Data and Artificial Intelligence
Cyber Shujaa Program

Week 5 Assignment
Data Visualization using Tableau

Student Name: Violet Joy

Student ID: cs-do01-25025

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INTRODUCTION

Human resource departments mainly rely on dynamic tools to track, assess, and make well-informed decisions regarding their workforce in today's data-driven workplace. The HR manager has responded to this requirement by asking for an interactive dashboard that offers comprehensive employee records for in-depth analysis in addition to high-level summaries. This dashboard will enable granular analysis of individual employee data and enable stakeholders to rapidly comprehend workforce trends.

The solution provides a thorough understanding of organizational health and is broken down into three main summary sections: Overview, Demographics, and Income Analysis. A comprehensive employee directory that includes all necessary information, including name, department, position, gender, age, education, and pay, will be provided in addition to visual summaries. All columns in this directory will support dynamic filtering, allowing for more specialized searches and in-depth analysis.

To create this solution, I will:

- **Load and transform** the relevant datasets to ensure consistency and accuracy.
- **Create calculated measures** to enrich the analysis (e.g., average salary by department, age distribution, gender ratios).
- Build engaging **visualizations**, including bar charts, area charts, maps, scatter plots, and heat maps, to convey key insights.
- Design a compelling and user-friendly Tableau **dashboard** that meets business needs and supports decision-making processes.
- **Publish and share** the dashboard into my professional portfolio website/blog to showcase the project and its impact.

This project bridges data analysis and HR strategy, offering a practical example of how interactive visualizations can drive smarter workforce management.

TASKS COMPLETED

2.1 Load and Transform

The relevant HR datasets were imported into Tableau (or the selected analysis tool) to start the analysis. These datasets contained departmental data, pay records, and employee demographic information. After that, the data was transformed and cleaned to guarantee accuracy, consistency, and usability.

Key transformation steps included:

- **Data Cleaning:** Removed duplicate records, handled missing values, corrected data types (e.g., dates, numerical fields), and standardized categorical entries such as job titles and education levels.
- **Data Integration:** Merged multiple tables using common identifiers (e.g., employee ID or department code) to create a unified dataset suitable for analysis.
- **Calculated Fields:** Created new variables such as age (from date of birth), tenure (from hire date), and salary ranges to support detailed filtering and aggregation.
- **Data Enrichment:** Grouped similar values for easier analysis (e.g., grouping education levels into basic, intermediate, and advanced categories).
- **Filtering and Aggregation:** Prepared the dataset to enable dynamic filtering on key dimensions such as gender, department, and job position.

This preparation stage was essential to ensure the accuracy and efficiency of subsequent visualizations and to support interactive, real-time insights within the dashboard.

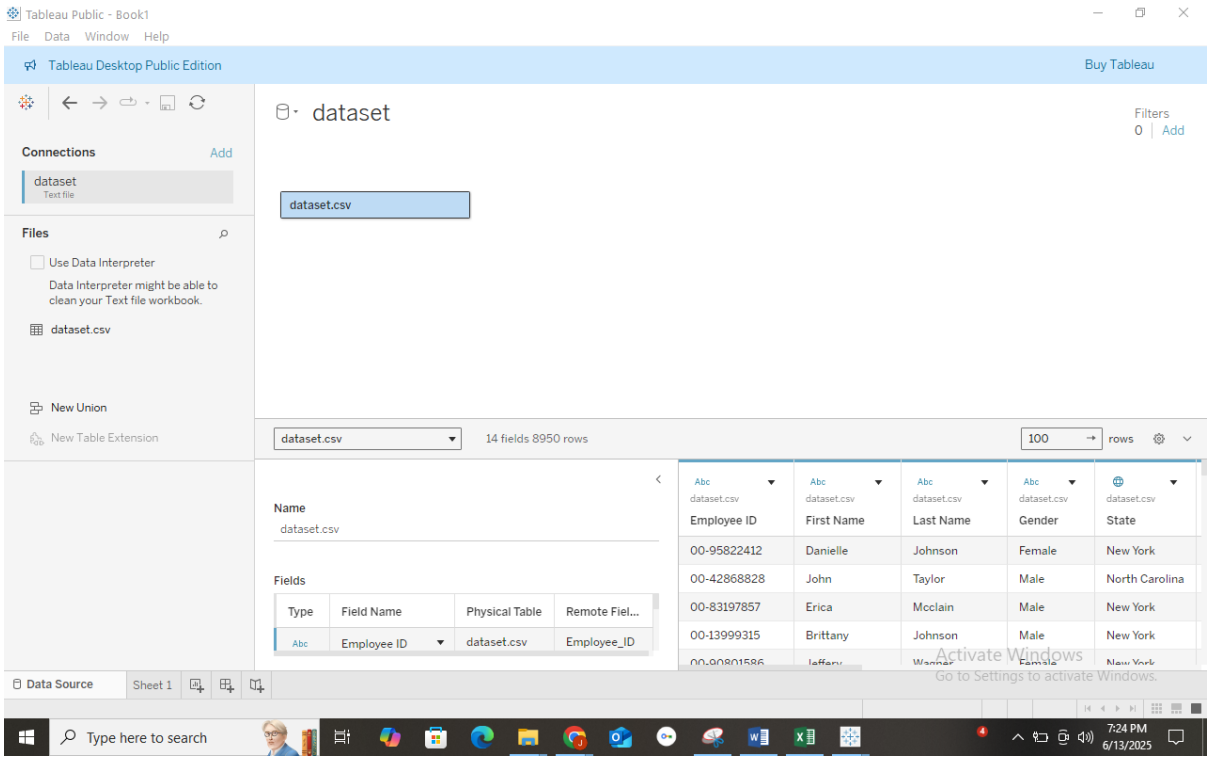

Fig 2.1.1: Output of loading data as a text file

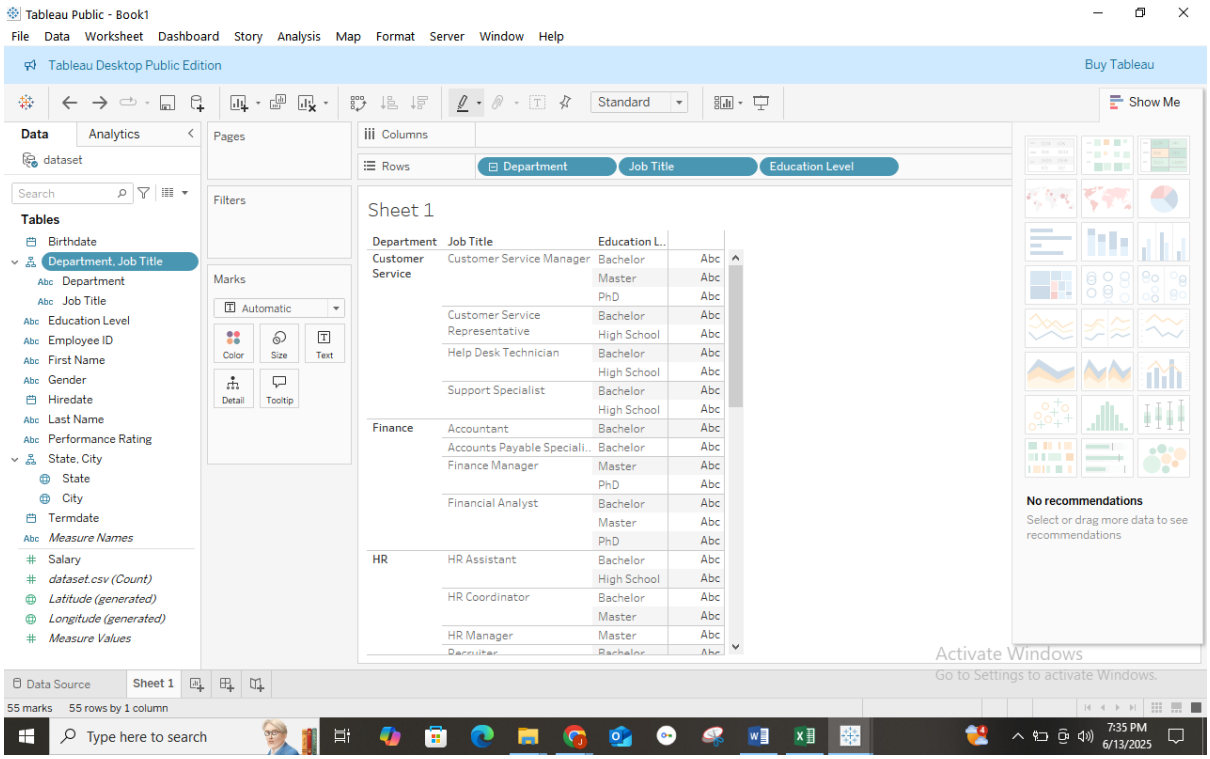

Fig 2.2.2: Output of understanding the data

2.2 Calculated Measures

During the process of analysis, a number of calculated measures were created to facilitate dynamic data exploration and support meaningful insights. The purpose of these metrics was to offer summarized metrics, comparisons, and ratios that represent important HR indicators.

Some of the key calculated measures include:

- **Total Terminated**
- **Total Hired**
- **Total Active**

These calculated fields enhanced the depth of analysis by enabling comparisons, detecting patterns, and supporting the creation of filters, KPIs, and dynamic visuals. They form the backbone of the dashboard's ability to tell a meaningful and data-informed story.

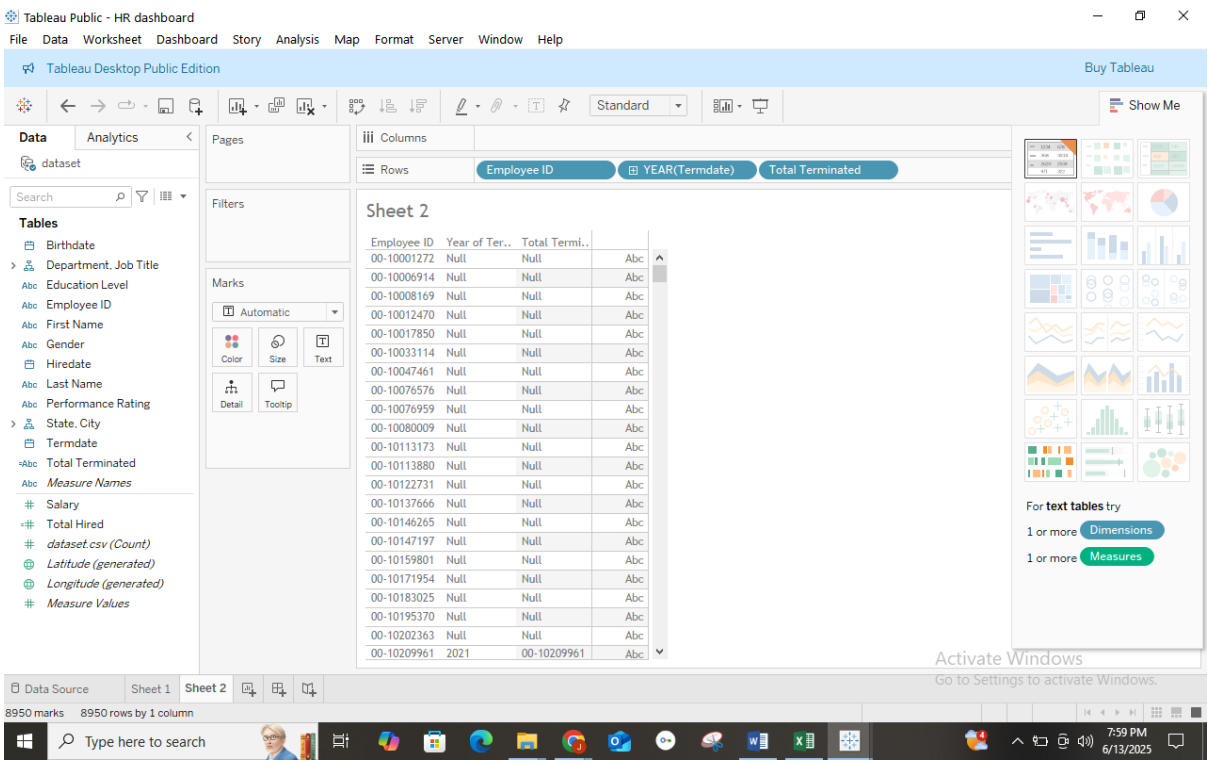

Fig 2.2.1: Output of checking if the total terminated measure works

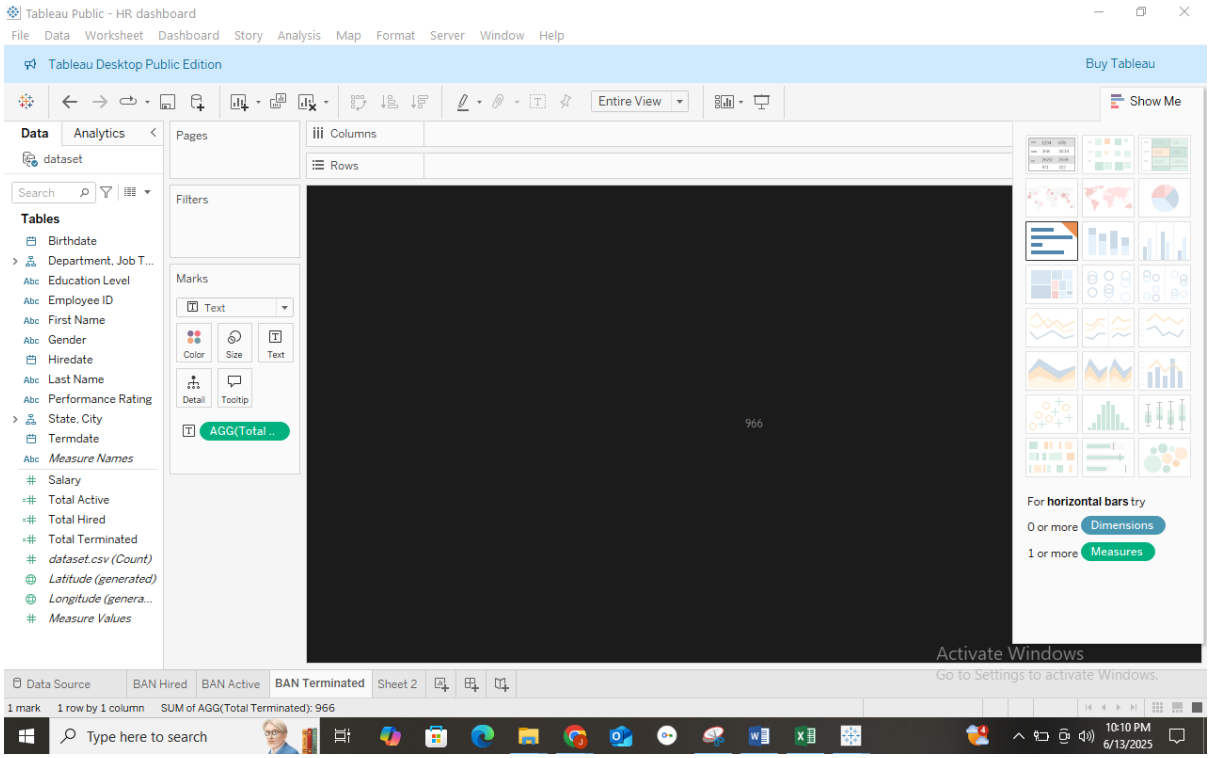

Fig 2.2.2: Output of the ban containing terminated

2.3 Build Visualizations

Tableau was used to create a range of visualizations that converted raw data into understandable and useful insights. The kind of data and the analytical objectives of the HR dashboard were taken into consideration when choosing each visualization.

The following types of charts were developed:

- **Line Charts**: Used to compare terminated year vs number of employees, total hired over the year's vs number of employees
- **Bar Charts**: Used to compare employee count, average salary, and education levels across departments and gender categories.
- **Area Charts**: Illustrated trends over time, such as changes in headcount or salary distribution over different hiring periods.
- **Maps**: Visualized geographic distribution of employees (if location data is available), helping identify workforce concentration across regions.
- **Scatter Plots**: Showed relationships between numerical variables, such as age vs. salary or tenure vs. performance (if available), to identify patterns and outliers.
- **Heat Maps**: Provided a quick view of salary distribution across departments and positions, with color intensity indicating higher or lower values.
- **Pie Charts**: Summarized categorical data like gender and education level proportions for a high-level demographic overview.
- **Barbell Chart**: Comparing salaries across different education levels for both genders to identify discrepancies or patterns.

Each visualization was interactive, allowing users to click, filter, and drill down into the data for deeper analysis. Together, these charts provided a comprehensive view of the organization's workforce, supporting both operational insights and strategic decision-making.

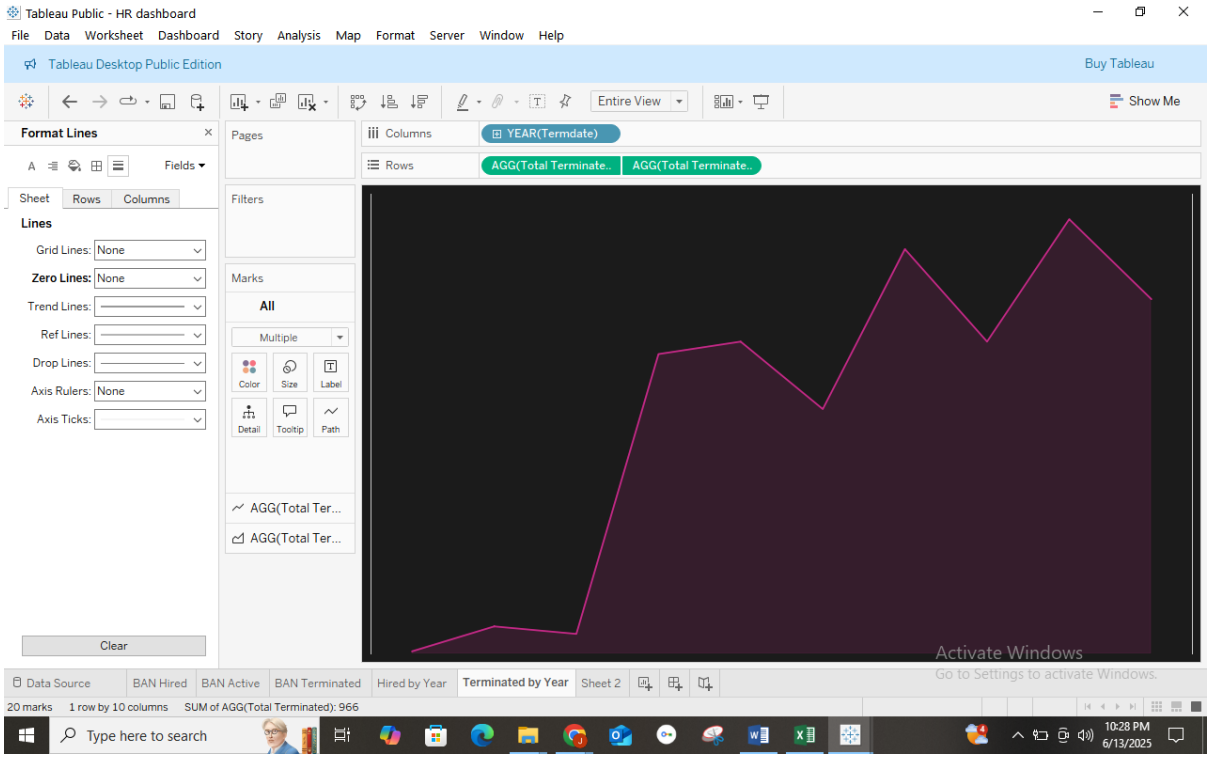

Fig 2.3.1: Output of visualization of total number of hired and terminated employees over years using line graph and area graph

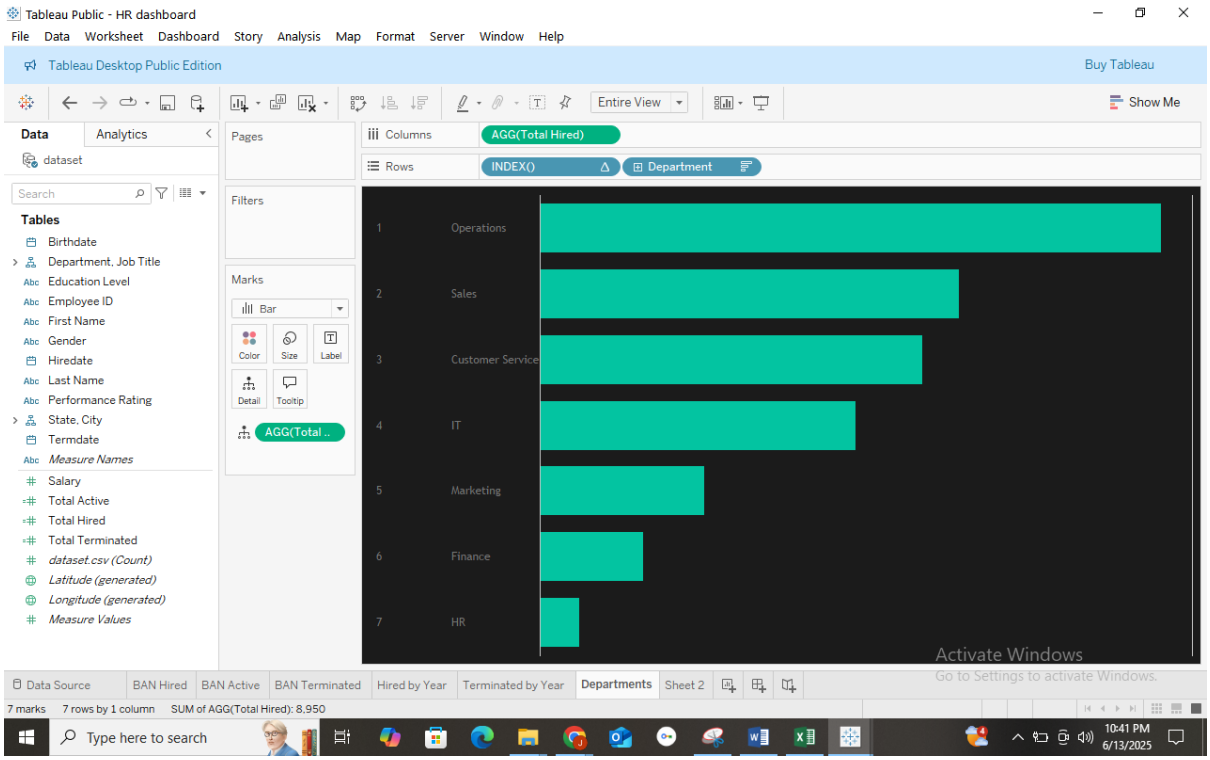

Fig 2.3.2: Output of breakdown of total employees by department and job titles using bar chart

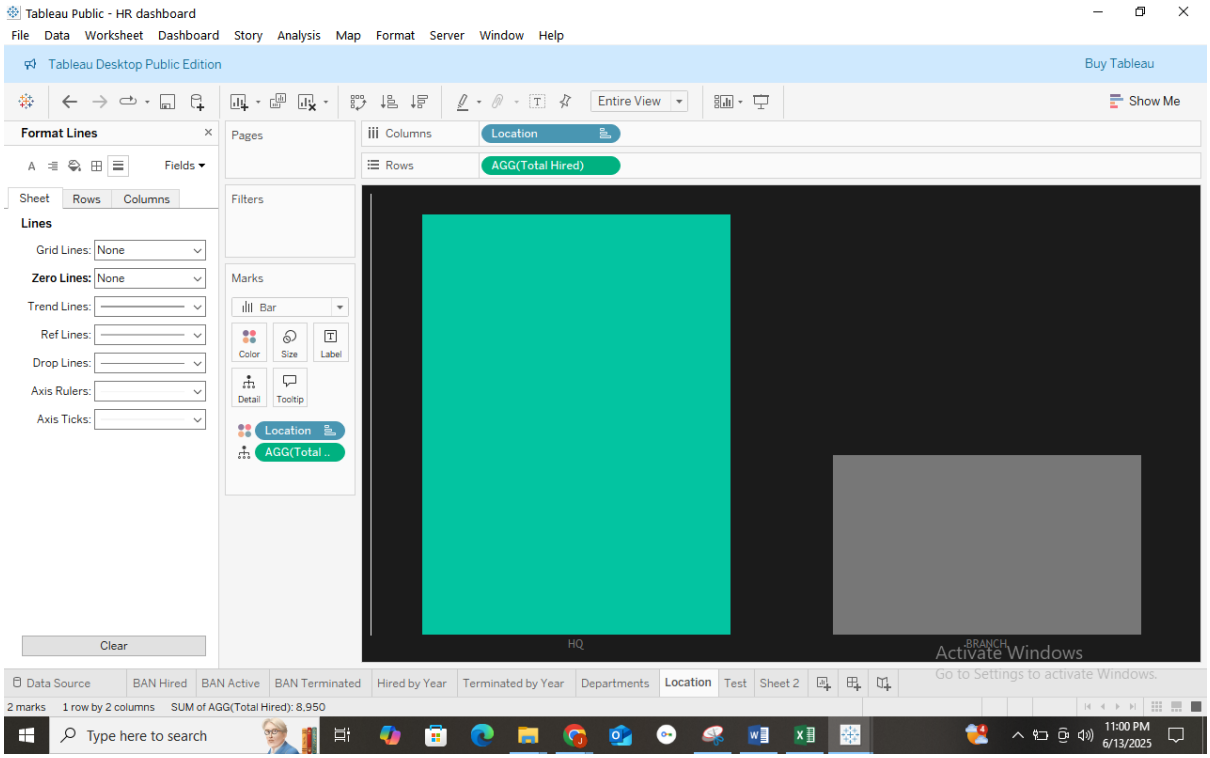

Fig 2.3.3: Output of total employees between Hq (New York) and branches using bar chart

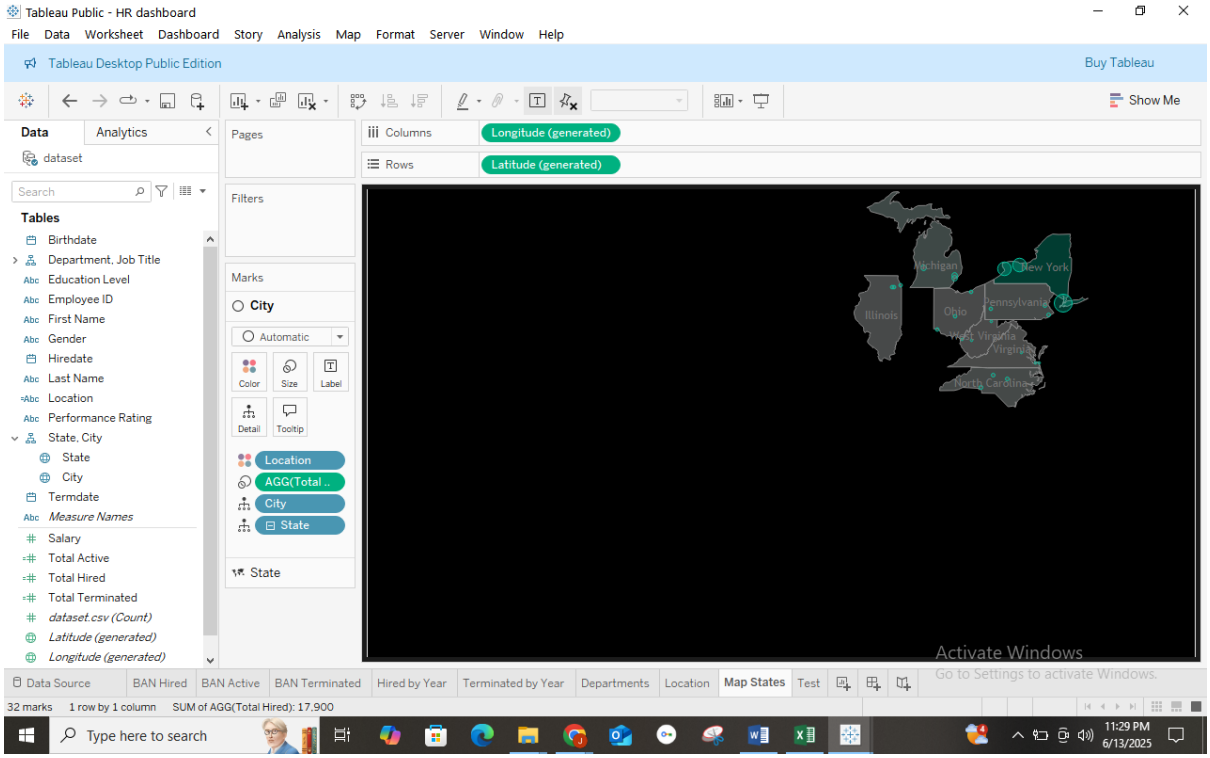

Fig 2.3.4: Output of distribution of employee by state and city

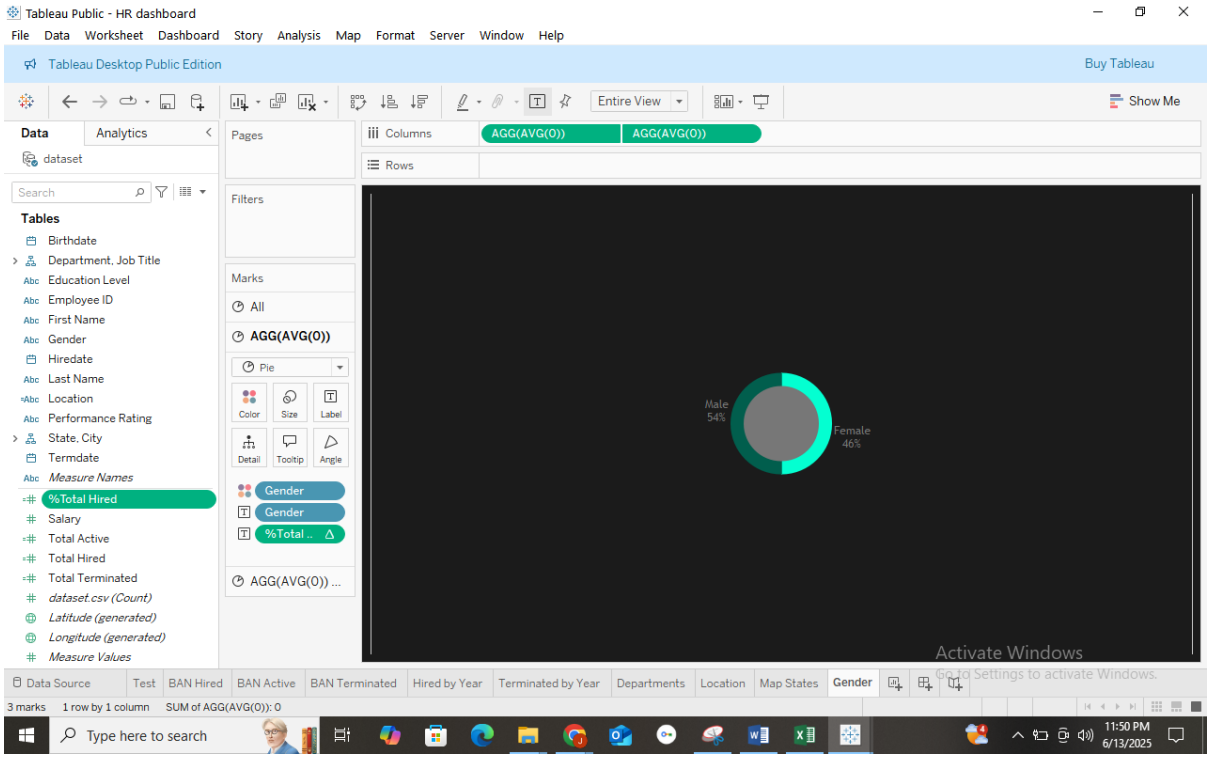

Fig 2.3.5: Output of gender and total employed

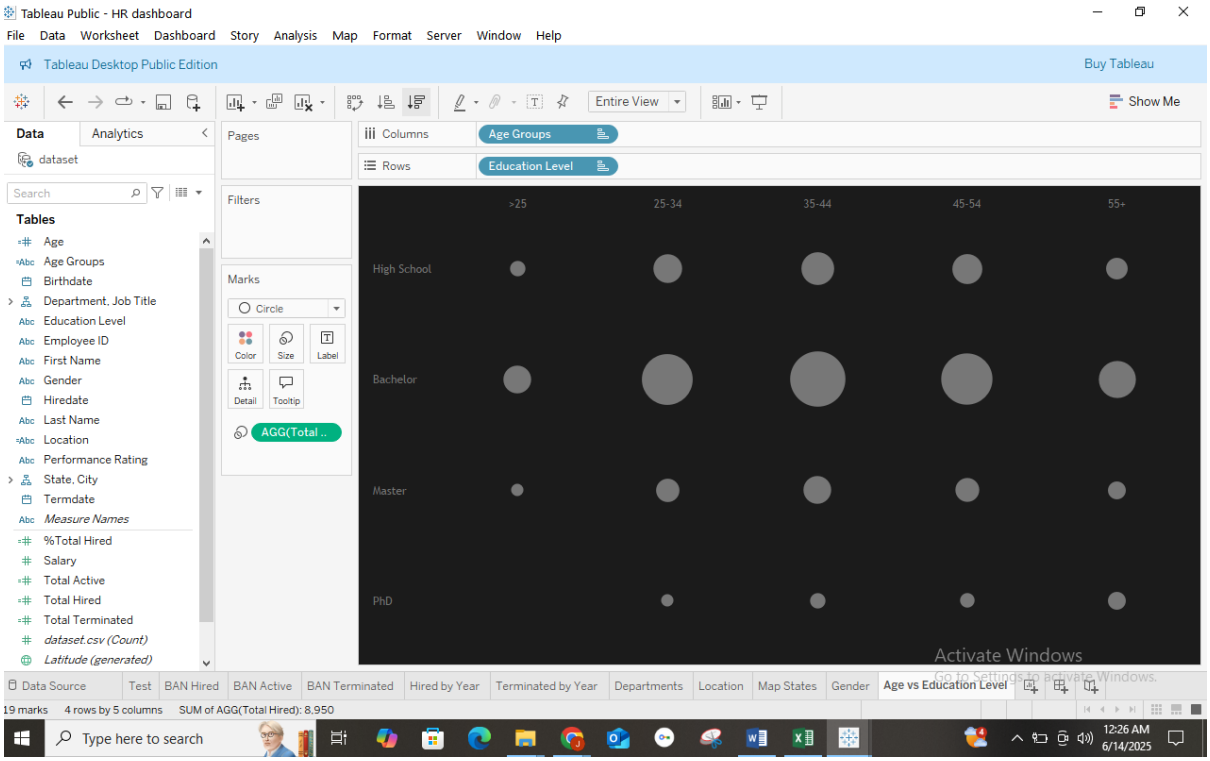

Fig 2.3.6: Output of visualizing the distribution of employees across age groups and education level using heat map

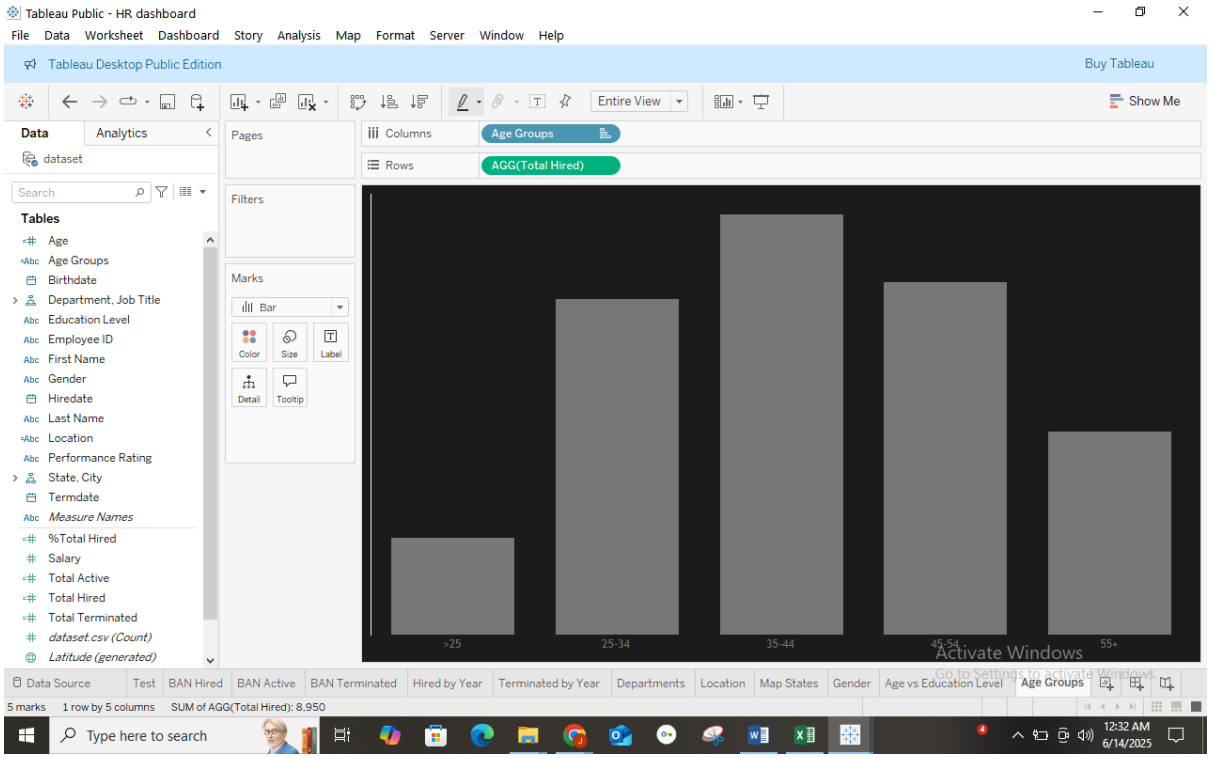

Fig 2.3.7: Output of total number of employees within each age group using bar chart

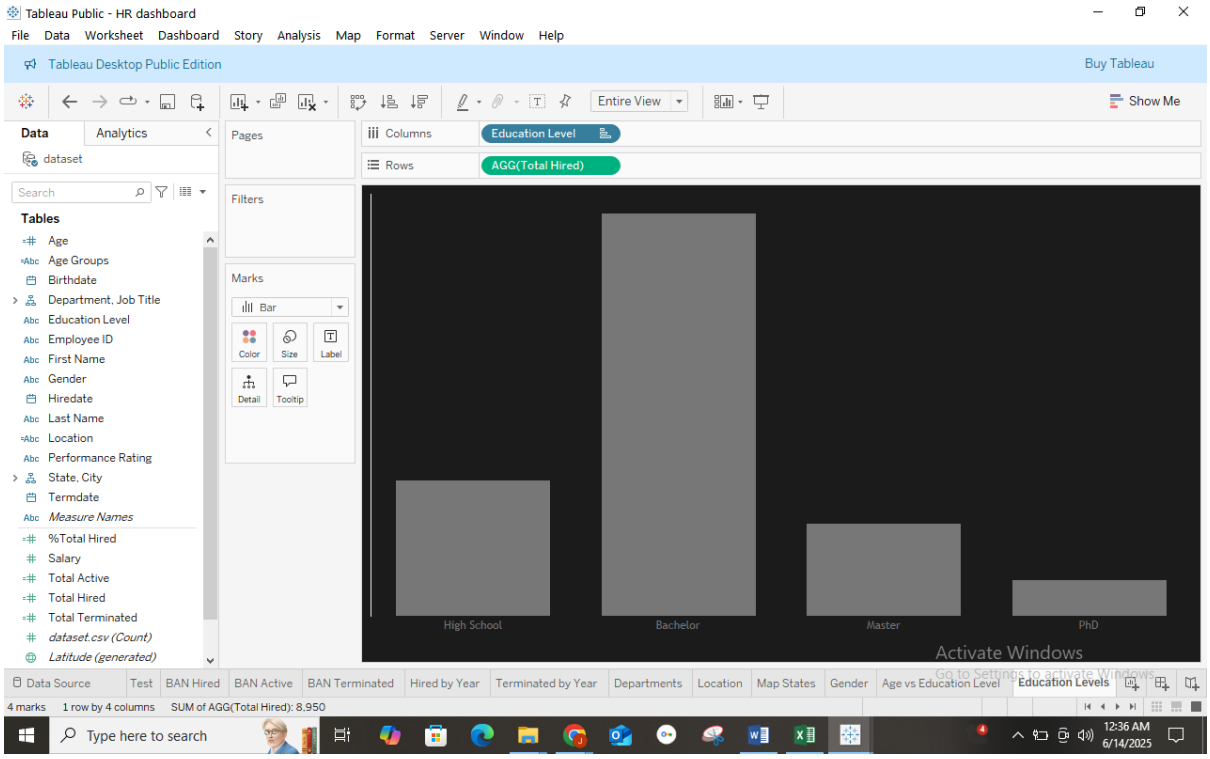

Fig 2.3.8: Output of total number of employees with each education level using bar chart

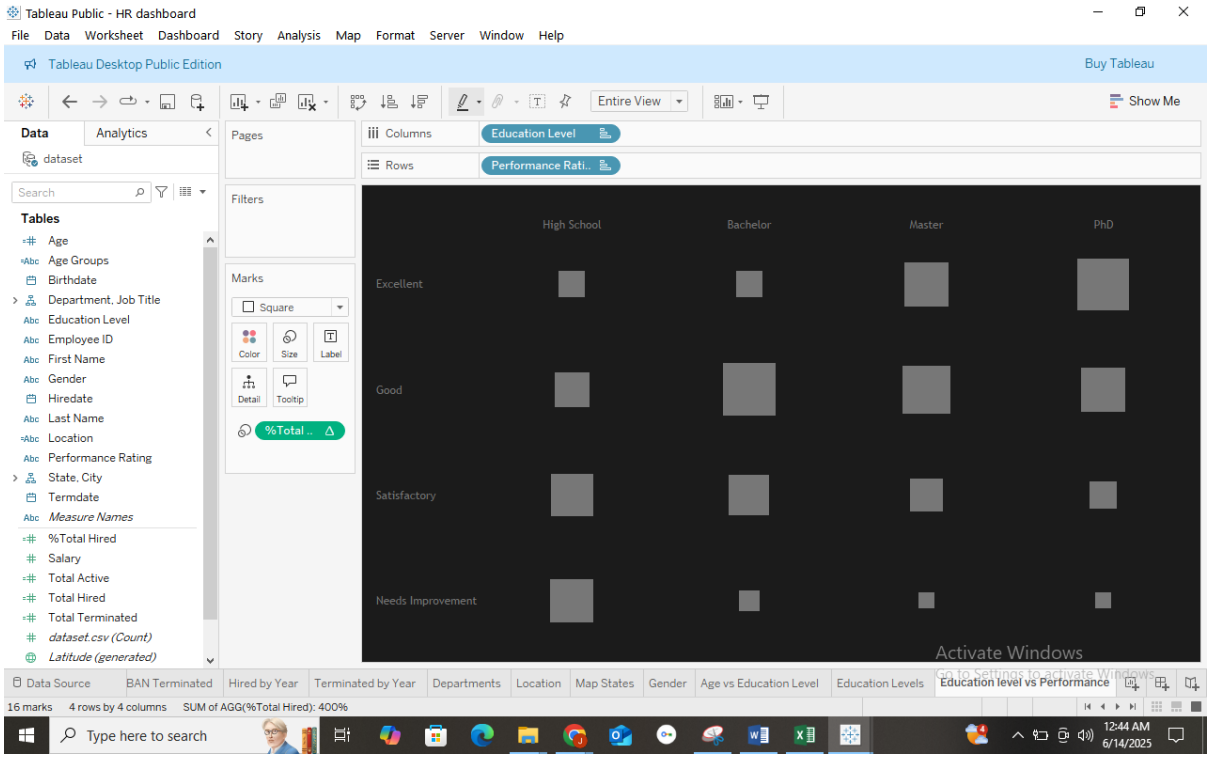

Fig 2.3.9: Output of the present correlation between employee's education backgrounds and their performance ratings using heat map

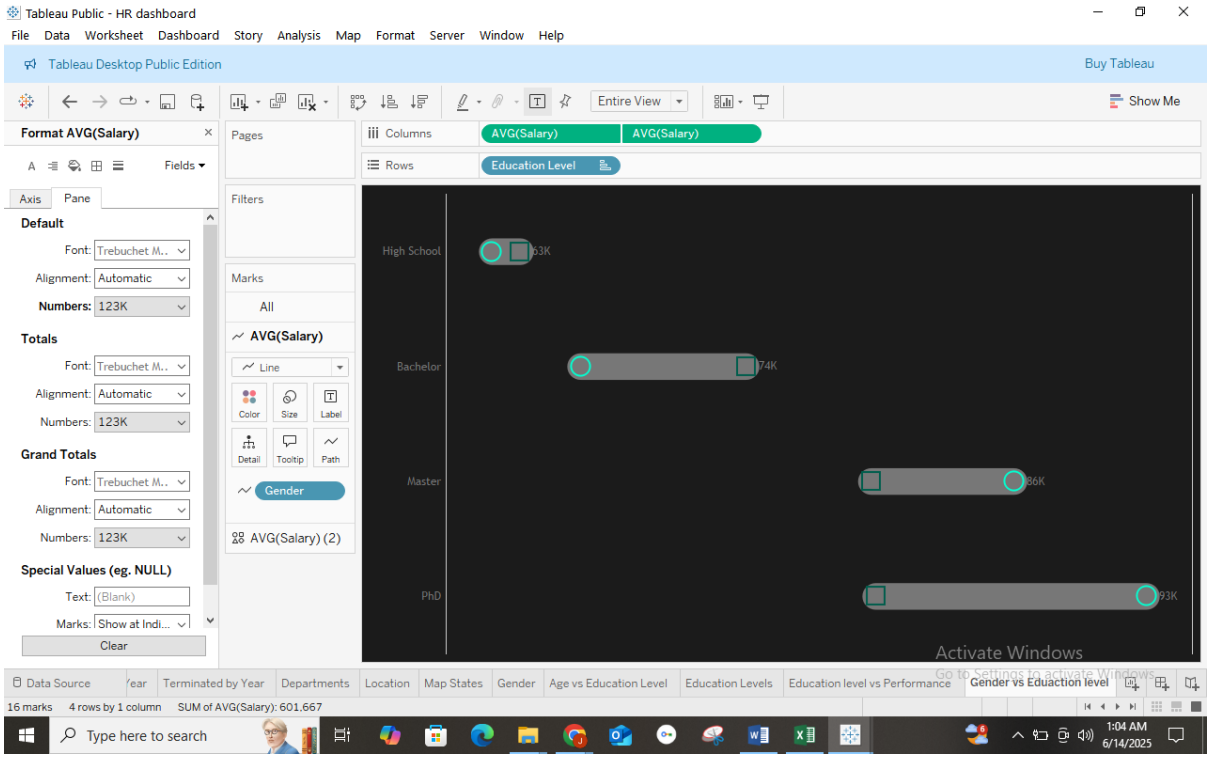

Fig 2.3.10: Output on comparing salaries across different education levels for both genders to identify discrepancies or patterns using barbell chart

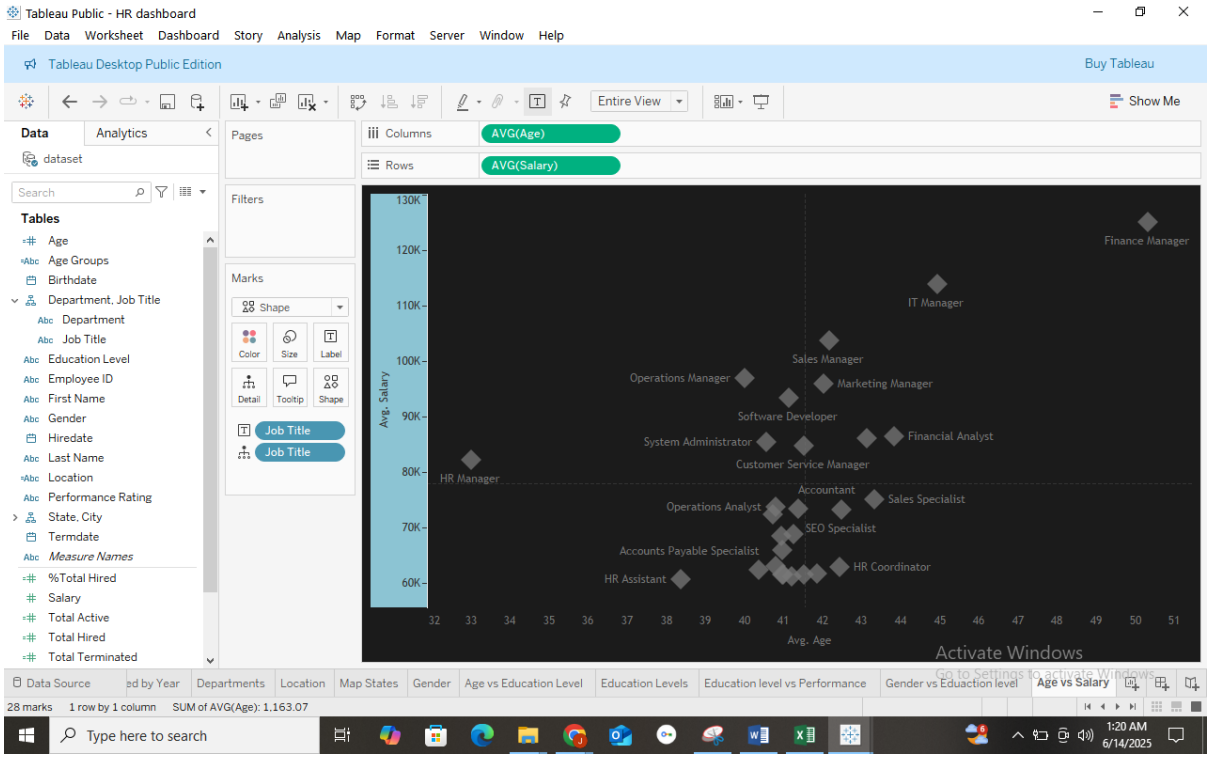

Fig 2.3.11: Output of age correlate with salary for employees in each department using scatter plot

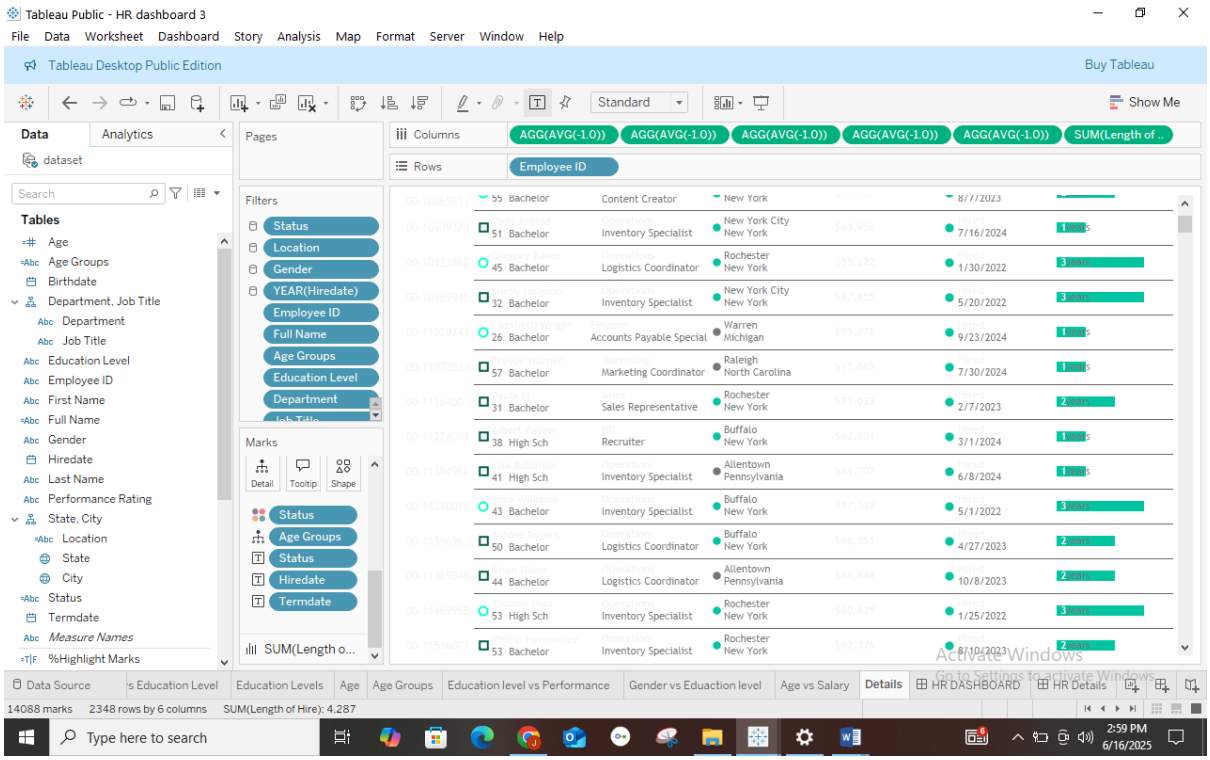

Fig 2.3.12: Output of employee ID, department, demographic, geographic, salary, job status, working years

2.4 Dashboard

The final output of the analysis is a compelling and interactive dashboard designed to meet the HR manager's business needs and support data-driven decision-making. The dashboard combines clarity, interactivity, and functionality to present both high-level summaries and detailed employee insights in a user-friendly format.

The dashboard is organized into three main sections:

- **Overview**: Highlights key metrics such as total number of employees, average salary, gender distribution, and departmental headcount using KPI cards and summary charts.
- **Demographics**: Provides visual breakdowns of employee age groups, education levels, gender ratios, and departmental composition through bar charts, donut charts, and heat maps.
- **Income Analysis**: Explores salary distribution by department, position, and education level using scatter plots, salary range charts, and interactive filters.

A dynamic employee directory is also included, allowing users to view individual records with fields such as name, department, position, gender, age, education, and salary. Filters and dropdowns enable users to customize views and focus on specific groups of interest.

The dashboard was built with usability in mind—enabling HR personnel and decision-makers to gain both a broad organizational perspective and the ability to explore individual-level data with just a few clicks. Its interactive features allow for fast and flexible analysis, making it a practical tool for strategic workforce planning and operational reviews.

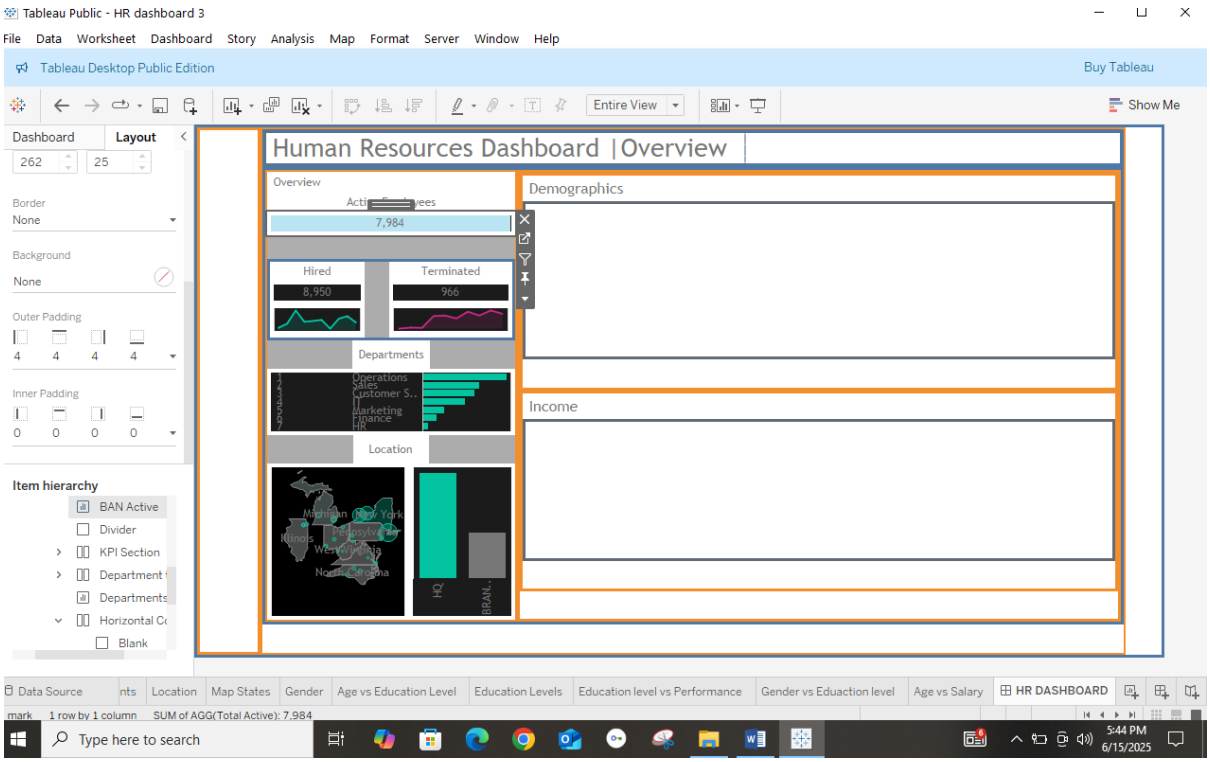

Fig 2.4.1: Output of the overview side of the dashboard

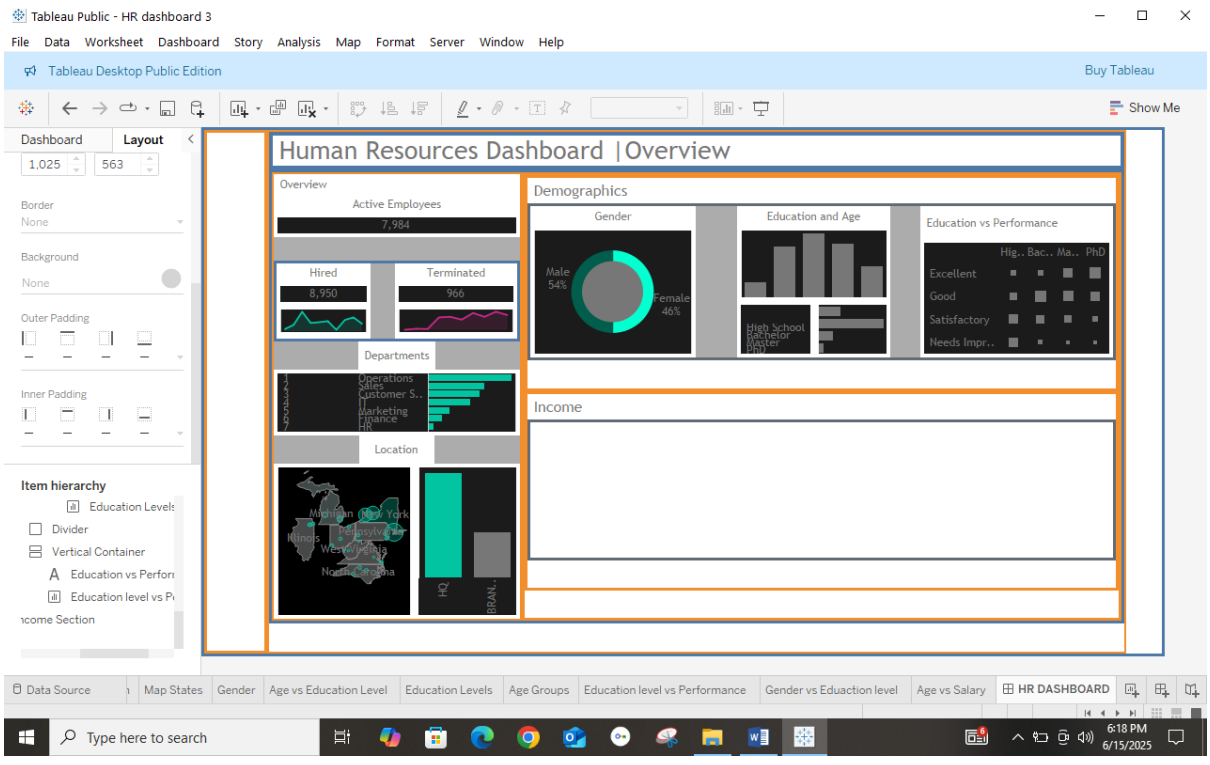

Fig 2.4.2: Output of the overview and demographic side of the dashboard

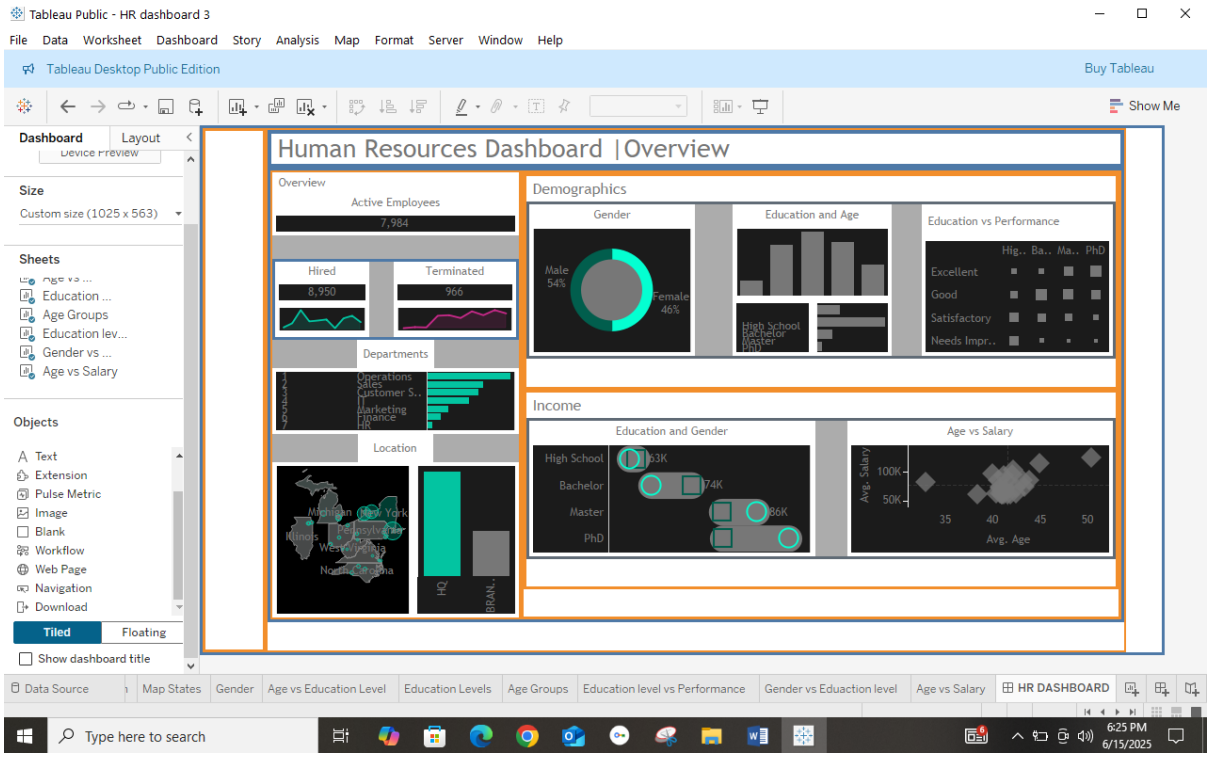

Fig 2.4.3: Output of the overview, demographic and income side of the dashboard

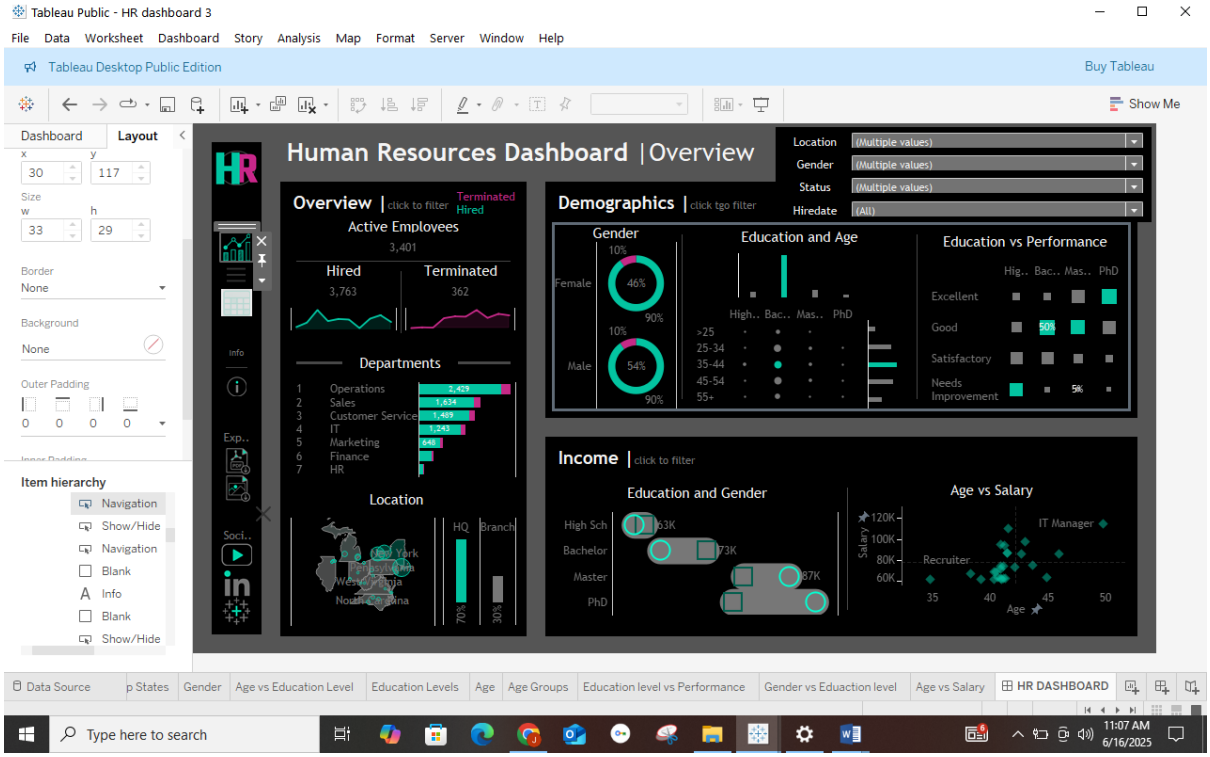

Fig 2.4.4: Output of the final Human Resource Dashboard |Overview

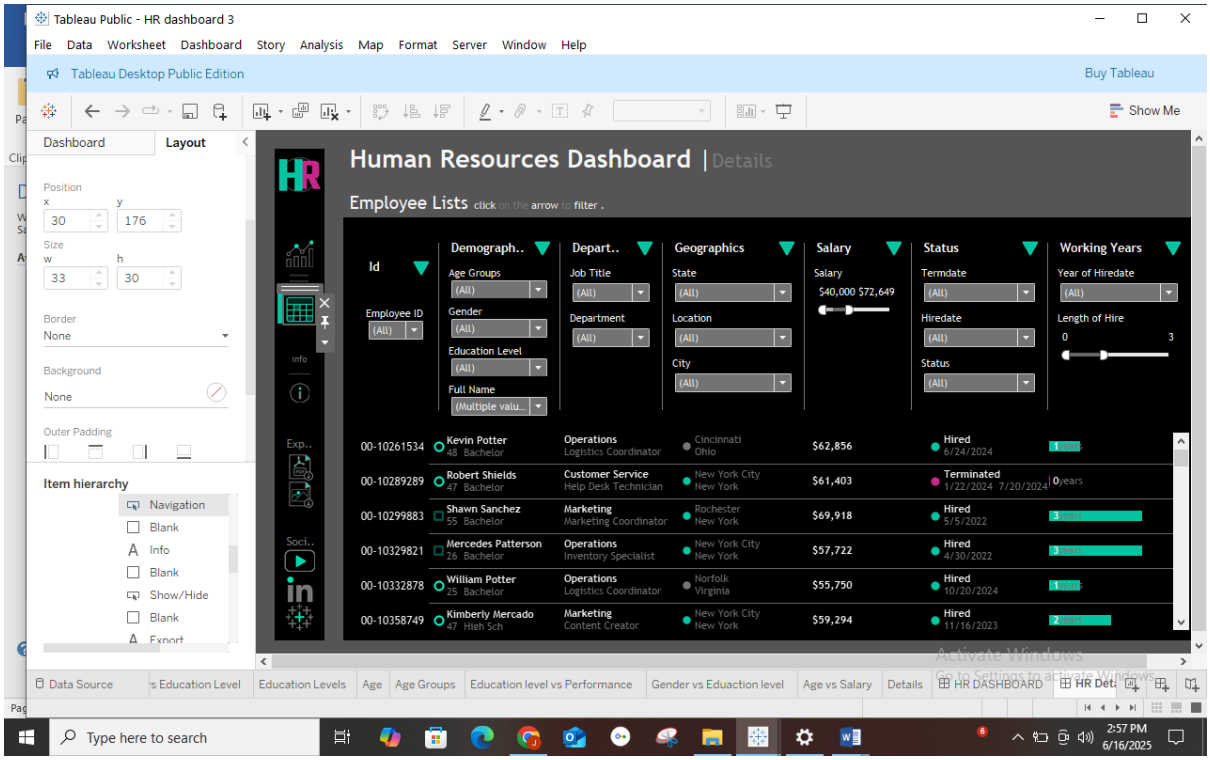

Fig 2.4.5: Output of the final Human Resource Dashboard |Details

2.5 Publish and Share

After completing the analysis and building the interactive dashboard in Tableau, the final step was to publish and share the project to maximize its visibility and impact. The dashboard was published to **Tableau Public**, making it accessible to stakeholders, collaborators, and potential employers.

To showcase the project as part of my professional work, the dashboard was also embedded in my **project portfolio website**, accompanied by a brief project summary and key insights. This not only demonstrates my technical and analytical skills but also provides real-world context on how data visualization can support HR decision-making.

By sharing the final product through both Tableau Public and my personal site, the project serves as a tangible example of my ability to manage data from start to finish transforming raw information into meaningful, actionable insights through clear storytelling and effective design.

Important links

The required files are attached below

Link to the resources used:

https://www.datawithbaraa.com/tableau/tableau-hr-project-thank-you/

Link to the you tube channel:

https://www.youtube.com/watch?v=UcGF09Awm4Y

Link to Code:
https://public.tableau.com/views/HRdashboard_17500796499830/HRDetails?:language=en-US&:sid=668661D3714045BCB53D4F9031624F7F-0:0&:redirect=auth&:display_count=n&:origin=viz_share_link

CONCLUSION

A robust as well as interactive HR dashboard that blends strategic overview and in-depth employee-level insights is the result of this project. The dashboard provides a comprehensive picture of the workforce dynamics of the company by dividing the analysis into three main sections: Overview, Demographics, and Income Analysis. Users can easily access and examine individual records thanks to the inclusion of a thorough, filterable employee directory, which supports both operational tasks and strategic planning.

This solution offers a data-driven basis for well-informed HR decision-making through diligent data preparation, the development of calculated measures, and the creation of various visualizations. In addition to fulfilling the specific business needs, the finished Tableau dashboard is a useful tool for demonstrating real-world data visualization and analysis abilities. This project, which was published and included in my professional portfolio, is proof of the ability of visual analytics to turn unprocessed data into useful business intelligence.