Week 6: Classroom Analytics Project

Data Science for Mathematics Teachers

November 11, 2025

Course Information

Course: Data Science for Mathematics Teachers
Series: Professional Development Series
Duration: 8 weeks
Level: Beginner To Intermediate
Target: Mathematics Teachers

1 Week 6: Classroom Analytics Project

1.1 Learning Objectives

By the end of this week, you will be able to:

- Conduct end-to-end analysis of your classroom data
- Generate actionable insights to improve teaching methods
- Create professional reports for school administration
- Present data-driven recommendations confidently

1.2 Topics Covered This Week

- Complete analysis of real classroom data
- Creating actionable insights for teaching
- Presenting findings to educational stakeholders

1.3 Key Concepts You Will Work With

- Project structure and data organization
- Exploratory data analysis (EDA) workflows
- Statistical hypothesis testing with scipy.stats
- Creating executive summaries and key findings
- Professional report generation with matplotlib and pandas
- Data storytelling and visualization best practices
- Version control and documentation for educational projects
- Presenting technical findings to non-technical audiences

1.4 Practical Exercises

Difficulty Level: Intermediate
Total Exercises: 3

Exercise 1: AI-Enhanced Challenge: Complete analysis of real classroom data

Difficulty: Intermediate
AI-Enhanced Programming Exercise
Task: Using Python, develop a Python solution focusing on project structure and data organization.
Step-by-Step Instructions:

1. Focus on implementing project structure and data organization effectively
2. Create clear, educational examples for student understanding
3. Test your implementation with classroom scenarios
4. Add comprehensive comments for teaching purposes
5. Validate results and create sample outputs

Technical Requirements:

- Use Project structure and data organization in your implementation
- Use Exploratory data analysis (EDA) workflows in your implementation
- Use Statistical hypothesis testing with scipy.stats in your implementation

Expected Output: A working Python script that mathematics teachers can run in their classroom to solve real educational problems.
Assessment: Your solution should be practical, well-commented, and directly applicable to teaching mathematics.
Teaching Context: Real-world application in your mathematics classroom

Exercise 2: Concept-Based Challenge: Creating actionable insights for teaching

Difficulty: Intermediate
Task: Implement a solution to generate actionable insights to improve teaching methods.
Technical Requirements:

- Use Statistical hypothesis testing with scipy.stats as the primary method
- Integrate Creating executive summaries and key findings for enhanced functionality
- Test your solution with real classroom data
- Document your code with clear comments

Deliverable: A complete Python script that mathematics teachers can use immediately.
Teaching Context: Real-world application in your mathematics classroom

Exercise 3: AI-Enhanced Challenge: Presenting findings to educational stakeholders

Difficulty: Intermediate
AI-Enhanced Programming Exercise
Task: Using Python, develop a Python solution focusing on professional report generation with matplotlib and pandas.
Step-by-Step Instructions:

1. Focus on implementing professional report generation with matplotlib and pandas effectively
2. Create clear, educational examples for student understanding
3. Test your implementation with classroom scenarios
4. Add comprehensive comments for teaching purposes
5. Validate results and create sample outputs

Technical Requirements:

- Use Professional report generation with matplotlib and pandas in your implementation
- Use Data storytelling and visualization best practices in your implementation
- Use Version control and documentation for educational projects in your implementation

Expected Output: A working Python script that mathematics teachers can run in their classroom to solve real educational problems.
Assessment: Your solution should be practical, well-commented, and directly applicable to teaching mathematics.
Teaching Context: Real-world application in your mathematics classroom

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