

Team Contribution Report

University Library Analytics Data Warehouse Project

Date: January 12, 2026

Course: Data Mining and Data Warehousing (FA1 Group Work)

Project Title: University Library Analytics (Library Usage Data Warehouse)

1. Project Overview

This project focused on designing and implementing a complete data warehouse solution for the University Library. The library had three separate legacy systems (book lending, digital resources, and room bookings) that produced inconsistent reports. The goal was to integrate all sources into one dimensional model, enable OLAP operations, support dashboards, and implement security and backup plans.

2. Team Members and Individual Contributions

Team Member	Role	Main Contributions
Member 1	Data Architect & Database Designer	Designed warehouse architecture, created ERD and star schema, wrote DDL scripts
Member 2	ETL Specialist & Data Quality Manager	Built ETL pipeline to extract from MySQL/CSV/Excel, cleaned inconsistent departmental data
Member 3	Analytics, Reporting & Security Lead	Implemented OLAP operations, created pivot views and BI queries, built dashboard

3. Key Tasks Completed

Database Design: Created staging, dimension, and fact tables with correct primary/foreign keys and constraints.

ETL Pipeline: Extracted and transformed data from heterogeneous sources and loaded it into the warehouse.

OLAP & Reporting: Built pivot views and queries to support drill-down, roll-up, slicing, and dicing.

Dashboards: Designed datasets for Power BI dashboards for executive, departmental, and operational needs.

Security: Implemented RBAC roles, masking, audit logging, and access restriction by department.

Backup & Recovery: Defined backup schedule and restoration procedure for business continuity.

4. Challenges Faced

During implementation, the team encountered several issues including inconsistent department codes (CS vs CompSci), different date formats in digital usage files, missing StudentIDs in room bookings, and duplicate booking records. Another major challenge was aligning the ETL script with the real database schema (correct column names such as department_id instead of department_key). Additionally, MariaDB/XAMPP limitations required alternative approaches for encryption at rest.

5. Solutions Applied

To solve data quality issues, transformation rules were created to standardize department names, convert all dates to ISO formats, handle NULL values using defaults such as 'UNKNOWN', and remove duplicates before loading. Database schema mismatches were fixed by carefully checking DESCRIBE outputs. For security, views were created for masked and restricted access, and audit triggers were added for monitoring.

6. Lessons Learned

The project strengthened the team's understanding of dimensional modeling, ETL best practices, and data governance. We learned the importance of validating database schemas early, keeping clear documentation, and testing each module independently. We also gained practical experience in designing BI dashboards and implementing RBAC policies to ensure privacy and compliance.

7. Conclusion

The University Library Analytics Data Warehouse successfully integrates all three legacy systems into one consistent reporting platform. It supports decision-making through OLAP analysis, dashboards, and BI queries while ensuring data quality, security, and recoverability. The team collaboration ensured all deliverables were completed within the given timeline.

8. Sign-Off Section

We confirm that the above contributions are accurate and reflect the work completed by each member.

Team Member 1 Signature: _____

Team Member 2 Signature: _____

Team Member 3 Signature: _____

Date: _____