Business Intelligence Project

Use Case Proposal

Analytics for Open Learning Platforms (OULAD)

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1 Introduction & Business Context

Open Learning Platforms generate large volumes of data related to learner demographics, course registrations, assessments, and academic performance. Despite the availability of this data, many educational institutions struggle to transform it into actionable insights that improve learner success and platform performance.

This project aims to design and implement an end-to-end Business Intelligence (BI) solution using the Open University Learning Analytics Dataset (OULAD). The dataset contains over 32,000 students, 22 course presentations, 174,000 assessment submissions, and comprehensive demographic and temporal data from the Open University (UK) covering the 2013-2014 academic years. The solution will focus on analyzing learner behavior, assessment engagement patterns, and academic performance to support data-driven decision-making and improve learning outcomes.

2 Business Problem

Open Learning Platforms face several critical challenges that hinder their ability to support learner success and optimize educational delivery:

- **Low completion rates:** A significant proportion of learners withdraw before completing their courses, resulting in poor retention metrics and reduced educational impact
- **Limited visibility into learner engagement:** Difficulty understanding how learners engage with course assessments and identifying behavioral patterns that lead to success
- **Late identification of at-risk learners:** Interventions typically occur after disengagement has already happened, when it is often too late to provide effective support
- **Difficulty evaluating course and assessment effectiveness:** Unclear relationship between course structure, assessment timing and difficulty, learner performance, and final outcomes
- **Fragmented data sources:** Educational data is spread across multiple operational systems without analytical structure, making it difficult to gain holistic insights

Impact:

As a result, academic and administrative decisions related to learner support, course design, resource allocation, and performance improvement are often made without reliable, consolidated insights. This leads to inefficient use of educational resources, missed opportunities for timely intervention, inability to personalize learning experiences, and ultimately, suboptimal learning outcomes and student satisfaction.

3 Analytical Questions

The BI solution will answer the following 10 analytical questions, organized by strategic focus area:

Course Performance & Outcomes

1. Which courses have the highest and lowest completion rates, and what factors distinguish them?
2. How do assessment results influence final course outcomes (Pass, Fail, Distinction, Withdrawn)?
3. How does the number of assessments attempted affect learner success rates?

Assessment Engagement & Performance

4. How does assessment participation and submission timing correlate with course completion and final grades?

5. How does assessment performance evolve throughout the course lifecycle, and when do learners typically struggle?
6. What patterns exist between assessment submission behavior (on-time vs. late) and final scores?

Retention & Risk Analysis

7. Which learners are most at risk of withdrawal based on early engagement behavior and demographic factors?
8. How does registration timing impact completion and withdrawal rates?

Demographic & Strategic Insights

9. Which learner demographic groups (age, education level, socioeconomic status) show higher engagement and academic performance?
10. Which courses generate the highest overall learner engagement over time, and what are their characteristics?

4 Key Performance Indicators (KPIs)

The following 9 KPIs will be tracked and visualized in the BI dashboards to measure platform performance and learner success:

1. Total Enrollments per Course

Measures course popularity and demand trends

2. Course Completion Rate (%)

Primary indicator of course effectiveness and learner success

3. Withdrawal Rate (%)

Measures learner dropout levels and retention challenges

4. Average Assessment Score

Evaluates overall academic performance quality

5. Assessment Participation Rate (%)

Percentage of assessments submitted vs. assigned - measures learner engagement

6. On-Time Submission Rate (%)

Percentage of assessments submitted by deadline - measures time management

7. Average Days Between Assessments

Time intervals between assessment submissions - measures learning pace

8. At-Risk Learner Percentage (%)

Proportion of learners with low engagement and high withdrawal probability

9. Distinction Achievement Rate (%)

Percentage of learners achieving distinction-level performance

5 Conclusion

This Business Intelligence project will leverage the comprehensive OULAD dataset to transform raw educational data into actionable insights that directly address the critical challenges faced by open learning platforms. By implementing a robust analytical solution with clear KPIs and focused analytical questions, this project will enable data-driven decision-making in areas of learner support, course design, and performance optimization.

The proposed solution will not only provide immediate operational value through real-time monitoring and reporting but will also establish a scalable foundation for advanced analytics initiatives, including predictive modeling for at-risk learner identification, personalized intervention strategies, and continuous improvement of educational outcomes.
