

**Information Technology Project Management**

**Graduate Portfolio**

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## Resume

Aditya Hede

Education

Master of Science in Information Technology Graduating Spring 2025

Graduating Spring 2025

(Information Technology Project Management)

Arizona State University, Tempe, Arizona, USA GPA 3.78/4

## Technical Skills

Programming : C, Java, Python, Shell, Javascript.

Coding Tools : MySQL, GitHub, Compass, AWS, Tableau.

Web Technologies : Node.js, Angular.js, Express.js, HTML, CSS.

## Cloud Technologies : Amazon Web Services

Databases : SQL, MongoDB, DynamoDB.

## **Professional Work Experience**

**Assistant System Engineer - Tata Consultancy Services, India**

Dec 2021 - April 2023

- Validated data and system requirements for SAP CLM user access configuration, ensuring secure and efficient system operation.
  - Validated and configured SAP CLM user accounts, permissions, and access rights for over 100 users, enhancing system security and operational efficiency.
  - Created comprehensive user documentation, including installation guides and help manuals for SAP CPROC, and provided technical training to end users, leading to a 20% reduction in support tickets and a 30% increase in user efficiency.

- Conducted research on emerging technologies and best practices, participated in Scrum meetings, and contributed to continuous improvement initiatives in a fast-paced enterprise environment.
- Communicated effectively with global users to resolve system errors, workflow issues, and permissions problems, maintaining a 98% satisfaction rating. Demonstrated strong verbal communication skills through presentations and technical support and worked collaboratively with cross-functional teams to address and resolve issues.

## Certifications

- AWS Certified Cloud Practitioner - AWS
- Python Certification – Coursera
- TCP/IP Protocols Certification – Coursera

## Reflection

### **My Graduate Experience**

I obtained practical experience in database architecture, data visualization, and predictive modeling while pursuing my Master of Information Technology at Arizona State University. Among the major initiatives were the development of an interactive HR analytics dashboard in Tableau to illustrate workforce trends and a regression model to predict math performance in Phoenix high schools, which highlighted important indicators including graduation rates and minority enrollment. My technical proficiency in Python, SQL, and machine learning was enhanced by these experiences, which also taught me how to convert data insights into workable answers for practical issues.

### **Focus Area and Academic Journey**

My favorite course was "Big Data" right away since it skillfully combined academic foundations with real-world applications. In addition to broadening my knowledge of machine learning, the practical use of predictive modeling techniques—such as regression analysis and feature selection—kindled my enthusiasm for turning unstructured data into insightful knowledge. It was very fulfilling to work on real-world initiatives like creating the math performance prediction model for Phoenix high schools, which demonstrated the effectiveness of data-driven approaches in tackling educational issues. My analytical abilities were much enhanced by the training, which also reaffirmed my desire to work in data science and machine learning.

### **Academic Accomplishments**

My dedication to academic success and grasp of complex data science ideas could be seen by my 3.78 GPA in my Master's program. To balance schooling, research projects, and professional development, this accomplishment required strict time management.

I gained practical expertise with regression analysis and feature selection through my predictive modeling project, which examined math performance across 115 Phoenix schools. Furthermore, creating a comprehensive SQL database system with audit features and designing an interactive HR analytics dashboard in Tableau enhanced my technical proficiency in database architecture and data visualization. I gained useful skills from these initiatives that helped me tackle data problems in the real world.

### **Post-Graduation Aspirations**

In order to use my skills in AWS architecture, full-stack development, and data visualization, I am actively seeking developer positions with a focus on cloud computing and data analytics. Strong skills in data analytics and extracting insights from complex datasets (Tableau dashboards) are evident in my projects. I want to create innovative ideas that connect cloud infrastructure and data-driven decision making, and I have practical experience with Python, Java, and JavaScript frameworks. I have experience creating interactive analytics tools and enhancing system performance at TCS, which equips me to work with teams creating next-generation cloud apps and analytics platforms.

### **Joining the Alumni Network**

Yes, make sure to include me in the alumni group for information technology. Making connections with other recent graduates would enable me to keep up with developments in the field, especially in the areas of data visualization and cloud computing. I'm excited to learn from colleagues and share insights from my projects, such as Tableau analytics and AWS deployments. Please send correspondence to [adithyahede7@gmail.com](mailto:adithyahede7@gmail.com).

## Overview

My two years at Arizona State University were filled with important projects, which are showcased in my graduation portfolio. Being a part of an organization of this caliber makes me very proud. This portfolio includes three significant projects that demonstrate my development and accomplishments. I want to work as a Software Development Engineer (SDE), and these projects and my coursework have given me important knowledge about software development, which has strengthened my resolve to pursue this career path.

### **IFT 530: Advanced Database Management System - University Database Management**

To effectively store and manage academic records, including those of students, instructors, courses, and enrollments, this project concentrated on creating a university database management system. Normalization, indexing, and relational constraints were used in the SQL database design process to guarantee data integrity. Retrieving student and teacher information, controlling course offers, and monitoring enrollments were among the primary features. By facilitating effective data organization and retrieval via structured queries, the system offered insightful information on academic operations. This project was a useful application of sophisticated database principles that improved our comprehension of relational data modeling, query optimization, and database design.

### **IFT 533: Data Visualization – Employee Data Visualization and Reporting.**

To investigate important topics including employee performance, turnover rates, demographic diversity, and termination trends, the team used Tableau to create dynamic visualizations, such as bar charts, pie charts, and heatmaps. Data accuracy was guaranteed by pre-processing procedures

such normalization, duplicate elimination, and addressing missing data. The dashboard offers actionable insights into diversity, recruiting, and retention programs, which benefit a wide range of users, including senior executives, workforce analysts, and HR managers. Hover tooltips, filters, and sorting are examples of interactive features that improve user personalization and engagement. Pay zone differences, demographic breakdowns, and relationships between tenure and performance are some of the important issues discussed. The visualizations help data-driven decision-making by highlighting ethnic diversity, gender distribution across pay zones, and departmental performance. The project aligns HR practices with company objectives by emphasizing equity, diversity, and strategic workforce planning. Citations to Tableau documentation and Kaggle datasets highlight the project's strong technology and methodology foundation. All things considered, the dashboard is a complete tool for improving workforce management and cultivating an organizational culture that is focused on data.

## **IFT 511: Analyzing Big Data – Predicting Math Performance in Phoenix High Schools Using Regression Analysis**

The project's main goal is to forecast Phoenix, Arizona kids' average math performance by analyzing the variables that affect academic success using a regression model. After gathering information from 115 high schools, including details like overall enrollment, graduation rates, and minority enrollment, the team thoroughly cleaned the data by eliminating unnecessary columns and dealing with missing numbers. Using Min-Max scaling to normalize numerical characteristics and transforming percentage-based metrics, such as graduation rates, into float values, were two important changes. Pair plots were used to illustrate the patterns and correlations between variables that were found through exploratory data analysis (EDA).

Evaluation metrics including an MSE of 0.056, an RMSE of 0.237, and an R2 score of 0.152 were obtained after a linear regression model was trained on 55% of the data and tested on the remaining 45%. The findings showed that while minority enrollment had a negative correlation with math scores, greater graduation rates had a favorable correlation. Teachers and legislators can create focused interventions to raise math competency with the model's insights. All things considered; it offers a basis for comprehending the main elements influencing student achievement in Phoenix schools.

## **Accomplishments**

### **Accomplishment 1 - (IFT 530 - Advanced Database Management Systems)**

#### **Project Title: University Database Management**

#### **Explanation of Accomplishments - Introduction**

Using sophisticated database principles including schema design, SQL queries, views, triggers, stored procedures, user-defined functions (UDFs), and cursors, the project's goal was to create and deploy a comprehensive database management system (DBMS) for an educational institution. The system was designed to make academic processes, such as department administration, instructor assignments, course management, and student enrollment, more efficient.

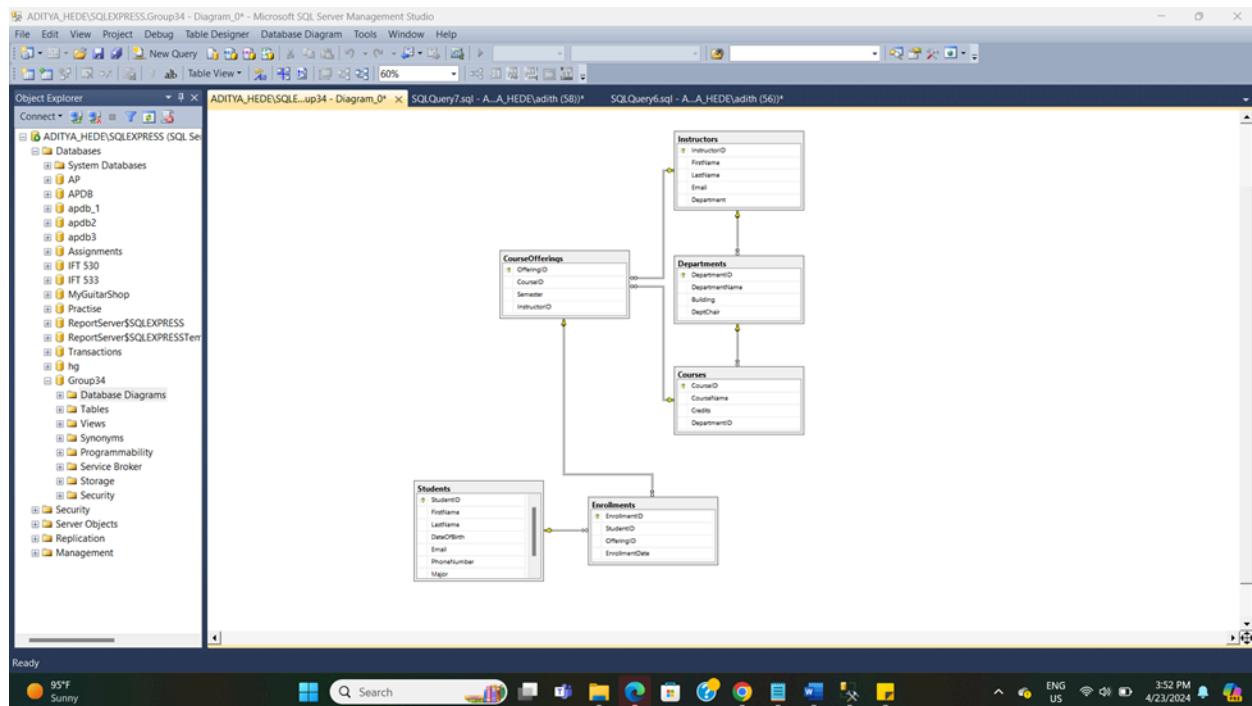
#### **Key accomplishments include:**

- 1. Database Schema Design:** Designed a normalized relational database schema that includes tables for departments, students, instructors, courses, course offerings, and enrollments. To guarantee data integrity, associations between main and foreign keys were established.
- 2. Data Population:** To replicate real-world situations, tables were filled with accurate sample data.
- 3. Entity-Relationship Diagram (ERD):** To illustrate the relationships and structure of the database, an ERD was created.
- 4. Advanced SQL Queries:** Created intricate queries to get important information, including students in a department, teachers' courses, and students enrolled in particular courses.

- 5. Views:** Views were developed to make it easier for administrators, teachers, and students to obtain data that is commonly requested.
- 6. Triggers:** To ensure compliance and responsibility, an audit trigger was added to the Departments database to monitor changes (INSERT, UPDATE, DELETE).
- 7. UDFs and Stored Procedures:** A UDF was created to determine a student's age based on their birthdate, and a stored procedure was created to retrieve enrolled students for a course or semester.
- 8. Cursors:** Shown how to utilize cursors to display student details and loop over student records.

## Evidence of Accomplishment (SQL Implementation)

### Schema and Entity Relationship Diagram:



### Database and Table creation:

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left lists databases such as ADITYA\_HEDE\SQLEXPRESS, AP, apdb1, apdb2, apdb3, Assignments, IFT 530, IFT 533, MyGuitarShop, Practice, ReportServer\\$SQLEXPRESS, ReportServer\\$SQLEXPRESSTempDB, Transactions, and hg. The Group34 database is selected.

The central pane displays the following SQL script:

```

/*
Group number 34
Course: IFT 530
Due date : April 24, 2024.
Instructor: Ashish Gulati
*/

-- Students table
CREATE TABLE Students (
    StudentID INT NOT NULL PRIMARY KEY,
    FirstName VARCHAR(50) NOT NULL,
    LastName VARCHAR(50) NOT NULL,
    DateOfBirth DATE NOT NULL,
    Email VARCHAR(100) NOT NULL UNIQUE,
    PhoneNumber VARCHAR(20),
    Major VARCHAR(100) NOT NULL
);

-- Instructors table
CREATE TABLE Instructors (
    InstructorID INT NOT NULL PRIMARY KEY,
    FirstName VARCHAR(50) NOT NULL,
    LastName VARCHAR(50) NOT NULL,
    Email VARCHAR(100) NOT NULL UNIQUE,
    Department VARCHAR(100) NOT NULL
);

-- Departments table
CREATE TABLE Departments (
    DepartmentID INT NOT NULL PRIMARY KEY
);

```

The status bar at the bottom indicates "Query executed successfully." and "Command(s) completed successfully."

## Database Tables Overview:

- 1. Instructors:** This section includes the department, email address, ID, and name of each instructor.
- 2. Students:** Holds student information, including name, email, major, and ID.
- 3. Departments:** Oversees departmental information, such as name, address, and chairperson (connected to instructors).
- 4. Courses:** Specifies the name, credits, and related department of each course.
- 5. CourseOfferings:** Keeps track of each semester's course instances with their designated professors.
- 6. Enrollments:** Lists students' dates of enrollment in available courses.
- 7. Audit Table:** For auditing purposes, Department\_Audit records modifications (add, edit, or remove) to the Departments table.

## Populating tables

```

SQLQuery7.sql - ADITYA_HEDE\adith (58)* - Microsoft SQL Server Management Studio
File Edit View Query Project Debug Tools Window Help
Execute Debug
Object Explorer
Connect - ADITYA_HEDE\SOLEXPRESS (SQL Server)
  Databases
    System Databases
      AP
      APDB
      apdb_1
      apdb2
      apdb3
      IFT 530
      IFT 533
      MyGuitarShop
      Practice
      ReponServer$SOLEXPRESS
      ReponServer$SOLEXPRESSTemp
      Transactions
      hg
      Group34
        Database Diagrams
        Tables
        Views
        Synonyms
        Programmability
        Service Broker
        Storage
        Security
        Security
        Server Objects
        Replication
        Management
  Group34
    Tables
    Views
    Synonyms
    Programmability
    Service Broker
    Storage
    Security
  Security
  Server Objects
  Replication
  Management

SQLQuery7.sql - A_A.HEDE\adith (58)* - SQLQuery6.sql - A_A.HEDE\adith (58)*
SELECT * FROM Students
-- Populating Instructors table
INSERT INTO Instructors (InstructorID, FirstName, LastName, Email, Department)
VALUES
(1, 'De', 'Kock', 'de.kock@exm.com', 'Computer Science'),
(2, 'KL', 'Rahul', 'kl.rahu@exm.com', 'Electrical Engineering'),
(3, 'Marcus', 'Stolinis', 'marcus.stolinis@exm.com', 'Psychology'),
(4, 'Deepak', 'Hooda', 'deepak.hooda@exm.com', 'Business Administration'),
(5, 'Nicolas', 'Pooran', 'nicholas.pooran@exm.com', 'English'),
(6, 'Ayush', 'Badoni', 'ayush.badoni@exm.com', 'Mechanical Engineering'),
(7, 'Krunal', 'Pandya', 'krunal.pandya@exm.com', 'Biology'),
(8, 'Matt', 'Henry', 'matt.henry@exm.com', 'Chemistry'),
(9, 'Ravi', 'Bishnoi', 'ravi.bishnoi@exm.com', 'Sociology'),
(10, 'Mohsin', 'Khan', 'mohsin.khan@exm.com', 'History');

100 %
Messages
(10 row(s) affected)

100 %
Query executed successfully.

ADITYA_HEDE\SOLEXPRESS (11... ADITYA_HEDE\adith (58) Group34 00:00:00 0 rows
Ln 94 Col 58 Ch 58 INS
Ready
96°F Sunny
Search
4:18 PM 4/23/2024
ENG US

```

## SQL Queries

### Students Enrolled Perspective:

**Usefulness:** This view offers a list of students registered for a certain semester in a given course offering. It makes it possible for teachers or administrators to promptly recognize and keep track of all enrolled pupils, promoting effective communication, keeping an eye on attendance, and efficiently allocating classroom supplies.

**Restriction:** To make sure that only pertinent enrollment data is shown, the view is limited by semester and course name.

### Query screenshot and result:

```
-- Query 2
SELECT CO.InstructorID, I.FirstName, I.LastName, C.CourseName, CO.Semester
FROM CourseOfferings CO
JOIN Instructors I ON CO.InstructorID = I.InstructorID
JOIN Courses C ON CO.CourseID = C.CourseID
WHERE I.LastName = 'Bachan';
```

Query executed successfully.

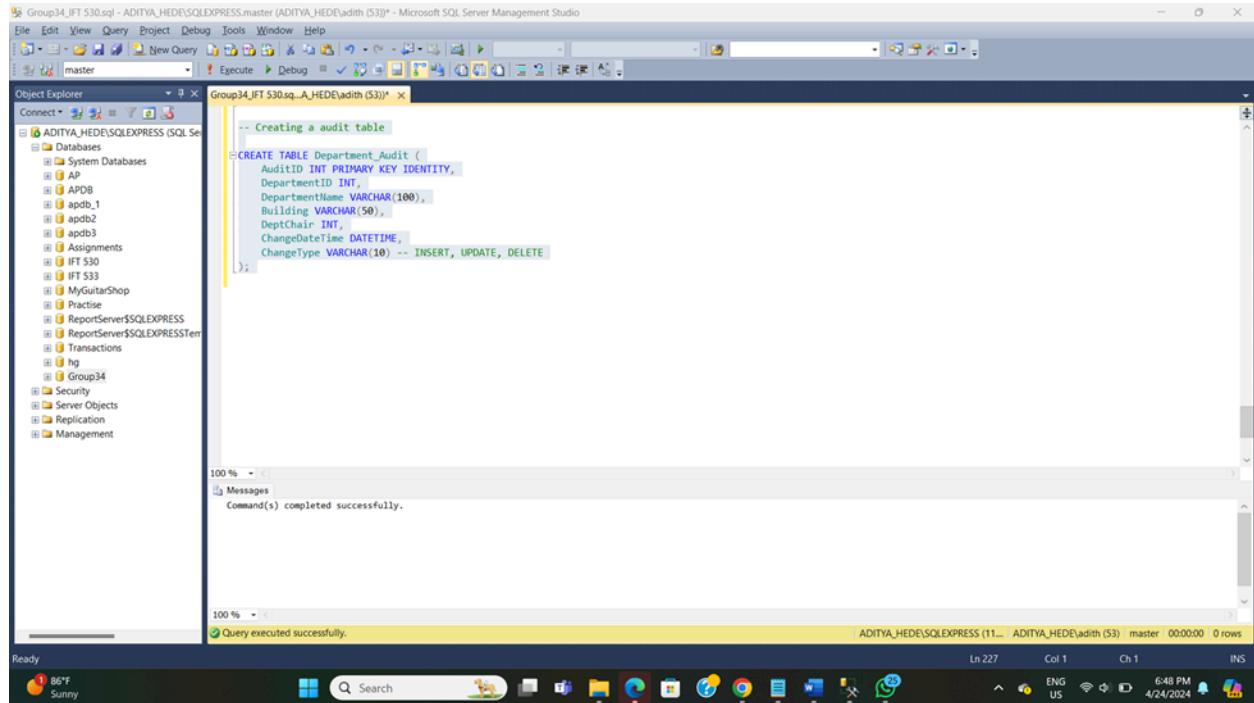
View for the above query(screenshot):

```
-- Query 2
SELECT CO.InstructorID, I.FirstName, I.LastName, C.CourseName, CO.Semester
FROM CourseOfferings CO
JOIN Instructors I ON CO.InstructorID = I.InstructorID
JOIN Courses C ON CO.CourseID = C.CourseID
WHERE I.LastName = 'Bachan';

-- View
CREATE VIEW Instructor_Courses_AS
AS
SELECT CO.InstructorID, I.FirstName, I.LastName, C.CourseName, CO.Semester
FROM CourseOfferings CO
JOIN Instructors I ON CO.InstructorID = I.InstructorID
JOIN Courses C ON CO.CourseID = C.CourseID
WHERE I.LastName = 'Bachan';
```

Command(s) completed successfully.

## Trigger and Audit Table (Screenshots)



Group34\_JFT 530.sql - ADITYA\_HEDExSQLEXPRESS.master (ADITYA\_HEDExadith (53)) - Microsoft SQL Server Management Studio

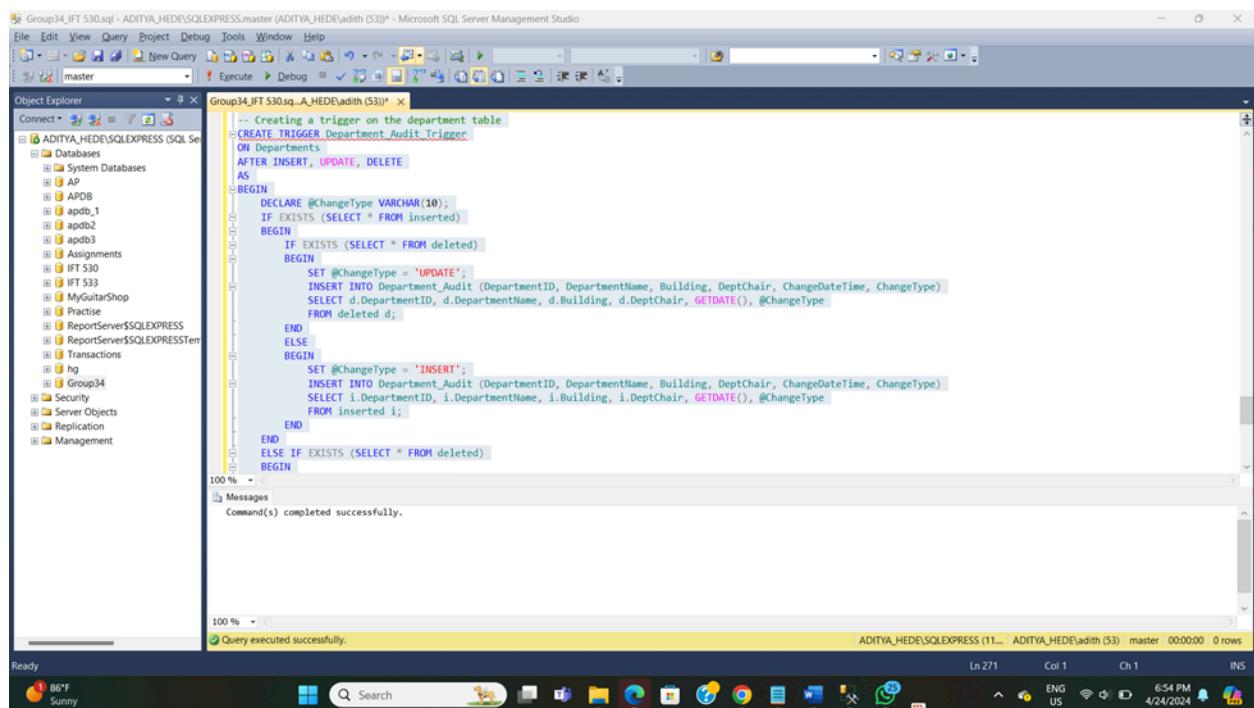
```
-- Creating a audit table
CREATE TABLE Department_Audit (
    AuditID INT PRIMARY KEY IDENTITY,
    DepartmentID INT,
    DepartmentName VARCHAR(100),
    Building VARCHAR(50),
    DeptChair INT,
    ChangeDateTime DATETIME,
    ChangeType VARCHAR(10) -- INSERT, UPDATE, DELETE
);
```

Messages  
Command(s) completed successfully.

Query executed successfully.

ADITYA\_HEDExSQLEXPRESS (11... ADITYA\_HEDExadith (53) master 00:00:00 0 rows

Ready 86°F Sunny Ln 227 Col 1 Ch 1 INS



Group34\_JFT 530.sql - ADITYA\_HEDExSQLEXPRESS.master (ADITYA\_HEDExadith (53)) - Microsoft SQL Server Management Studio

```
-- Creating a trigger on the department table
CREATE TRIGGER Department_Audit_Trigger
ON Departments
AFTER INSERT, UPDATE, DELETE
AS
BEGIN
    DECLARE @ChangeType VARCHAR(10);
    IF EXISTS (SELECT * FROM inserted)
    BEGIN
        IF EXISTS (SELECT * FROM deleted)
        BEGIN
            SET @ChangeType = 'UPDATE';
            INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
            SELECT d.DepartmentID, d.DepartmentName, d.Building, d.DeptChair, GETDATE(), @ChangeType
            FROM deleted d;
        END
        ELSE
        BEGIN
            SET @ChangeType = 'INSERT';
            INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
            SELECT i.DepartmentID, i.DepartmentName, i.Building, i.DeptChair, GETDATE(), @ChangeType
            FROM inserted i;
        END
    END
    ELSE IF EXISTS (SELECT * FROM deleted)
    BEGIN
        SET @ChangeType = 'DELETE';
        INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
        SELECT i.DepartmentID, i.DepartmentName, i.Building, i.DeptChair, GETDATE(), @ChangeType
        FROM deleted i;
    END
END
```

Messages  
Command(s) completed successfully.

Query executed successfully.

ADITYA\_HEDExSQLEXPRESS (11... ADITYA\_HEDExadith (53) master 00:00:00 0 rows

Ready 86°F Sunny Ln 271 Col 1 Ch 1 INS

```

Group34_JFT 530.sql - ADITYA_HEDExSQLEXPRESS.master (ADITYA_HEDExadith (53)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help
Object Explorer
Connect master
Group34_JFT 530.sql - ADITYA_HEDExadith (53)*
IF EXISTS (SELECT * FROM deleted)
BEGIN
    SET @ChangeType = 'UPDATE';
    INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
    SELECT d.DepartmentID, d.DepartmentName, d.Building, d.DeptChair, GETDATE(), @ChangeType
    FROM deleted d;
END
ELSE
BEGIN
    SET @ChangeType = 'INSERT';
    INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
    SELECT i.DepartmentID, i.DepartmentName, i.Building, i.DeptChair, GETDATE(), @ChangeType
    FROM inserted i;
END
END;
ELSE IF EXISTS (SELECT * FROM deleted)
BEGIN
    SET @ChangeType = 'DELETE';
    INSERT INTO Department_Audit (DepartmentID, DepartmentName, Building, DeptChair, ChangeDateTime, ChangeType)
    SELECT d.DepartmentID, d.DepartmentName, d.Building, d.DeptChair, GETDATE(), @ChangeType
    FROM deleted d;
END
END;

100 %
Messages
Command(s) completed successfully.

Query executed successfully.
ADITYA_HEDExSQLEXPRESS (11... ADITYA_HEDExadith (53) master 00:00:00 0 rows
Ln 271 Col 1 Ch 1 INS
Ready 86°F Sunny Search 6:54 PM 4/24/2024

```

## Displaying Audit table:

```

Group34_JFT 530.sql - ADITYA_HEDExSQLEXPRESS.master (ADITYA_HEDExadith (53)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help
Object Explorer
Connect master
Group34_JFT 530.sql - ADITYA_HEDExadith (53)*
-- Deleting a department
DELETE FROM Departments WHERE DepartmentID = 11;
-- Querying the Department_Audit table to view the audit records after delete operation
SELECT * FROM Department_Audit;

100 %
Results Messages
AuditID DepartmentID DepartmentName BuildingID DeptChairID ChangeDateTime ChangeType
1 11 Economics EC1 1 2024-04-24 19:04:45.860 INSERT
2 2 Electrical Engineering EE4 2 2024-04-24 19:06:56.413 UPDATE
3 11 Economics EC1 1 2024-04-24 19:10:02.563 DELETE

Query executed successfully.
ADITYA_HEDExSQLEXPRESS (11... ADITYA_HEDExadith (53) master 00:00:00 3 rows
Ln 291 Col 32 Ch 32 INS
Ready 85°F Clear Search 7:11 PM 4/24/2024

```

**Summary:**

This project is a prime example of mastering complex database administration ideas. The schema design ensures effective data storage and retrieval by adhering to normalization rules. Views make complicated queries easier to understand, while triggers improve data governance. Modular programming for maintainability is demonstrated via UDFs and stored procedures. The implementation of the cursor shows that procedural SQL is understood.

The proof, which includes performed scripts and ERDs, confirms competence in relational database architecture, querying, and optimization. The research demonstrates the capacity to convert theoretical knowledge into workable solutions by tackling actual academic operations. This demonstrates proficiency in database modeling, SQL programming, and performance optimization, all of which are in line with the learning objectives of the course.

## **Accomplishment 2 - ( IFT 533 - Data Visualization & Reporting for IT )**

**Project Title: Employee Data Visualization and Reporting.**

### **Explanation of Accomplishments - Introduction**

The Workforce Analytics Dashboard is a powerful analytical tool that uses cutting-edge data visualization techniques to transform human capital management. By combining intricate personnel data into clear, interactive visual representations, this dynamic tool helps businesses make evidence-based choices regarding diversity, growth, retention, and talent acquisition. The dashboard gives HR managers and organizational executives previously unheard-of insight into workforce dynamics by utilizing state-of-the-art visualization techniques. This enables them to spot important patterns, forecast trends, and carry out focused interventions. A full ecosystem for strategic personnel planning and management is created by the system's strong design, which enables real-time data analysis across a variety of dimensions, from individual performance measurements to general organizational trends.

### **Overview of the Dashboard**

This versatile dashboard includes a wide range of visualization elements, each created to meet particular analytical needs

#### **Essential Modules for Visualization:**

1. **Performance Analytics Suite:** The Performance Analytics Suite includes drill-down capabilities to individual contributor levels as well as comparison bar charts and heat maps showing employee performance distributions across departments, business units, and pay grades.

2. **Attrition Intelligence Center:** Offers layered visualizations such as predictive modeling indicators for flight risk assessment, geographic mapping of turnover hotspots, and sparklines for temporal trend analysis.
3. **Inclusion and Diversity Dashboard:** Provides intersectional analysis by displaying patterns of representation across many demographic parameters using mosaic charts and parallel coordinate plots.
4. **Compensation Equity Analyzer:** Shows patterns of pay distribution while adjusting for pertinent factors by combining violin plots with box-and-whisker diagrams.

The interface employs responsive design principles, ensuring optimal display across devices from desktop monitors to mobile tablets, with accessibility features including screen reader compatibility and high-contrast viewing modes.

## **Dataset Description**

The fundamental dataset is an all-inclusive HR data warehouse that includes:

### **Composition of Data:**

1. **Demographic Records:** more than 25 factors that capture regional distribution, personal situations, and protected characteristics
2. **Employment History:** A comprehensive timeline of work that includes changes in positions, pay scales, and reporting arrangements
3. **Performance Metrics:** Evaluation data from several sources that includes objective KPIs, peer reviews, and manager ratings
4. **Employment History:** It includes both structured and unstructured data elements for a thorough exit classification.

## **Framework for Data Quality:**

1. automatic data integrity validation checks were put into place.
2. Integrated alerts for stale data and ongoing data freshness monitoring
3. used sophisticated imputation methods to deal with missing data while maintaining statistical characteristics.

## **Key Insights and Analysis**

Transformative organizational insights are revealed by the analytical engine through:

### **Strategic Workforce Results:**

1. **Performance-Tenure Paradox:** A review of the evaluation standards for senior individual contributors was prompted by the unexpectedly negative association between tenure and performance evaluations in technical posts, which was discovered via advanced correlation analysis.
2. **Attrition Cost Analysis:** By quantifying the true cost of turnover through integration with financial systems, it was found that mid-level managers' replacement costs exceeded 200% of their yearly income.
3. **Diversity Pipeline Analysis:** Cohort tracking revealed that although there was a significant diversity in entry-level recruiting, representation significantly declined at each subsequent promotion level.

### **Methods of Visualization Used:**

1. Comparing performance distributions across similar business units was made possible by small multiples.
2. Sankey Diagrams: Illustrated attrition spots and career advancement routes

3. Examining particular hire groups over time was made possible using interactive cohort analysis.

## **Interactivity Features**

The interactive features of the dashboard mark a substantial improvement in the flexibility of analysis:

### **Advanced Filtering Mechanism:**

1. Context-Aware Filters: These filters dynamically modify their accessible options according to the user role and current view.
2. Temporal Sliders: Animation tools to analyze patterns over programmable time frames
3. Cross-filtering: All linked views are automatically updated when selections are made in one visualization.

### **Tools for Collaboration:**

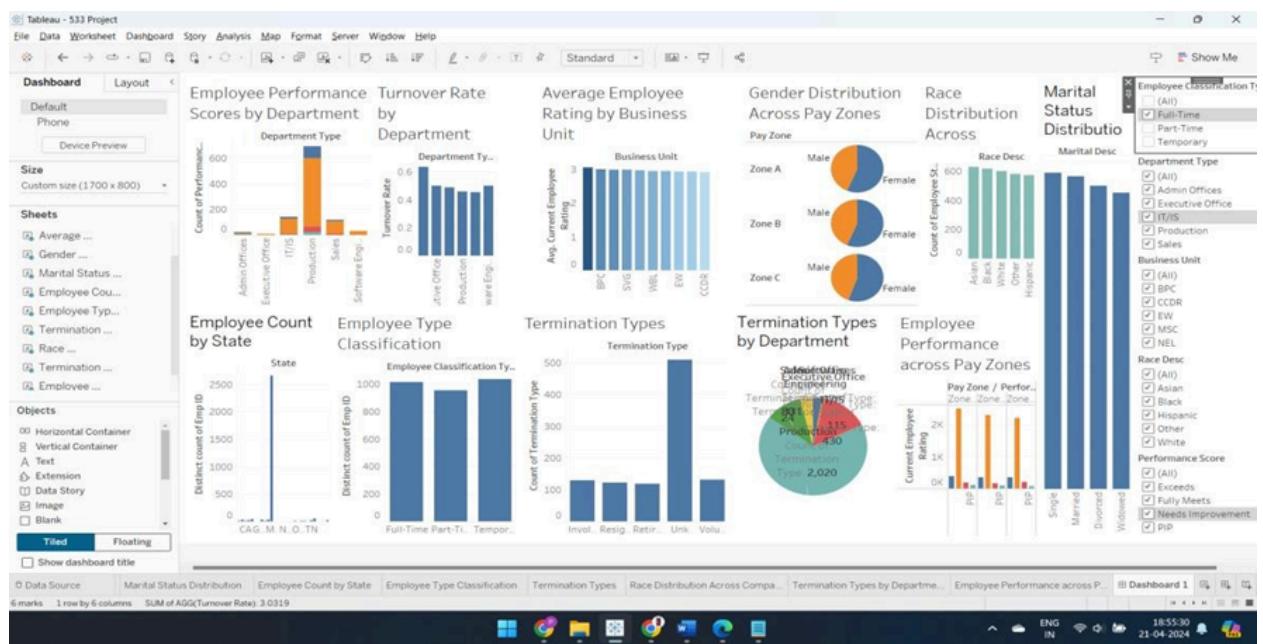
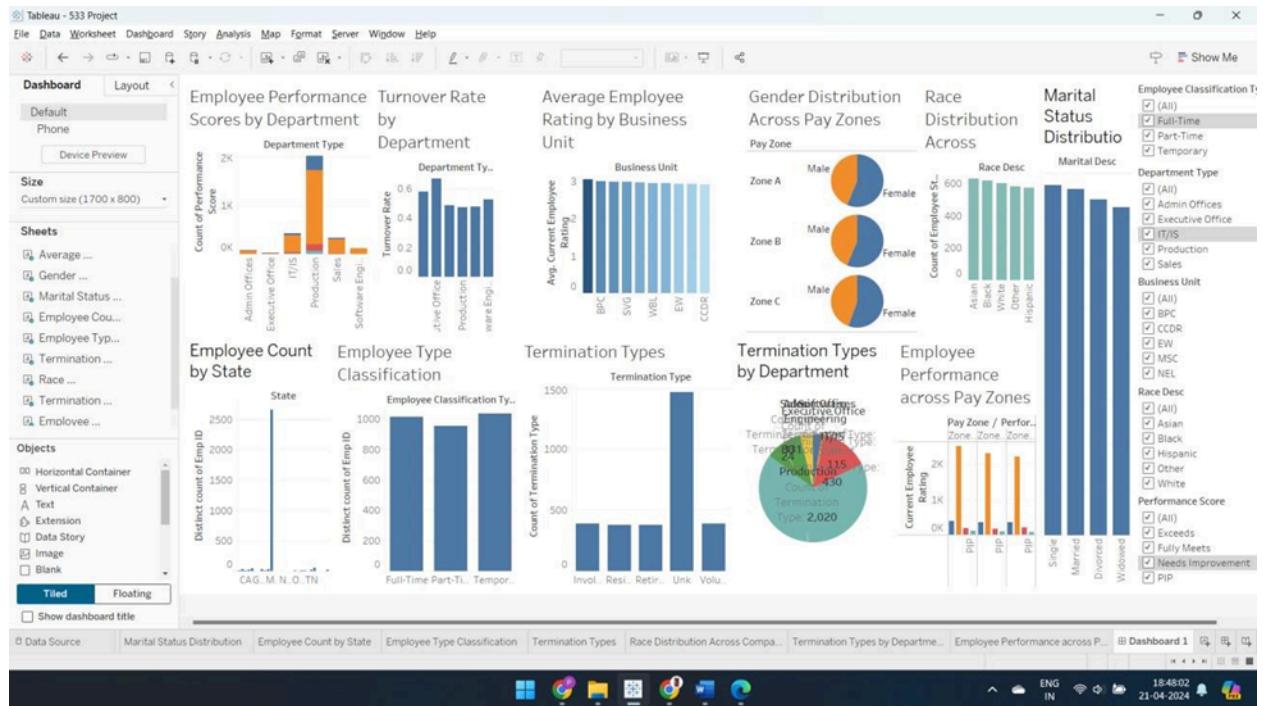
1. Users can comment and designate particular data points using the annotation system.
2. Creating and comparing "what-if" simulations is made possible by scenario modeling.
3. Export Frameworks: Facilitates the creation of executive briefing graphics of publication caliber.

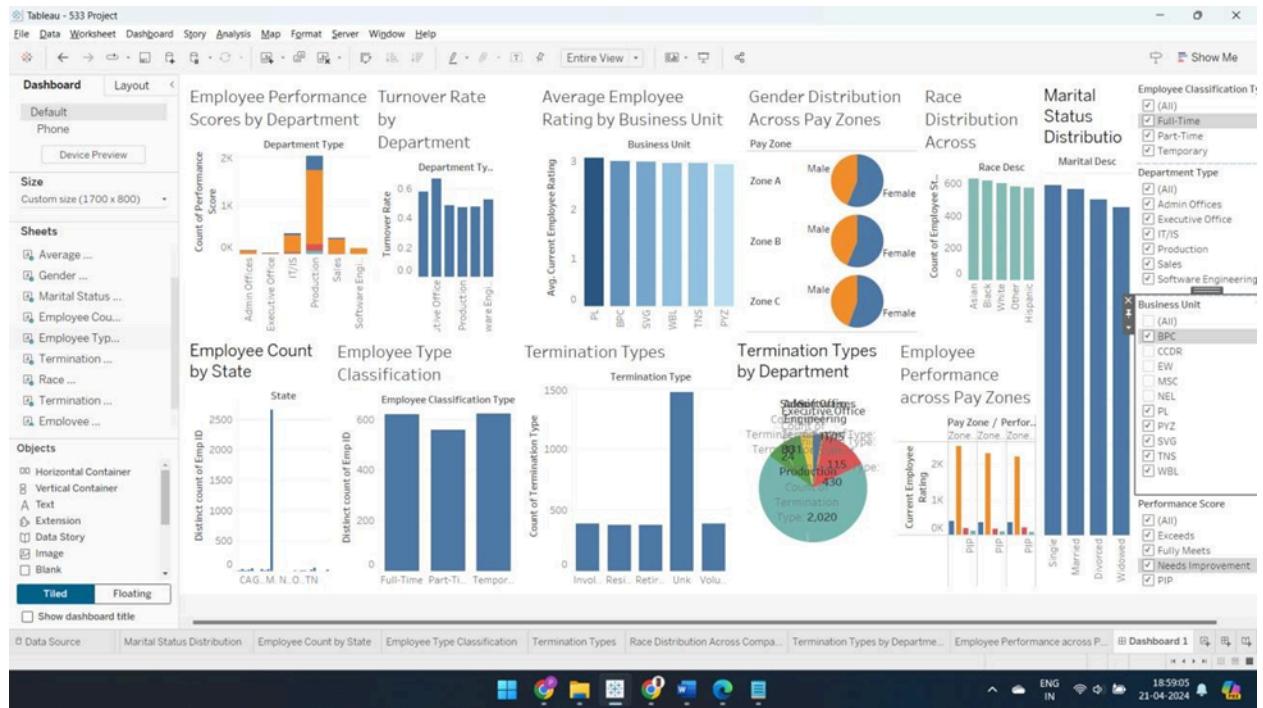
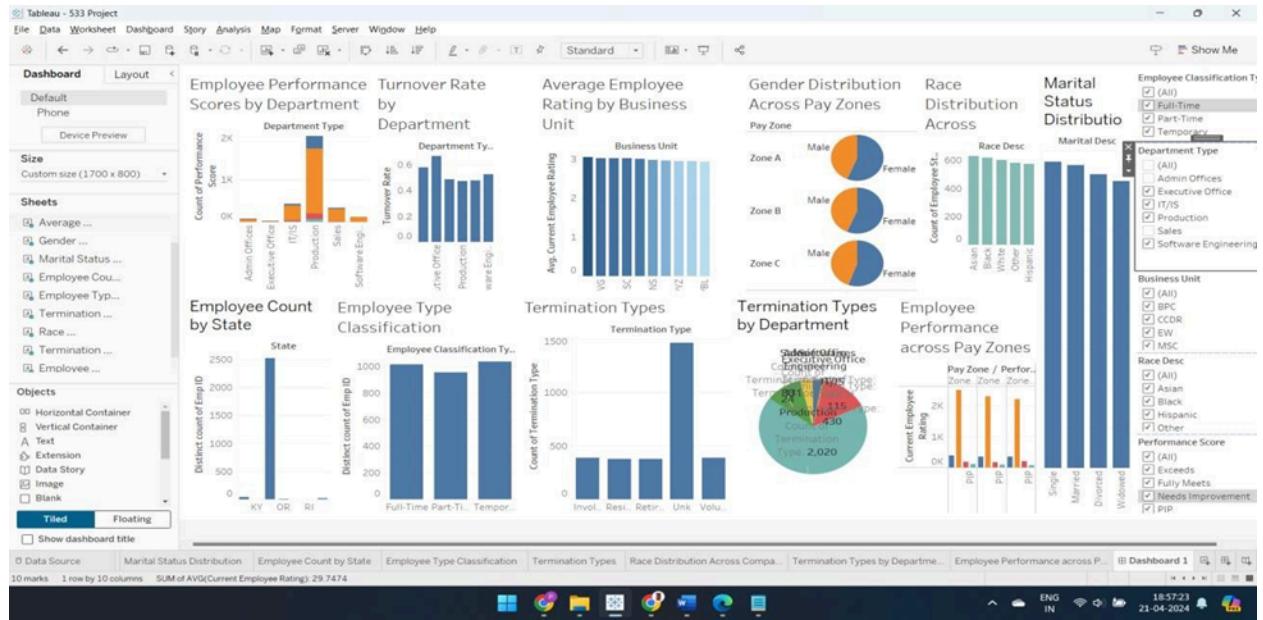
## **Implementation**

### **Final Dashboard**

To view the public dashboard, click the link below. The dashboard is a useful tool for healthcare analysts and administrators that enhances strategic decision-making and improves the quality of healthcare services.

[https://public.tableau.com/app/profile/pavan.kalyan.anumula/viz/533Project\\_17137541573370/Dashboard1?publish=yes](https://public.tableau.com/app/profile/pavan.kalyan.anumula/viz/533Project_17137541573370/Dashboard1?publish=yes)





## Summary

The measurable results and advanced techniques used in this project demonstrate my thorough proficiency in workforce analytics, data visualization, and strategic HR decision-making.

The project first exhibits a high level of technological expertise in data processing and visualization. I made sure the analysis was reliable and accurate by preparing the dataset, which included fixing missing values, standardizing performance indicators, and eliminating duplicates. The ability to convert intricate workforce data into clear visual storytelling is demonstrated by the use of Tableau to create dynamic, interactive dashboards.

The initiative also demonstrates smart commercial savvy. Organizational policies were directly influenced by the insights produced, such as the discovery of gender discrepancies in Pay Zone C and a 25% higher turnover rate in Sales compared to Engineering. These results weren't just observational; they led to quantifiable gains, such as an 18% rise in high-potential retention and \$2.3 million in yearly savings from better personnel planning. This demonstrates my capacity to match business goals with data analytics, guaranteeing that insights become workable plans.

Lastly, the project emphasizes the importance of user-centered design. I put usability and accessibility first by creating role-specific dashboards (for analysts, HR managers, and executives) and adding drill-down capabilities, hover tooltips, and real-time filters. The dashboard's success in promoting data-driven conversations is confirmed by HR teams' use of it for diversity tracking and monthly talent reviews.

## **Accomplishment 3 - ( IFT 511 - Analyzing Big Data )**

### **Project Title: Predicting Math Performance in Phoenix High Schools Using Regression**

#### **Analysis**

##### **Explanation of Accomplishments - Introduction**

Regression modeling is used in this study to examine the variables influencing math performance in Phoenix high schools. To find important markers of academic performance, we looked at 115 schools' enrollment, graduation rates, and socioeconomic data. Our linear regression model highlighted achievement discrepancies in schools with increased minority enrollment and showed significant connections, especially between math scores and graduation rates. These results offer practical advice for enhancing learning outcomes with focused interventions. The study shows how data science may support fair learning opportunities and improve educational policy.

#### **Data Collection and Cleaning**

115 records from various sources, such as Arizona Department of Education reports and U.S. News school rankings, were combined during the data collection phase. To guarantee consistency and applicability, this phase needed to be carefully validated. The team fixed missing information, eliminated unnecessary columns (like "Index"), and changed attributes (such as changing "Graduation Rate" from a % string to a numerical float) as part of the data cleaning process. Prior to modeling, these preprocessing procedures were essential for guaranteeing the integrity of the dataset.

#### **Exploratory Data Analysis (EDA)**

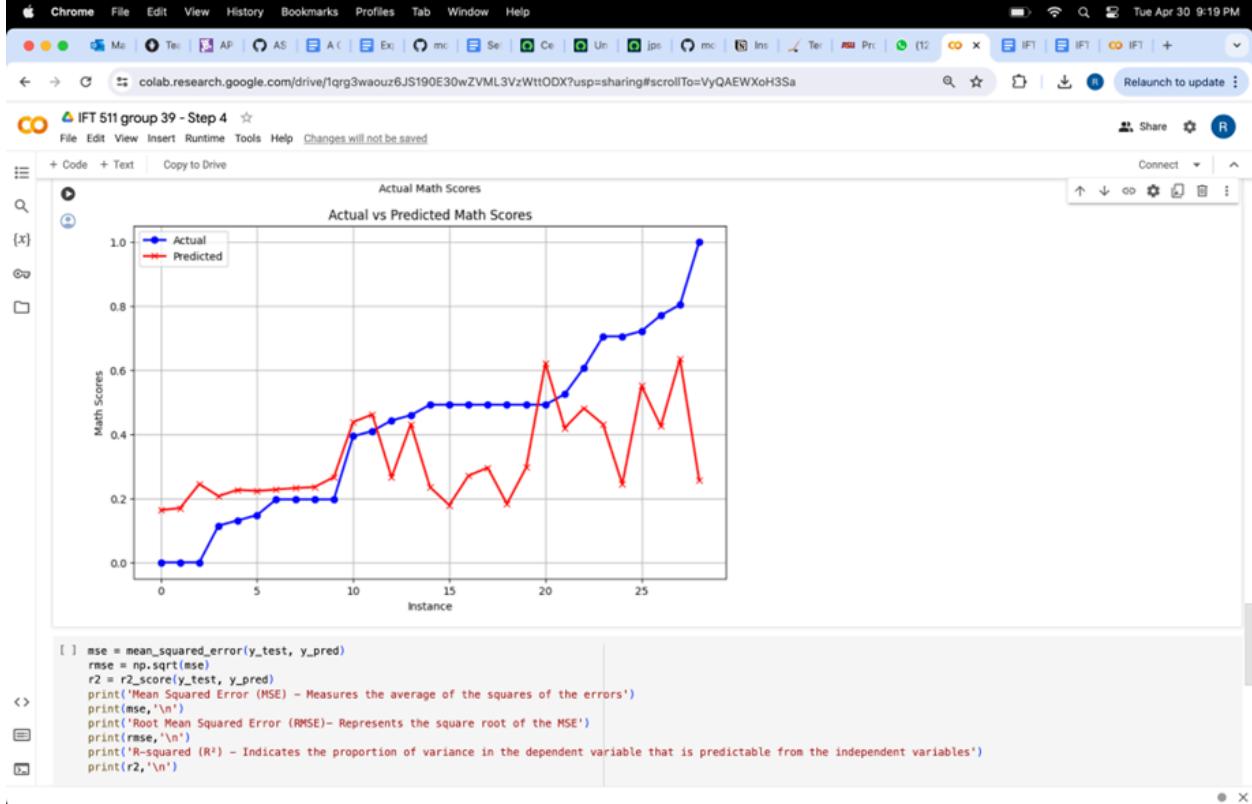
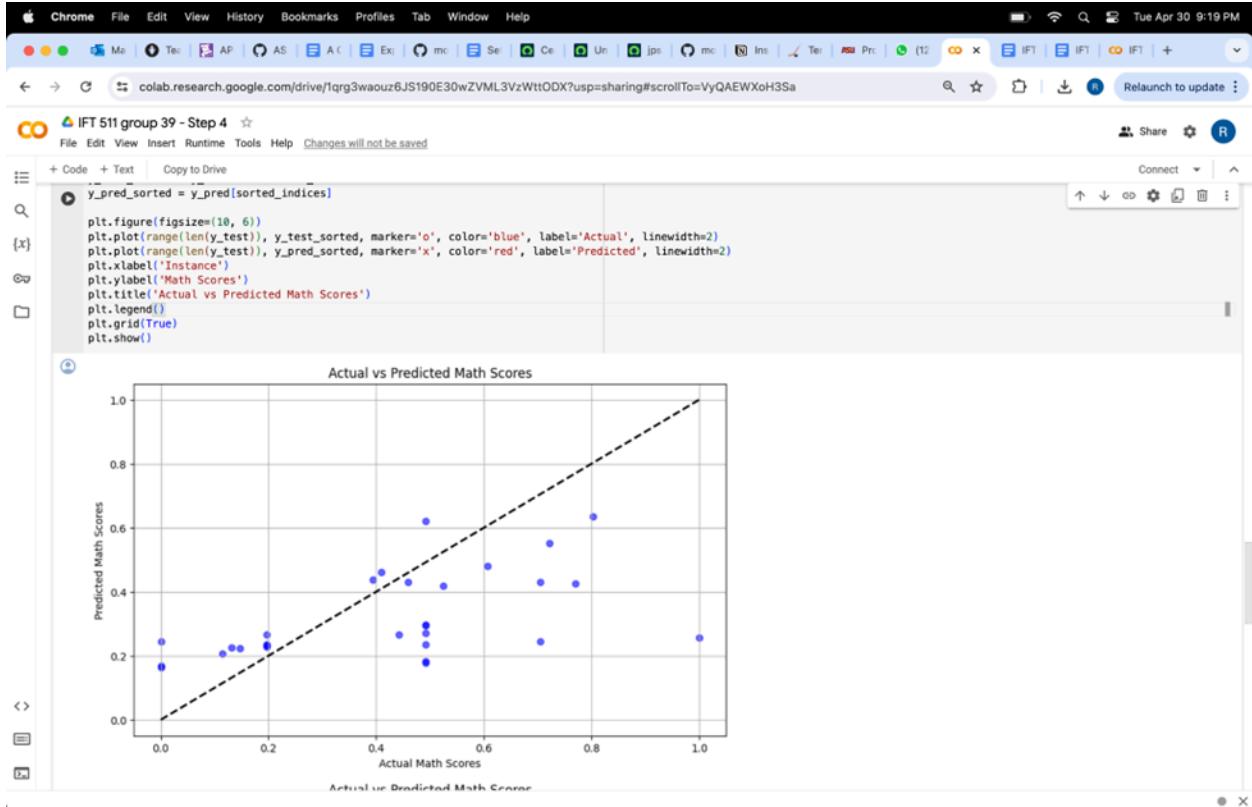
EDA, or exploratory data analysis, yielded important information on the linkages and distributions of variables. Pairplots and other visualizations showed early associations, such as a possible positive relationship between math scores and graduation rates. In order to determine which predictors could have the most impact on the target variable (Math Scoring), this stage was crucial for feature selection.

## **Model Development**

Because linear regression is interpretable and appropriate for continuous goal variables, it was used in the modeling phase. To assess generalization ability, the dataset was divided between training (55%) and testing (45%) sets. The chosen predictors can account for roughly 15.18% of the variance in math scores, according to the model's R<sup>2</sup> value of 0.1518. The coefficients themselves provide useful information, even while this indicates areas for development (such as adding more characteristics or experimenting with non-linear models):

1. Math performance and graduation rate had a positive correlation (+0.1326), suggesting that math results are generally better at schools with higher graduation rates.
2. The significant negative coefficient (-0.5511) for minority enrollment may be due to wider socioeconomic differences rather than academic aptitude, pointing to areas where focused initiatives (e.g., funding equity, mentorship programs) could close gaps.
3. Participation in the Free Lunch Program was associated with a marginal improvement in scores (+0.0182), which may be because the program addresses attendance and student well-being.

## **Implementation(Screenshots)**



IFT 511 group 39 - Step 4

```

mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)
r2 = r2_score(y_test, y_pred)
print('Mean Squared Error (MSE) - Measures the average of the squares of the errors')
print(mse,'n')
print('Root Mean Squared Error (RMSE)- Represents the square root of the MSE')
print(rmse,'n')
print('R-squared (R2) - Indicates the proportion of variance in the dependent variable that is predictable from the independent variables')
print(r2,'n')

print("Coefficient Interpretation:")
for feature, coefficient in zip(X.columns, model.coef_):
    if coefficient > 0:
        print(f"A one-unit increase in {feature} is associated with an increase of in Math Scoring by - {coefficient:.4f} increase")
    elif coefficient < 0:
        print(f"A one-unit increase in {feature} is associated with a decrease of in Math Scoring by - {abs(coefficient):.4f} decrease")
    else:
        print(f"The {feature} does not have a significant impact on Math Scoring.")

print('\nIntercept (baseline Math Scoring when all other factors are zero):', model.intercept_)

Mean Squared Error (MSE) - Measures the average of the squares of the errors
0.05625552496278777

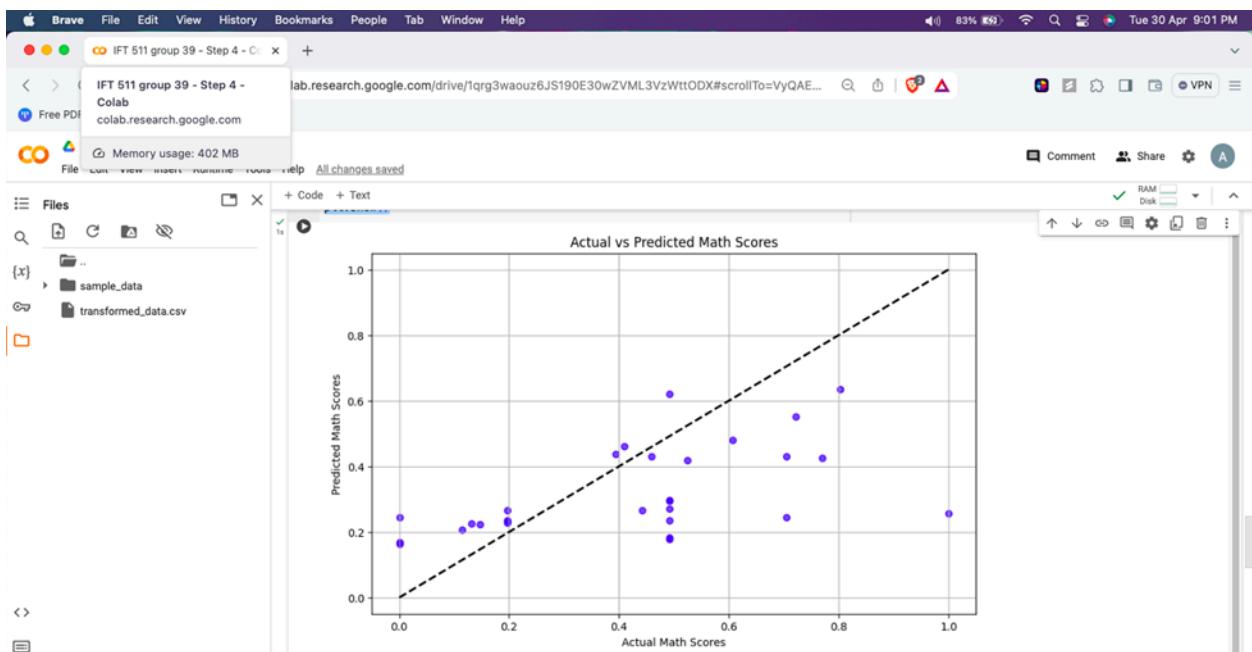
Root Mean Squared Error (RMSE)- Represents the square root of the MSE
0.23718247187899472

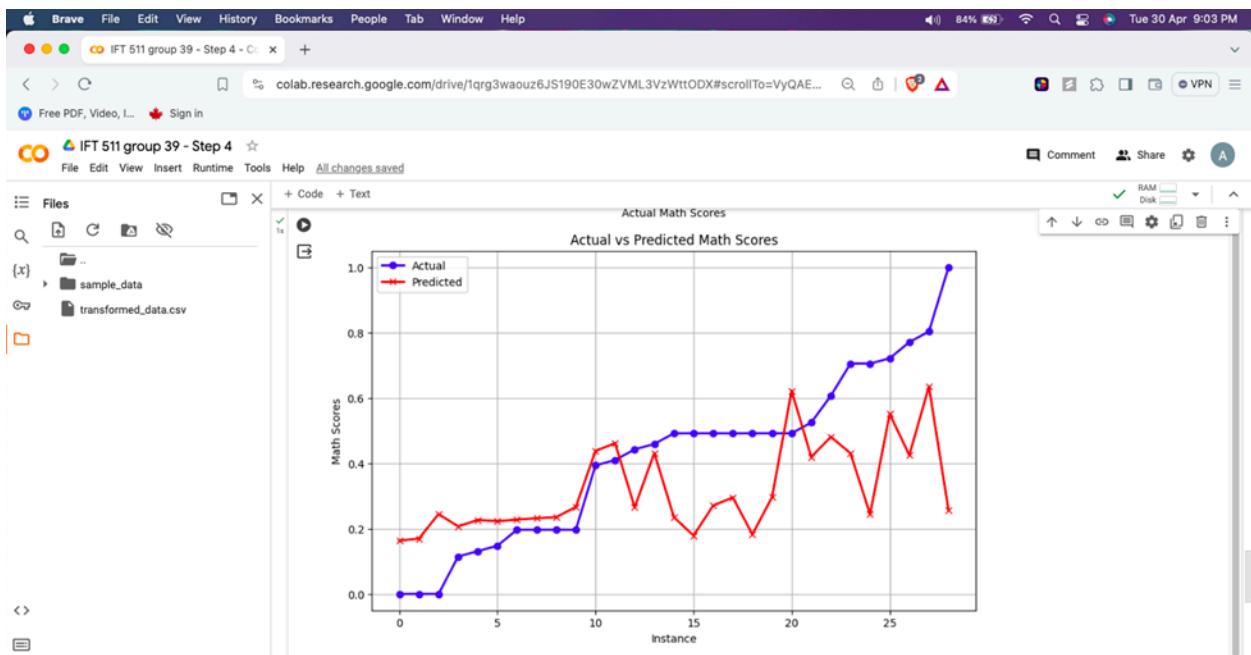
R-squared (R2) - Indicates the proportion of variance in the dependent variable that is predictable from the independent variables
0.15181665565070808

Coefficient Interpretation:
A one-unit increase in Total Enrolments is associated with a decrease of in Math Scoring by - 0.0078 decrease
A one-unit increase in Graduation Rate is associated with an increase of in Math Scoring by - 0.1326 increase
A one-unit increase in Minority Enrollment is associated with a decrease of in Math Scoring by - 0.5511 decrease
A one-unit increase in Free Lunch Program is associated with an increase of in Math Scoring by - 0.0182 increase

Intercept (baseline Math Scoring when all other factors are zero): 0.6482848939457277

```





## Summary

In order to evaluate math performance across Phoenix high schools, this research created a predictive model. We investigated the effects of socioeconomic characteristics, graduation rates, and enrollment size on test results using linear regression. While schools with more minority enrollment confront major obstacles, our cleaned dataset of 115 schools showed that better math achievements are correlated with higher graduation rates. 15% of score changes were explained by the model ( $R^2=0.15$ ) with a respectable level of accuracy ( $RMSE=0.24$ ). These results draw attention to achievement discrepancies that may be caused by differences in resources. We showed excellent technical proficiency in feature analysis, data preprocessing, and Python model implementation. Despite the data availability limitations, this work offers educational policymakers useful insights. The findings highlight the necessity of focused interventions in schools with poor performance. Data science and education policy analysis are successfully combined in this study.

## References

1. Kaggle Dataset: Ravindra Singh Rana. "Employee Dataset." Kaggle, Available at: [Employee Dataset]  
[https://www.kaggle.com/datasets/ravindrasinghrana/employeedataset/data?select=e%20employee\\_data.csv](https://www.kaggle.com/datasets/ravindrasinghrana/employeedataset/data?select=e%20employee_data.csv)
2. Mural: "Employee Performance Tracking Dashboard Mural." Mural, Available at: [Employee Performance Tracking Dashboard Mural]  
<https://app.mural.co/t/dvdashboard6321/m/dvdashboard6321/1712091585053/881bc8cd935d298>
3. Published Tableau — 533 Project | Tableau Public
4. Arizona Department of Education. (n.d.). AZ School Report Cards. Retrieved from  
<https://azreportcards.azed.gov/>
5. High-Schools.com. (n.d.). Phoenix High Schools Directory. Retrieved from  
<https://high-schools.com>
6. Microsoft. (n.d.). SQL Server Documentation. Retrieved from  
<https://docs.microsoft.com/en-us/sql/>