

Reflection Paper: Advanced Data Acquisition

Data acquisition, storage, analysis, and business intelligence

Vera Lake | D211 | 6/12/2022

**Part 1:  Data Dashboards**

A.  Provide a copy of your dashboards that support executive decision-making.

# Provide both data sets that serve as the data source for the dashboards. (Expand header to see more)

1. churn\_data (provided)
2. conversion\_data (https://www.kaggle.com/datasets/loveall/clicks-conversion-tracking)

# Provide step-by-step instructions to guide users through the dashboard installation. (Expand header to see more)

The Tableau Story with dashboards can be accessed via this link:

<https://public.tableau.com/app/profile/vera.butler/viz/SQLtoTeleCoCustomerRecruitmentandCustomerRetention/CustomerRecruitmentandCustomerRetention>

1. Navigate to the link in a web browser
2. Start on the first page of the story labeled “Introduction to the workbook”
3. Navigate to different dashboards by clicking the rectangle with the dashboard descriptions or the back and forward arrows
4. Table

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# Provide clear instructions to help users navigate the dashboards. (Expand header to see more)

## How to access and navigate the dashboards

The Tableau Story with dashboards can be accessed via this link: <https://public.tableau.com/app/profile/vera.butler/viz/TeleCoCustomerRecruitmentandCustomerRetention/CustomerRecruitmentandCustomerRetention>

1. Click the link
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4. Table

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## How to utilize the interactive controls of the dashboard

#### Dashboard 1: Customer Recruitment based on Gender from a recent Facebook ad campaign

The first things to note about this dashboard are:

1. Conversions are the total number of people who *enquired* about the product after clicking the ad.
2. Approved Conversions are the total number of people who *purchased* the product after clicking the ad.

Interactive controls can be used to engage with the dashboard to gather, visualize, and drill down to insights.

1. Click a gender from the legend to keep or exclude data from within all the pie charts
   1. Graphical user interface, application

      Description automatically generated
2. Select a piece of a pie chart to keep or exclude data from the individual chart
   1. Chart

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3. Hover over a slice of a pie chart for more information

#### Dashboard 2: Customer Recruitment on Age from a recent Facebook Campaign

See Dashboard 1 above. All the same interactions apply to Dashboard 2.

#### Dashboard 3: Churn by Gender

See Dashboard 1 above. All the same interactions apply to Dashboard 3.

#### Dashboard 4: Churn by County Map

See Tableau’s help center article on map interactions: <https://help.tableau.com/current/pro/desktop/en-us/maps_customize_interaction.htm>

A search feature was also added to the map. Use this feature to search by county on the map to.

1. Select the search field
2. Type in your county of interest
3. Look at the map for the highlighted county
4. Hover or click the highlighted county on the map for more information

#### Dashboard 5: Churn Count: Search by County, City, Job

A search feature has been added for all tables in the dashboard. To use the search feature:

1. Click the search field for the table you would like to search
2. Type in the data you are searching for
3. Press enter
4. View the filtered results in the table below

How to sort the table:

1. Click the three bars at the top of the table to switch the sort from ascending to descending order
2. Click the down arrow next to the three bars to sort by other options (field, data source, alphabetical, etc.)
   1. Graphical user interface, application

      Description automatically generated

#### Dashboard 6: Search by City: Avg Tenure v Churn Bar Chart

A search feature has been added for the bar chart. To use the search feature:

1. Click the search field
2. Type in the city you are searching for
3. Press enter
4. View the filtered search results in the list

How to sort the table:

1. Click the three bars at the top of the table to switch the sort from ascending to descending order
2. Click the down arrow next to the three bars to sort by other options (field, data source, alphabetical, etc.)

How to select specific data:

1. Use the legend to select Churn Yes or No to highlight only that data in all bars in the list
2. Select *one* color of the bar for yes or no to view only the data for that individual bar

#### Dashboard 7: Search by County: Avg Tenure v Churn Bar Chart

A search feature has been added for the bar chart. To use the search feature:

1. Click the search field
2. Type in the county you are searching for
3. Press enter
4. View the filtered search results in the list

How to sort the table:

1. Click the three bars at the top of the table to switch the sort from ascending to descending order
2. Click the down arrow next to the three bars to sort by other options (field, data source, alphabetical, etc.)

How to select specific data:

1. Use the legend to select Churn Yes or No to highlight only that data in all bars in the list
2. Select *one* color of the bar for yes or no to view only the data for that individual bar

#### Dashboard 8: Search by Job: Avg Tenure v Churn Bar Chart

A search feature has been added for the bar chart. To use the search feature:

1. Click the search field
2. Type in the job you are searching for
3. Press enter
4. View the filtered search results in the list

How to sort the table:

1. Click the three bars at the top of the table to switch the sort from ascending to descending order
2. Click the down arrow next to the three bars to sort by other options (field, data source, alphabetical, etc.)

How to select specific data:

1. Use the legend to select Churn Yes or No to highlight only that data in all bars in the list

Select *one* color of the bar for yes or no to view only the data for that individual bar

# Provide a copy of all SQL code and other code supporting the dashboards. (Expand header to see more)

## Churn Database

### Create Churn Database

## Text Description automatically generated

### Create Churn Public Schema

Text

Description automatically generated with medium confidence

### Create Churn Contract Table

Graphical user interface, text, application, email

Description automatically generated

### Add columns to the contract table

#### Add column contract\_id to contract table

Graphical user interface, text, application, email

Description automatically generated

#### Add column duration to Contract table

Graphical user interface, text, application, email

Description automatically generated

#### Add primary key contraint to Contract table

Graphical user interface, text, application, email

Description automatically generated

## Customer Table

### Create Customer table

Text

Description automatically generated

### Add Columns to the Customer Table

#### Add customer\_id column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add lat column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### add lng column to Customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add population column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add children column to customer table

Graphical user interface, text, application, chat or text message, email

Description automatically generated

#### Add age column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add income column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add marital column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add churn column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add gender column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add tenure column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add monthly\_charge column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add bandwidth\_gp\_year column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add outage\_seconds\_week column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add email column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add contacts column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add yearly\_equip\_failure column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add techie column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add port\_modem column to customer table

### Graphical user interface, text, application Description automatically generated

#### Add tablet column to customer table

Graphical user interface, text, application, email

Description automatically generated

#### Add job\_id column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add payment\_id column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add contract\_id column to customer table

Graphical user interface, text, application

Description automatically generated

#### Add location\_id column to customer table

Graphical user interface, text, application

Description automatically generated

### Create Contraints for the customer table

#### Create Foreign Key Constraint between the customer and contract tables

Text

Description automatically generated

#### Create Foreign Key Constraint between the customer and job tables

Graphical user interface, text

Description automatically generated

#### Create Foreign Key Constraint between the customer and location tables

Graphical user interface, text, application

Description automatically generated

#### Create Foreign Key Constraint between the customer and payment tables

Graphical user interface, text

Description automatically generated

#### Create Primary Key Constraint for the customer table

Graphical user interface, text, application, email

Description automatically generated

## Job Table

### Create job table

Text

Description automatically generated

### Add Columns to Job Table

#### Add job\_id to the Jobs Table

Graphical user interface, text, application

Description automatically generated

#### Add job\_title column to the jobs table

Graphical user interface, text

Description automatically generated

### Add Constraints to Job Table

### Add Primary Key Constraint to the jobs table

### Graphical user interface, text, application, email Description automatically generated

## Location Table

### Create the location table

Text

Description automatically generated

### Add columns to the location table

#### Add location\_id to the location table

Graphical user interface, text, application

Description automatically generated

#### Add zip to the location table

Graphical user interface, text, application

Description automatically generated

#### Add city to the location table

Graphical user interface, text, application

Description automatically generated

#### Add state to the location table

Graphical user interface, text, application

Description automatically generated

#### Add county to the location table

Graphical user interface, text, application

Description automatically generated

### Add constraints to the location table

Graphical user interface, text, application, email

Description automatically generated

## Payment Table

### Create the payment table

## Graphical user interface, text Description automatically generated

### Add columns to the payment table

#### Add payment\_id column to the payment table

Graphical user interface, text, application

Description automatically generated

#### Add payment\_type column to the payment table

Graphical user interface, text, application

Description automatically generated

### Add constraints to the payment table

#### Add primary key constraint to the payment table

Graphical user interface, text, application, email

Description automatically generated

## conversion\_data Database

### Create conversion\_data database

### Create facebook\_campaign table

### Add Columns to the facebook\_campaign table

#### Add ad\_id column to the facebook\_campaign table

Graphical user interface, text

Description automatically generated

#### Add teleco\_campaign\_id column to the facebook\_campaign table

#### Graphical user interface, text, application Description automatically generated

#### Add fb\_campaign\_id column to the facebook\_campaign table

#### Graphical user interface, text, application Description automatically generated

#### Add age\_group column to the facebook\_campaign table

#### Graphical user interface, text, application Description automatically generated

#### Add gender column to the facebook\_campaign table

#### Graphical user interface, text, application Description automatically generated

#### Add fb\_interest\_code column to the facebook\_campaign table

#### Graphical user interface, text Description automatically generated

#### Add total\_impressions column to the facebook\_campaign table

#### Graphical user interface, text Description automatically generated

#### Add total\_clicks column to the facebook\_campaign table

#### Graphical user interface, text Description automatically generated

#### Add total\_spent column to the facebook\_campaign table

#### Graphical user interface, text Description automatically generated

#### Add total\_conversions column to the facebook\_campaign table

#### Graphical user interface, text, application Description automatically generated

#### Add total\_approved\_conversions column to the facebook\_campaign table

Graphical user interface, text, application

Description automatically generated

### Add contraints to the facebook\_campaign table

#### Add Primary Key Constraint to the facebook\_campaign table

Graphical user interface, text, application, email

Description automatically generated

**Part 2:  Demonstration**

B.  Provide a link to a Panopto multimedia presentation in which you present the dashboards to an audience of data analytics peers. You should do all of the following in your presentation:

1.  Describe the technical environment used to create the dashboards.

2.  Demonstrate the functionality of the dashboards.

3.  Explain the SQL scripts used to support the creation of the dashboards.

4.  Explain how the data streams were prepared to support the analysis.

5.  Describe how data were aligned with other data points.

6.  Demonstrate how the databases were created.

7.  Explain how referential integrity was enforced in the database.

Note: The audiovisual recording should feature you presenting the material on screen (i.e., not in voice-over or embedded video) and should simultaneously capture both you and your multimedia presentation.

Note: For instructions on how to access and use Panopto, use the "Panopto How-To Videos" web link provided below. To access Panopto's website, navigate to the web link titled "Panopto Access," and then choose to log in using the “WGU” option. If prompted, log in using your WGU student portal credentials, and then it will forward you to Panopto’s website.

To submit your recording, upload it to the Panopto drop box titled “XX.” Once the recording has been uploaded and processed in Panopto's system, retrieve the URL of the recording from Panopto and copy and paste it into the Links option. Upload the remaining task requirements using the Attachments option.

**Part 3:  Report**

# C.  Write a report to outline the data exploration, use of advanced SQL operations, and the analysis of the data. Do the following as part of your report:

## 1.  Explain how the purpose and function of your dashboard aligns with the needs outlined in the data dictionary associated with your chosen data set.

The purpose and function of the dashboards within the Tableau story aligns with the needs outlined in the data dictionary associated with my chosen data set in several ways. TeleCo is concerned with customer acquisition and retention efforts and the data visualizations directly support business decisions that can be made around how to reduce the cost of acquiring and retaining customers but providing specific insights and interactive search features.

## 2.  Justify the selection of the business intelligence tool you used.

### pgAdmin 4

pgAdmin 4 is a business intelligence tool used for database management and design. Data can be imported, read, updated, and deleted into databases using SQL queries and GUI features. This tool was selected to store and manage the data for TeleCo.

### Tableau

Tableau is a data visualization tool used to import, manage and create visualizations from data. This tool was selected to manage and visualize TeleCo data in order to discuss business insights that can be used to make business decisions on customer acquisition efforts and customer retention efforts.

## 3.  Explain the steps used to clean and prepare the data for the analysis.

The steps used to clean and prepare the data for the analysis were:

Step 1: Look at the data we have with a SELECT \* statement for each data table.

Step 2: Rename the columns for clarity.

Step 3: Check for null values and replace with mean values.

## 4.  Summarize the steps used to create the dashboards.

### Step 1: Import the data (https://www.postgresqltutorial.com/postgresql-tutorial/import-csv-file-into-posgresql-table/)

### Step 2: Explore the data

### Step 3: Create sheets that uncover business insights

### Step 4: Create dashboards form the individual sheets

### Step 5: Add interactive search capabilities for easier exploration of the dashboards

### Step 6: Add the dashboards to a story

### Step 7: Make the dashboards public to allow easy access by other team members

## 5.  Discuss the results of your data analysis and how it supports executive decision-making.

### Data Analysis Results and Executive Decision-Making

#### Customer Recruitment based on Gender form a recent Facebook Ad

##### Conversions by Gender

Males and Females have an almost 50/50 split for conversions.

##### Approved Conversion by Gender

An approved conversion is defined as a conversion event that resulted in a purchase.

Males are more likely to purchase a product from TeleCo after clicking on a Facebook Ad than Females.

##### Impressions by Gender

Less impressions were made on Males than Females.

In conjunction with the approved conversions by gender this indicates that it takes less impressions to create a purchase for Males than Females.

##### Clicks by Gender

Males are less likely to click on a Facebook Ad than Females.

Less males click on a Facebook Ad but they are more likely to purchase.

##### Spent by Gender

It costs less to market to Males with a Facebook Ad than Females.

Overall, looking at the total amount spent on Facebook Ads and the total number of conversions it is **less expensive to target Males than Females and more likely to produce a recruitment event/approved conversion.**

#### Customer Recruitment on Age from a recent Facebook Ad Campaign

##### Conversions by Age

Age Group 30-34 are most likely to inquire about the product after clicking on a Facebook Ad.

##### Approved Conversion by Age

Age Group 30-34 are most likely to purchase after clicking on a Facebook Ad.

##### Impressions by Age

Age Group 30-34 had the most impressions from the Facebook Ad campaign.

##### Clicks by Age

Age Group 45-49 are the most likely to click on the Facebook Ad.

##### Ad Spend by Age

TeleCo currently spends the most on Facebook Ads for age groups 45-49 but should focus more on Age Group 30-34 to decrease costs since they are the most likely to click and then purchase/convert.

#### Churn by Gender

Males have a lower churn rate than Females.

Males also have a lower cost of recruitment from Facebook campaigns.

**Targeting males in the next Facebook Ad campaign will be cost effective in two ways:**

* **Lower acquisition costs**
* **Higher likelihood to stay with the company longer**

#### Churn by County

Regional managers can utilize this map chart to search and view the churn count for their county.

#### Churn Count: Search by County, City, Job

Executives can use these data tables to search for and view churn counts for county, city, and job titles that apply to their interests for business decisions.

#### Search by City: Avg Tenure v Churn Bar Chart

Executives can use this data table to search for and view churn v tenure in months by city.

#### Search by County: Avg Tenure v Churn Bar Chart

Executives can use this data table to search for and view churn v tenure in months by county.

#### Search by Job: Avg Tenure v Churn Bar Chart

Executives can use this data table to search for and view churn v tenure in months by job title.

## 6.  Discuss the limitation(s) of your data analysis.

One of the limitations is the amount of data that is provided for each class. For example, it feels like the company should have churn counts in the thousands and not the hundreds for the customers that match a certain city.

Another limitation is that the Facebook Ad campaign is anonymous and does not directly link to the customer data. If TeleCo could find a way to add a customer id to the Facebook Ad campaign conversion data we could create a relationship between the two data sources.

# D.  Record the web sources used to acquire data or segments of third-party code used to support the application. Ensure the web sources cited are reliable.

# 1. <https://www.kaggle.com/datasets/loveall/clicks-conversion-tracking>

# E.  Acknowledge sources, using in-text citations and references, for content that is quoted, paraphrased, or summarized.

# 1. <https://www.postgresqltutorial.com/postgresql-tutorial/import-csv-file-into-posgresql-table/>

# F.  Demonstrate professional communication in the content and presentation of your submission.