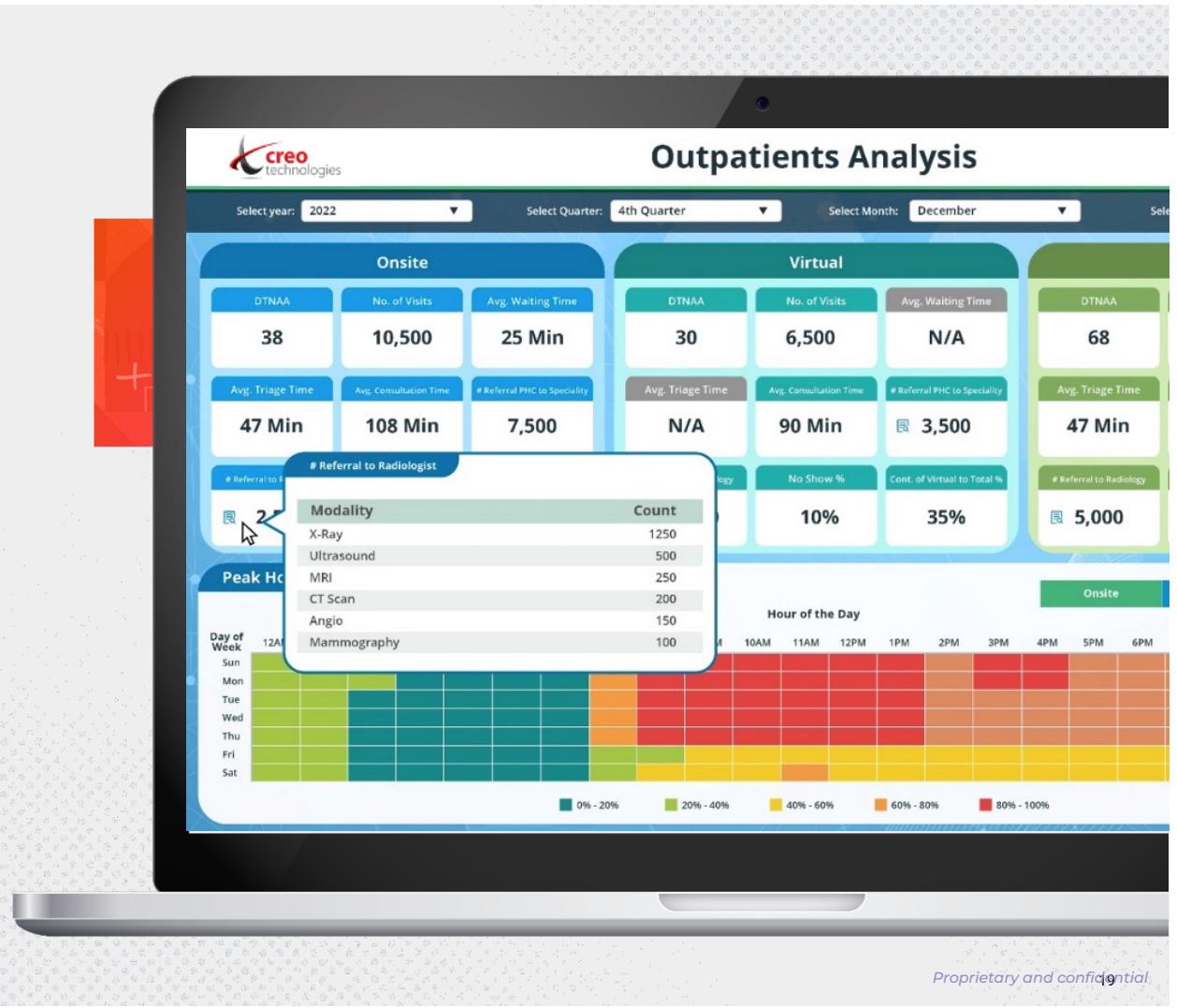
School Name	Location	Action	# Case
AL ITTIHAD PRIVATE SCHOOL	Jumeira	No Action	1
AL ITTIHAD PRIVATE SCHOOL (BR)	Jumeira	Switch close contacts only to DL/RW	1
AL MAAWAKEB SCHOOL- AL GASHIUD	Jumeira	No action	1
		Switch close contacts only to DL/RW	4

Traced Close Contacts for Cases

Close Contact Name	Location	Close Contact
Aine Mc Cartan	Same School Bus	
Freya Elizabeth	Assigned to different locations at school	

Proprietary and confidential 18

Outpatients Analysis



Supply Chain



Proprietary and confidential 2024

Transactions Table

TIME_KEY	PRODUCT_KEY	UNITS SOLD	DOLLARS SOLD	CHANNEL	CUSTOMER_KEY	DESTINATION_STATE
20191104	339695	1	5800	Fort Lauderdale	1830	NaN
20190512	293442	1	14	Website	4814	US-Colorado
20180905	239457	1	3509	Website	5185	US-Massachussets
20191121	392001	1	1899	Fort Lauderdale	3388	NaN
20180613	443553	1	159	Website	7557	US-Delaware

Products Table

PRODUCT_KEY	PRODUCT_LINE	PRODUCT_TYPE	DESCRIPTION	COST	UNIT_PRICE
441354	Musical instruments	Digital pianos	Casio Celviano AP270	776.26	1049
460568	Musical instruments	Digital pianos	Casio Celviano AP470	1139.24	1499
451845	Musical instruments	Digital pianos	Casio Celviano AP650	1696.50	2175
270105	Musical instruments	Digital pianos	Casio Celviano AP700	1874.25	2499
339695	Musical instruments	Digital pianos	Yamaha CLP 785	4118.00	5800

Products Data

1. Musical instruments

1. Acoustic pianos
2. Digital pianos and keyboards
3. Guitars (electric and acoustic)
4. Woodwinds (flutes, oboes, bassoons, saxophones, etc.)
5. Brass (trumpets, horns)
6. Synthesizers
7. Strings (everything bowed: violins, cellos, etc.)
8. Percussion (mostly drum kits)

2. Accessories

1. Strings (for guitars, violins, etc.)
2. Pedals and amps (for electric guitars)
3. Sheet music

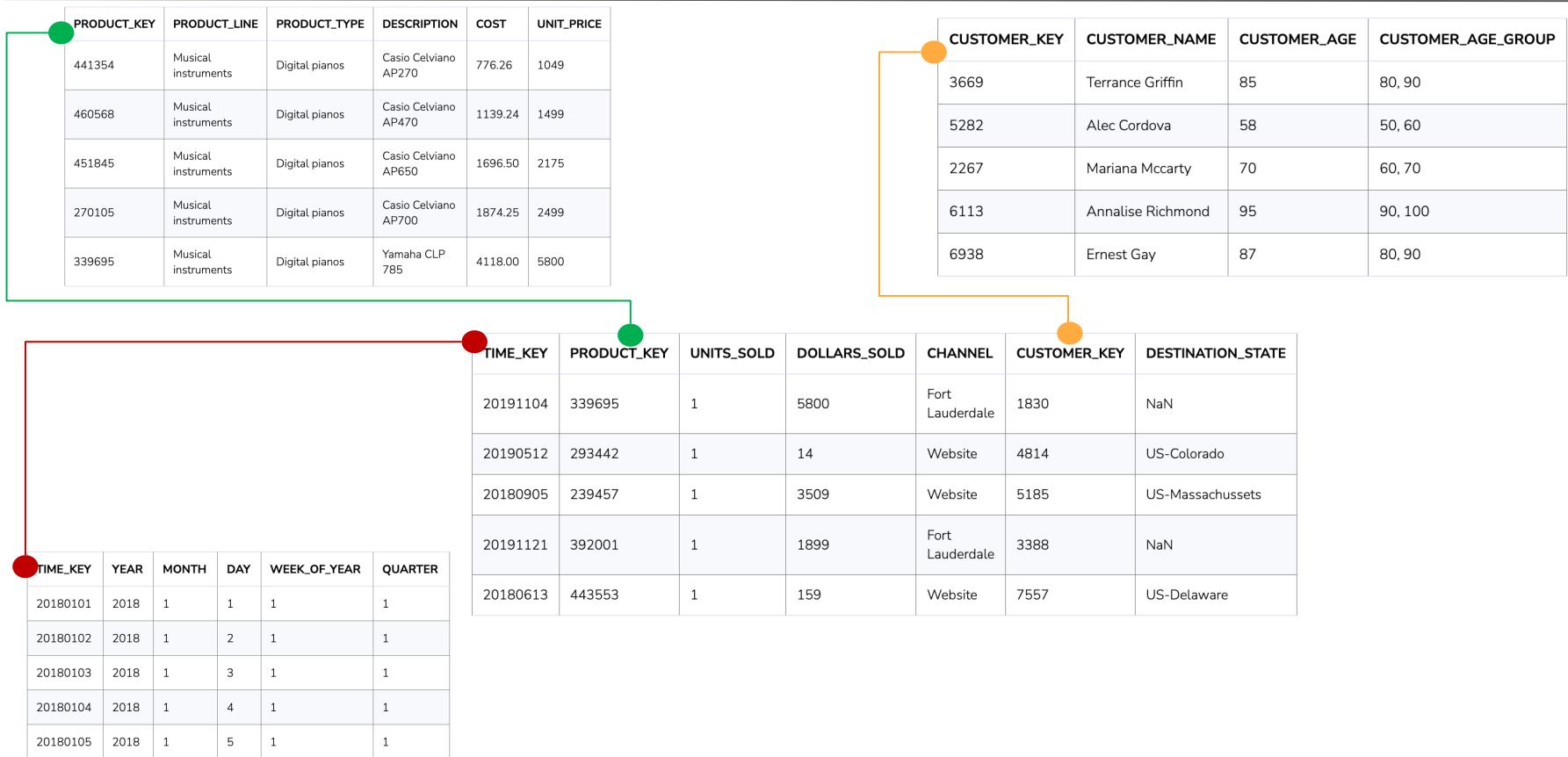
Time Table

TIME_KEY	YEAR	MONTH	DAY	WEEK_OF_YEAR	QUARTER
20180101	2018	1	1	1	1
20180102	2018	1	2	1	1
20180103	2018	1	3	1	1
20180104	2018	1	4	1	1
20180105	2018	1	5	1	1

Customer Table

CUSTOMER_KEY	CUSTOMER_NAME	CUSTOMER AGE	CUSTOMER AGE GROUP
3669	Terrance Griffin	85	80, 90
5282	Alec Cordova	58	50, 60
2267	Mariana Mccarty	70	60, 70
6113	Annalise Richmond	95	90, 100
6938	Ernest Gay	87	80, 90

Simply Music Model

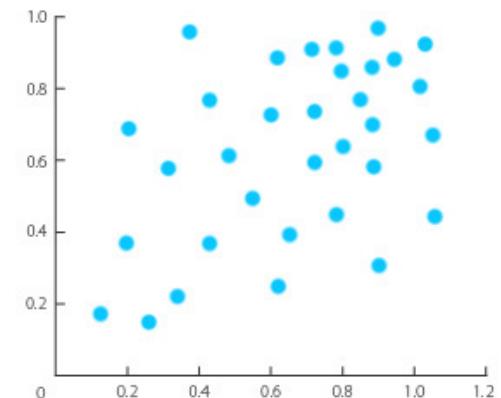
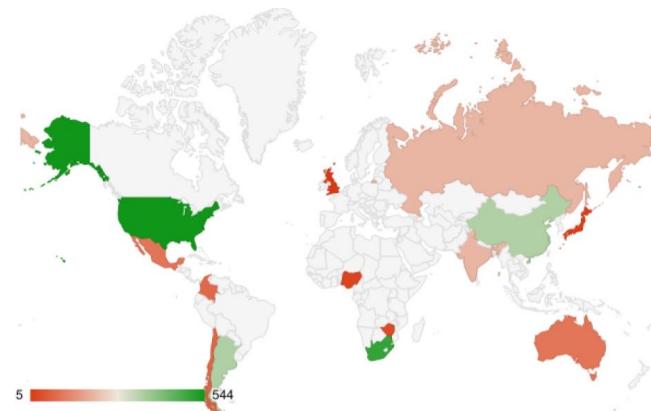
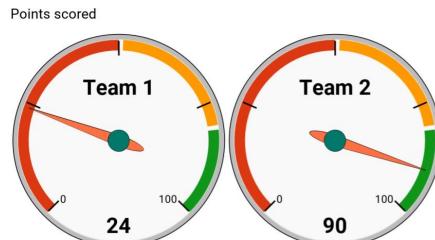


Choosing the right Visualizations

“The dashboard must display sales, revenue, and profit across product type, location, and customer age.”

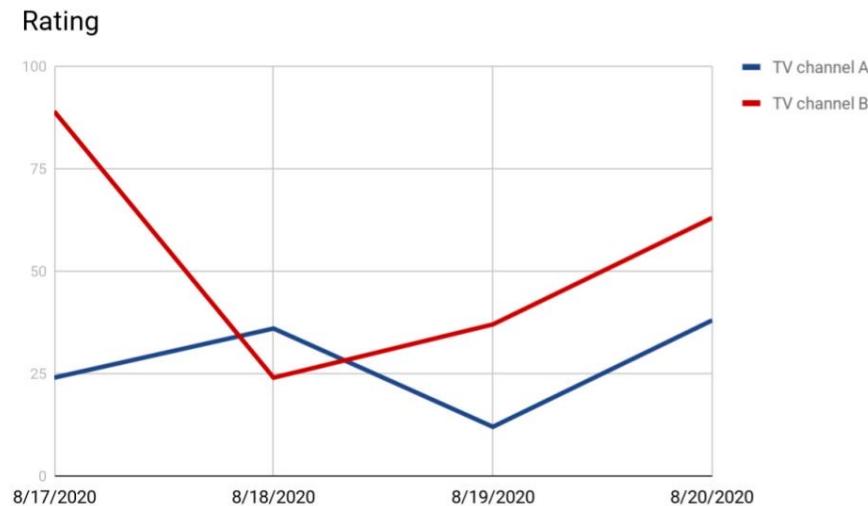
What visualizations are most appropriate given this?

Which of the following three chart types are appropriate for plotting **categorical vs. numerical** data? And which works best for **numerical vs. numerical** data?



Line Charts

If you need to plot a **numerical variable over time**, you might find line plots to be handy. You can add more series to the plot (i.e., more lines) to compare across different numerical variables over time as grouped by a categorical variable. When we add more series, we usually differentiate them using a different color for each one. Here's an example:



Crosstab

A common use case of tables is when you need to do a **cross-tabulation (crosstab)** of two categorical variables. Crosstabs (a.k.a. contingency tables), count the number of elements of category A that also belong to category B and present the results in a table:

Example of a Simple Survey Crosstab

Favorite Flavor	Boys		Girls	
Vanilla	8	32%	9	26%
Chocolate	10	40%	6	17%
Strawberry	5	20%	14	40%
Mint Chip	2	8%	6	17%
Total	25	100%	35	100%

Exercise

Variable	Type	
Location	Select an answer ▼	date
State of delivery	Select an answer ▼	categorical
Time	Select an answer ▼	
Customer age group	Select an answer ▼	
Product type	Select an answer ▼	
Product description	Select an answer ▼	
Product line	Select an answer ▼	

Exercise

Variable	Type	
Location	Categorical	
State of delivery	Categorical	
Time	Date	
Customer age group	Categorical	
Product type	Categorical	
Product description	Categorical	
Product line	Categorical	

date
categorical

Numerical Variables

Variable	Type
Revenue	Numeric (float)
Profit	Numeric (float)
Items sold	Numeric (integer)
Number of customers	Numeric (integer)

Metrics vs Dimensions

Metrics

The actual data that you plot and tabulate. It's numeric and results from applying mathematical aggregations to the data.

9.99,22
5.94,66755.39,0,0,0,
59.12,42826.99,0,0,0,30,30,30,30,
35.64,50656.8,0,0,0,30,30,30,30,
115.94,67905.07,0,0,0,30,30,30,30,
115.94,66938.9,0,0,0,30,30,30,30,
192.49,86421.04,0,0,0,30,30,30,30,
192.49,86421.04,0,0,0,30,30,30,30,

Dimensions

The variables that you use as filters.



DIMENSION	DIMENSION	METRIC	METRIC	METRIC
Product	Browser	Sessions	Pages/Session	Bounce Rate
Shoes	Chrome	3,000	3.5	50%
Shirts	Firefox	2,000	4.1	78%
Pants	Chrome	2,000	5.5	34%
Hats	Safari	1,000	2.5	90%
Gloves	Firefox	1,000	4.7	12%

Exercise

What mathematical operations are most appropriate to:

1. Calculate the total number of items sold, where each row represents a single item:
2. Calculate the total number of customers who purchased something in a given time period:
3. Calculate total profit:
4. Calculate total revenue:

count distinct
count
sum

Exercise

What mathematical operations are most appropriate to:

1. Calculate the total number of items sold, where each row represents a single item: **count**
2. Calculate the total number of customers who purchased something in a given time period: **count distinct**
3. Calculate total profit: **sum**
4. Calculate total revenue: **sum**

count distinct

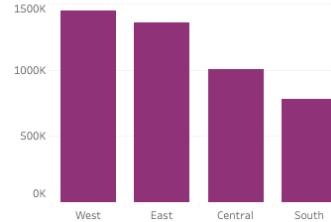
count

sum

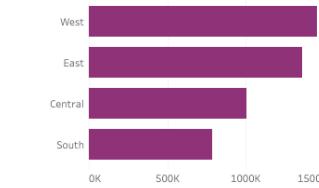
Exercise

var/var	Location	State of delivery	Customer age group	Product type	Product description	Product line
Location	*	?	?	?	?	?
State of delivery	*	?	?	?	?	?
Customer age group		*	?	?	?	?
Product type			*	?	?	?
Product description				*	?	
Product line					*	

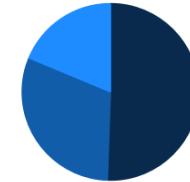
Column
The standard way to compare the size of things. Must always start at 0 on the axis.



Bar
The standard way to compare the size of things. Must always start at 0 on the axis. Good when the data are not time series and labels have long category names.



Pie Chart
A common way of showing part-to-whole data – but be aware that it's difficult to accurately compare the size of the segments.



Basic Choropleth (rate/ratio)
The standard approach for putting data on a map – should always be rates rather than totals and use a sensible base geography.

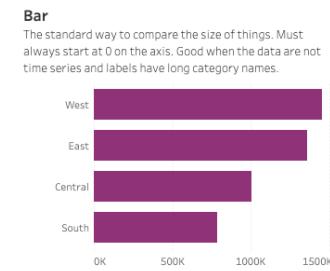
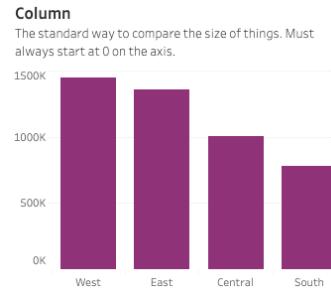


Crosstab

Age Range	I don't have a savings account			
	\$0	Just the minimum balance requirement	Less than \$1,000	More than \$1,000
Overall	21.0%	28.0%	9.0%	13.0%
18-24	22.4%	21.8%	9.7%	19.1%
25-34	18.0%	26.3%	10.6%	15.2%
35-44	18.9%	31.6%	6.6%	11.6%
45-54	21.6%	30.8%	7.7%	10.9%
55-64	22.8%	28.4%	8.4%	10.7%
65+	21.6%	27.6%	10.7%	8.2%

Exercise

var/var	Location	State of delivery	Customer age group	Product type
Location	*	Choropleth	Crosstab or bar/col/pie	Crosstab or bar/col/pie
State of delivery	*		Choropleth	Choropleth
Customer age group	*			Crosstab or bar/col/pie
Product type		*		
Product description				
Product line				



Crosstab

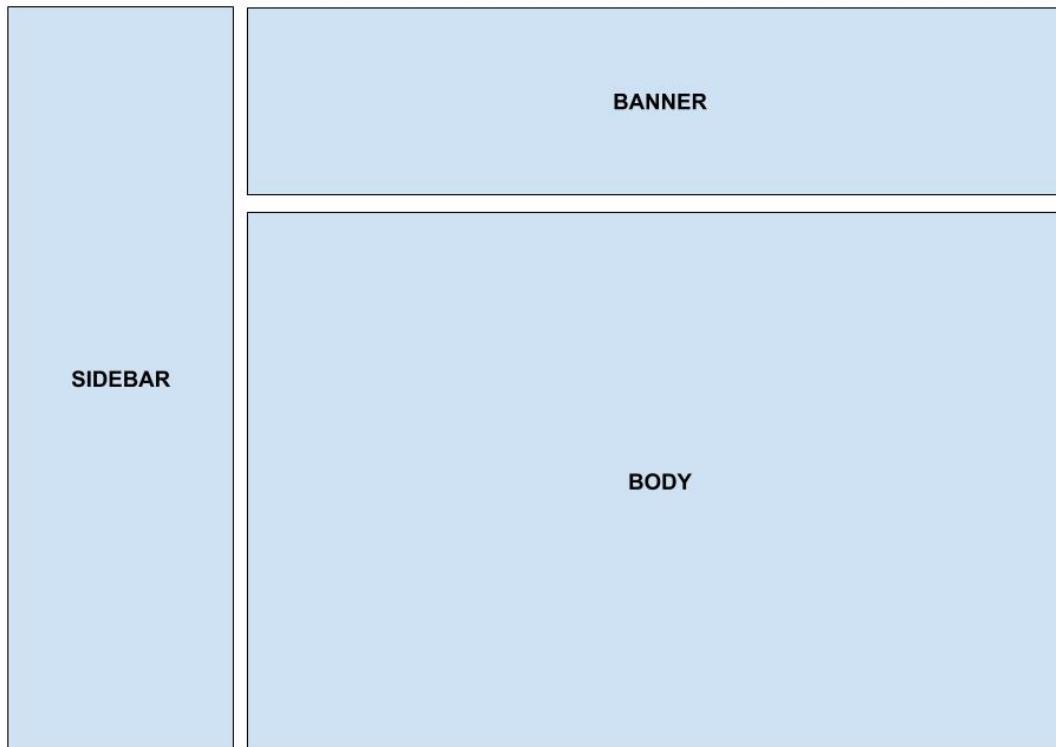
Age Range	I don't have a savings account	\$0	Just the minimum balance requirement	Less than \$1,000
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35-44	18.9%	31.6%	6.6%	11.6%
45-54	21.6%	30.8%	7.7%	10.9%
55-64	22.8%	28.4%	8.4%	10.7%
65+	21.6%	27.6%	10.7%	8.2%

Exercise

Let's say we want to plot revenue, profit, and sales over time.
What would be an appropriate visualization?

- line plot
- scatterplot
- crosstab
- pie chart

Dashboard Layout



Page Layout

Recall the original business problem. The managers want to know the following:

1. How have our sales, revenue, and profits evolved over time?
2. What are the locations with the highest numbers of sales and profit?
3. What are the items with the highest numbers of sales, profit, and revenue across product description, product type, product line, location, customer age group, and state of delivery?

The third question has lots of dimensions, so we can put it on the “**Detailed View**” page. Let’s put the first two questions on the “**Bird’s-Eye View**” page.

Page Design

What visualization would be appropriate to answer the second question?

2. *What are the locations with the highest numbers of sales and profit?*

- bar charts
- pie charts
- scatterplots
- choropleth charts

Page Mockup

The “Bird’s-Eye View” page must contain the following elements:

- The company logo
- A date picker (to filter the data)
- The profit and revenue line chart
- The sales line chart
- The scorecards
- The profit and revenue bar chart
- The sales bar chart

Page Mockup – Bird's Eye View

Company logo

Date picker

Scorecards

Line chart (profit and revenue)

Line chart (sales)

Grouped bar chart (profit and revenue) - by location

Bar chart (sales) - by location

Exercise

Which three plots would go well with these dimensions?

Location (number of items sold in each location):

Select an answer | 

Customer age group (number of customers in each age bracket):

Select an answer | 

State of delivery (number of items delivered):

Select an answer | 

choropleth map

bar chart

pie chart

Page Mockup – Detailed View

Company logo

Scorecards

Date picker

Bar chart with drill down (items and sales)

This chart will serve as a page-level filter

Bar chart (items and total profit)

Pie chart (sold items by location)

Bubble map (states, items delivered)

Bar chart (number of customers that buy this item)

LOOKER STUDIO

Gartner Magic Quadrant

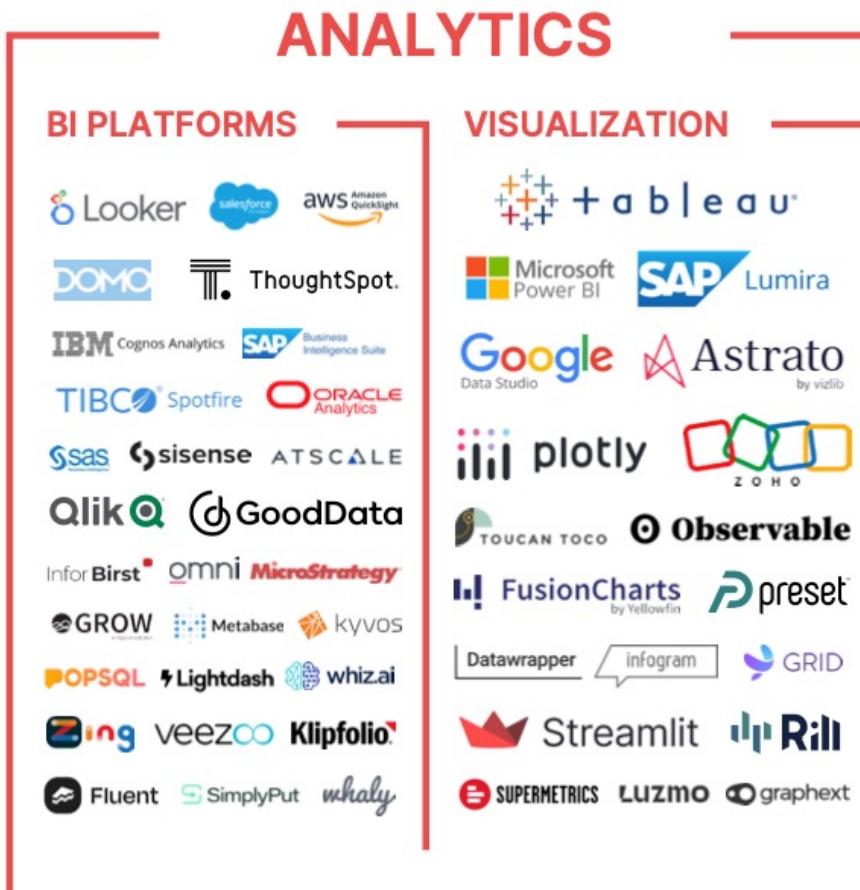
Figure 1: Magic Quadrant for Analytics and Business Intelligence Platforms



Gartner (June 2024)

Gartner

The 2024 MAD Landscape



Looker Studio

Looker Studio ? ⚙️ 👤

Create Recent Reports Data sources Explorer

Recent

Shared with me

Owned by me

Trash

Templates

Start with a Template

Blank Report Looker Studio

GA4 Report Google Analytics

Acme Marketing Google Analytics

Search Console Report Search Console

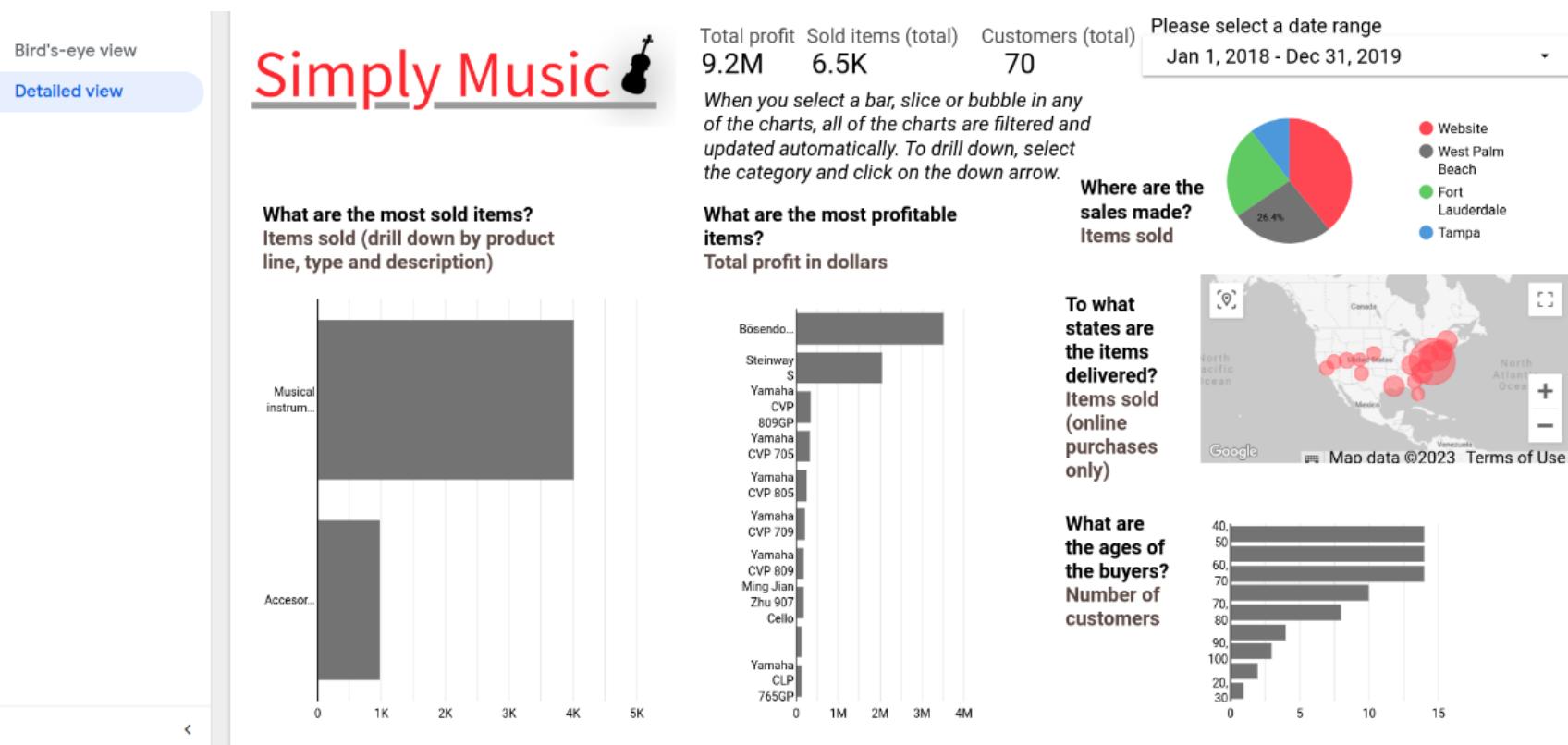
Google Ads Overview Google Ads

YouTube Channel Report YouTube Analytics

Template Gallery

Name	Owned by anyone	Last opened by me	Location
Blending Data	Tarek Atwan	12:55 AM	Owned by me
Simply Music 2018-2019 Report	Jana Marzouk	12:11 AM	Shared with me
Report Demo	Tarek Atwan	Nov 22, 2024	Owned by me
Simply Music Example	Tarek Atwan	Nov 22, 2024	Owned by me

Looker Dashboard



Looker Dashboard



Jan 1, 2018 - Dec 31, 2019

PROFIT
9.2M

DOLLARS_SOLD
42.9M

UNITS_SOLD
5.0K

