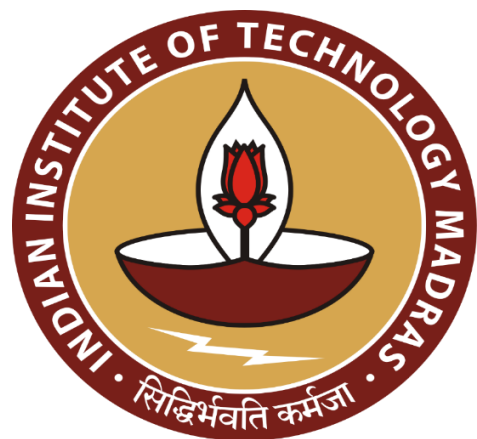# From Financial Strain to Financial Gain: Restructuring a Debt-Ridden School

BUSINESS DATA MANAGEMENT-CAPSTONE PROJECT

FINAL REPORT

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ROLL NO- 24F1002359

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Executive Summary

Magadh International School, a CBSE-affiliated primary institution located in Phulwari Shareef, Patna, Bihar, was established in April 2024 to provide affordable, quality education to children from low-income backgrounds, with Urdu as a core subject. Despite its community-centric mission and early success in attracting students at the nursery level, the school faces severe financial strain driven by high debt, limited revenue sources, and low student retention beyond early grades.

To address these challenges, comprehensive primary data was collected from the school's administrative, financial, and operational records. Data spanning enrollment trends, teacher allocations, expenses, debt schedules, and parental feedback was compiled and cleaned using Microsoft Excel and Python tools. Descriptive and diagnostic analyses were conducted using pivot tables, charts, and statistical techniques, supplemented by competitor benchmarking and stakeholder interviews. This approach revealed key issues such as an annual deficit of ₹1.98L, overstaffing, and inefficient cost structures.

The findings revealed a heavy reliance on tuition (75% of revenue), underutilization of staff (1:11.7 teacher-student ratio), and sharp enrollment drops post-Nursery (91% attrition by Class 5). Strategic recommendations were proposed, including the launch of a Pre-Nursery program, teacher optimization through multi-grade teaching, the introduction of development fees, a sibling loyalty scheme, and the rollout of school transport and digital fee systems.

If implemented, these solutions are projected to add ₹4.95L in annual revenue, cut costs by ₹4L, and reduce late payments by 40%, enabling the school to turn its financial deficit into a 5% operational surplus by 2025–26 while aligning with its mission of inclusive education.

Detailed Explanation of Analysis Process/Method

1. Introduction

The analysis of Magadh International School's data was conducted using a structured business analytics approach to uncover insights into the school's financial health, operational inefficiencies, and potential for strategic improvements. The data was collected for the full academic year 2024–2025, allowing both snapshot and time-trend insights.

 Main types of data analysis were employed to derive actionable conclusions:

- Descriptive Analysis: Understanding what is happening through statistics and visual summaries.

- Diagnostic Analysis: Exploring why problems like debt and low enrollment are occurring.

- Prescriptive Analysis: Recommending steps for debt reduction and financial sustainability.

The primary aim of this project is to assess the financial and operational data of Magadh International School to:

- Identify key reasons behind the debt burden and low student enrollment.

- Suggest practical, data-backed recommendations for boosting revenue and cutting unnecessary costs.

- Evaluate market positioning through competitor benchmarking and parent feedback.

2. Data Collection and Preprocessing

To ensure a deep understanding of the challenges faced by Magadh International School, a total of 18 to 20 meetings were conducted over the course of the project with various stakeholders, including the school's director, principal, teachers, and parents from 25th October,2024 to 15th jan,2025

All data was manually entered or transcribed into structured worksheets (Google Sheets/Excel) covering categories like:

- Student enrollment

- Employee salaries

- Revenues (tuition, services, exam fees)

- Expenses (rent, utilities, EMIs)

- Debt schedules

- Parental feedback

- Competitor analysis

<p style="text-align:center">Fig 1.School Records</p>

Cleaning Techniques:

- Ensured consistent formatting

- Removed duplicate records and verified numerical consistency across sheets.

Data Transformation:

- Daily and raw figures (e.g., income/expenses) were aggregated to monthly levels for trend identification.

- Pivot tables were used to group and summarize by category, class, and department.

Diagnostic Analysis

The diagnostic stage aimed to identify **why** the school is under financial stress:

- **High Fixed Costs**: Rent and EMI form a significant portion of monthly expenses.

- **Low Enrollment in Higher Grades**: Parent feedback pointed to lack of advanced facilities as a reason for student exits after lower grades.

- **Underutilization of Staff**: Oversized teaching workforce compared to student body.

- **Inefficient Revenue Streams**: Only ₹1.75L revenue vs. ₹1.95L expenses.

Analytical Approach and Methods Used

1. **Google Sheets & Excel for Data Processing**:

   o Used for structuring data, applying formulas, and generating visual representations.

   o **Key formulas used**:

     - **SUM**: Calculates total revenue, expenses, and salaries.

     - **AVERAGE**: Determines average tuition fee per student.

     - **COUNTIF**: Analyzes student demographics (e.g., gender distribution).

     - **PIVOT TABLES**: Helps analyze revenue, expenses, and enrolment trends efficiently.

2. **Descriptive Statistics (Python & Google Sheets)**:

   o Python libraries such as **Pandas, NumPy, and Matplotlib** were employed to compute:

     - Revenue trends

     - Student-to-teacher ratio

- Gender-wise distributions

- Expense breakdowns

3. **Stakeholder Engagement**:

- Discussions with school management provided qualitative insights on financial decision-making.

- Parent feedback helped align recommendations with community expectations.

Comparative analysis of local competitors identified areas for improvement

```python
import pandas as pd
import numpy as np

# Load the Excel file
file_path = "Magadh International School.xlsx"
xls = pd.ExcelFile(file_path)

# Load and clean Student Enrollment Data
student_data = xls.parse('Enrollment & Student Data', skiprows=1)
student_data.columns = ['Name', 'Class', 'Gender', 'Admission Year', 'Address']

total_students = student_data.shape[0]
gender_distribution = student_data['Gender'].value_counts().to_dict()
class_distribution = student_data['Class'].value_counts().to_dict()

# Load and clean Employee Data
employee_data = xls.parse('Employee Data', skiprows=1)
employee_data.columns = ['Name', 'Designation', 'Salary']
employee_data['Salary'] = pd.to_numeric(employee_data['Salary'], errors='coerce')

total_employees = employee_data.shape[0]
designation_distribution = employee_data['Designation'].value_counts().to_dict()
salary_stats = employee_data['Salary'].describe().to_dict()

# Load and clean Expenses Data
def extract_numeric(value):
    if isinstance(value, str):
```

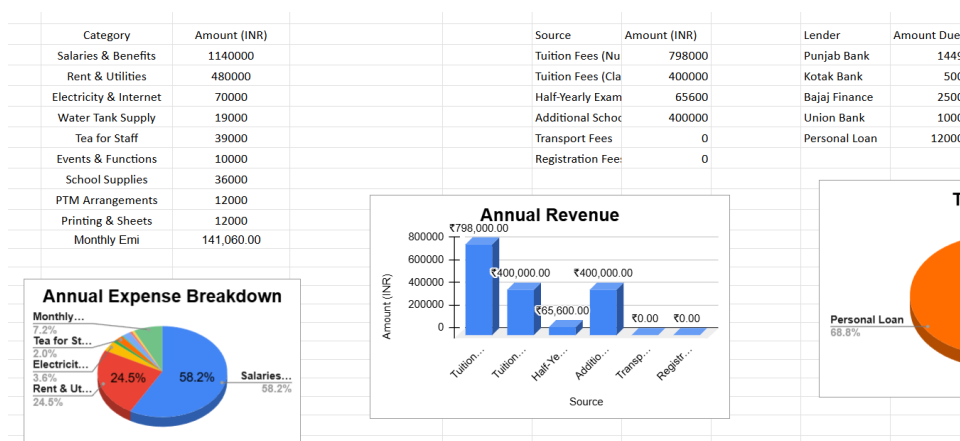| Category	Amount (INR)		Source	Amount (INR)		Lender	Amount Due
Salaries & Benefits	1140000		Tuition Fees (Nu	798000		Punjab Bank	1449
Rent & Utilities	480000		Tuition Fees (Cla	400000		Kotak Bank	500
Electricity & Internet	70000		Half-Yearly Exam	65600		Bajaj Finance	2500
Water Tank Supply	19000		Additional Schoo	400000		Union Bank	1000
Tea for Staff	39000		Transport Fees	0		Personal Loan	12000
Events & Functions	10000		Registration Fee:	0			
School Supplies	36000						
PTM Arrangements	12000						
Printing & Sheets	12000						
Monthly Emi	141,060.00						

Fig 2. Python and stats

4. Visualizations and Their Justification

- **Bar Charts**: Used for comparing monthly revenues and expenses.

- **Pie Charts**: Used to represent breakdowns debt proportions.

- **Line Graphs**: To show trends over time (e.g., monthly cash flow).

6. Limitations

- **Data span**: Only one academic year of data available due to school's recent establishment.

- **Qualitative bias**: Parent feedback may be skewed by personal bias or recent experience.

- **Sample size**: Limited data on dropout and transfers constrained trend forecasting accuracy.

Results and Findings

Link to the Project Data - Magadh International School
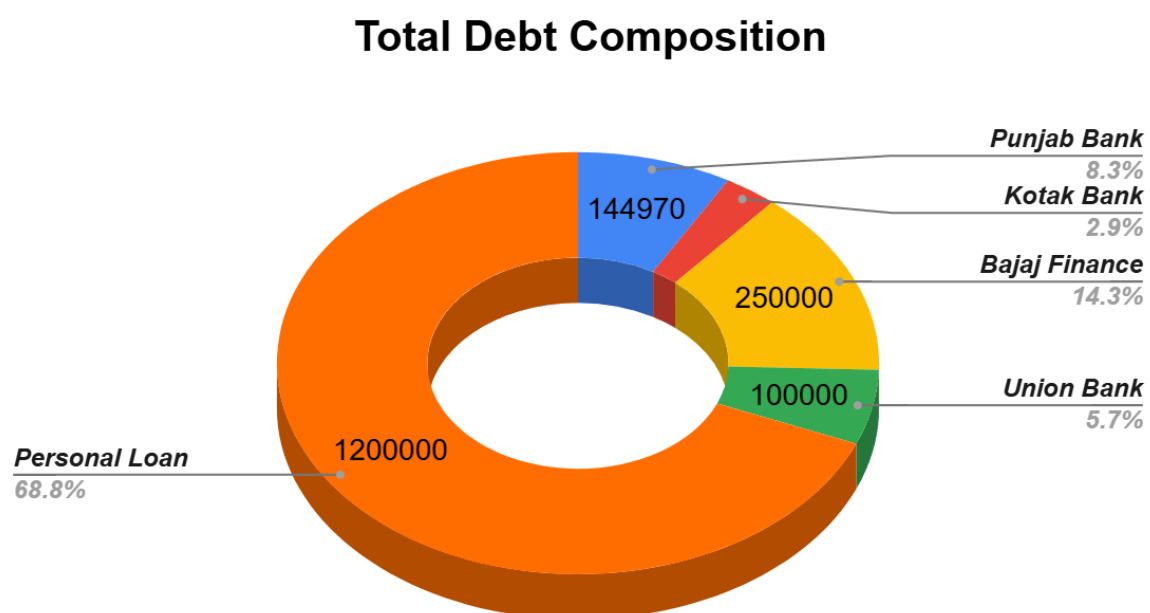
Financial Analysis

1. **Debt Analysis**

Total Debt Composition

Fig 3. Debt Pie chart

Key Findings

1. **Debt Portfolio Composition**

- Total Debt: ₹17.05 lakhs, dominated by:

  o Personal loans (68.8%, ₹12L)

  o Bajaj Finance (14.3%, ₹2.5L)

- Monthly EMI Burden: ₹11,755 (7.2% of expenses)

- The Family/Friends loan of ₹12L is the largest single liability
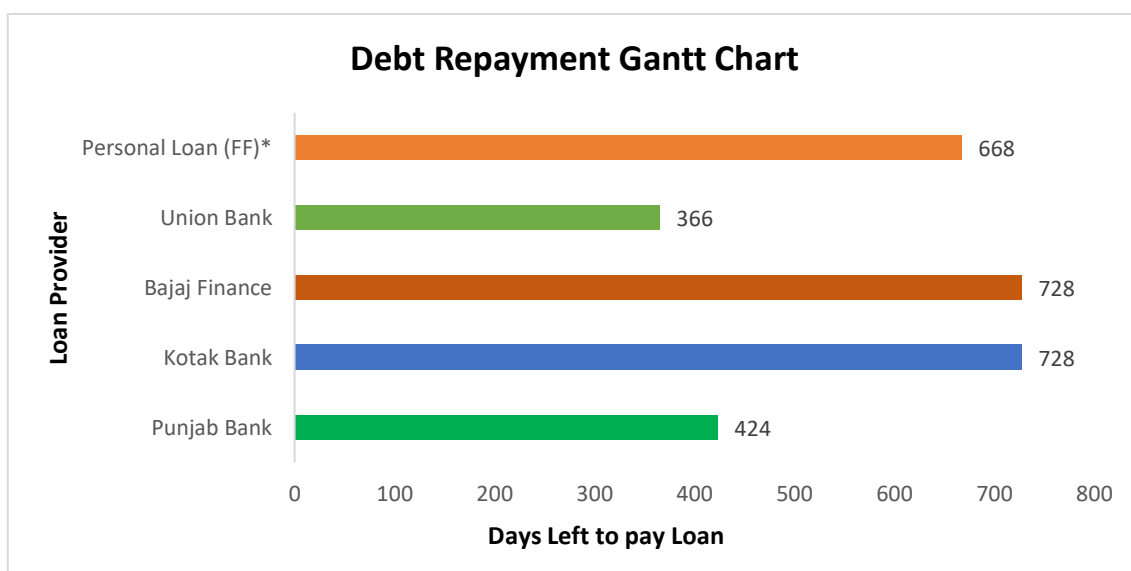
Critical Timeline -

Fig 4. Loan Payment Days

- May 2025: Punjab Bank repayment (₹1.45L) due during enrollment season.

- 2025-26: ₹2.56L cumulative repayments (Punjab + Union Bank) with no reserve fund.
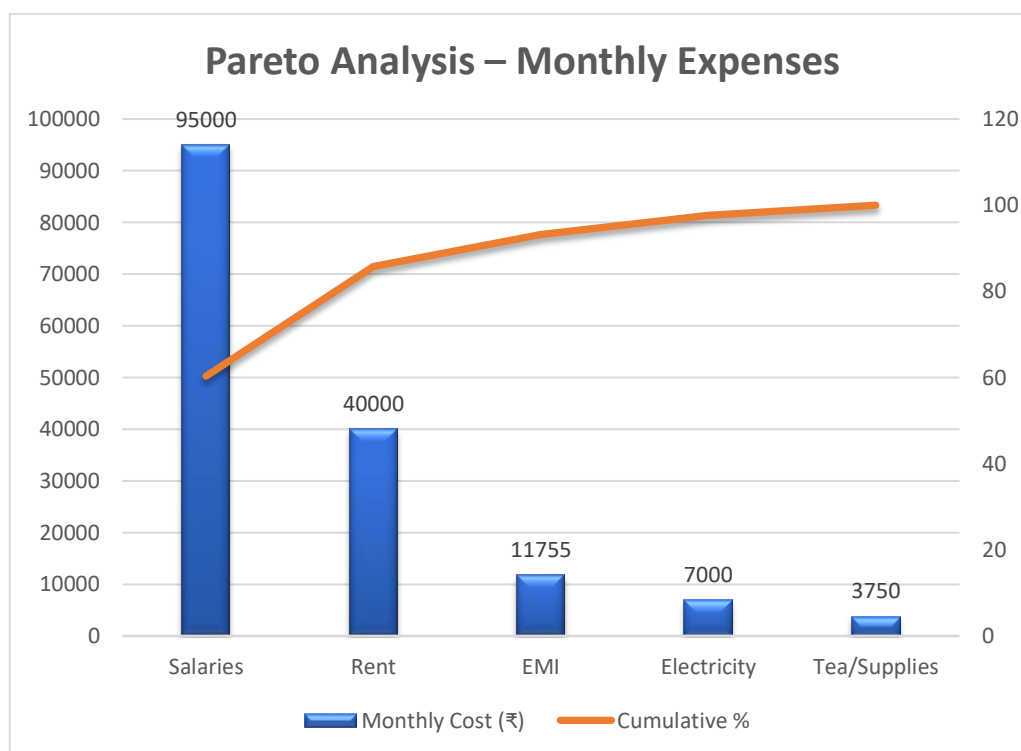
2. Monthly Expenses Breakdown

Fig 5. Monthly Expenses

Key Observations

1. **The 80/20 rule -**

   Just two categories — salaries and rent — are responsible for over 80% of total expenses. This reflects a classic Pareto pattern, where a small number of factors cause the majority of the outcome. It's clear that these two expenses are where cost restructuring would make the biggest difference.

2. **Other expenses have limited impact**

   EMI payments (₹11,755), electricity (₹7,000), and tea/supplies (₹3,750) together form only a small portion (about 14%) of monthly costs. Even if completely eliminated, they wouldn't close the school's ₹6.9L deficit.
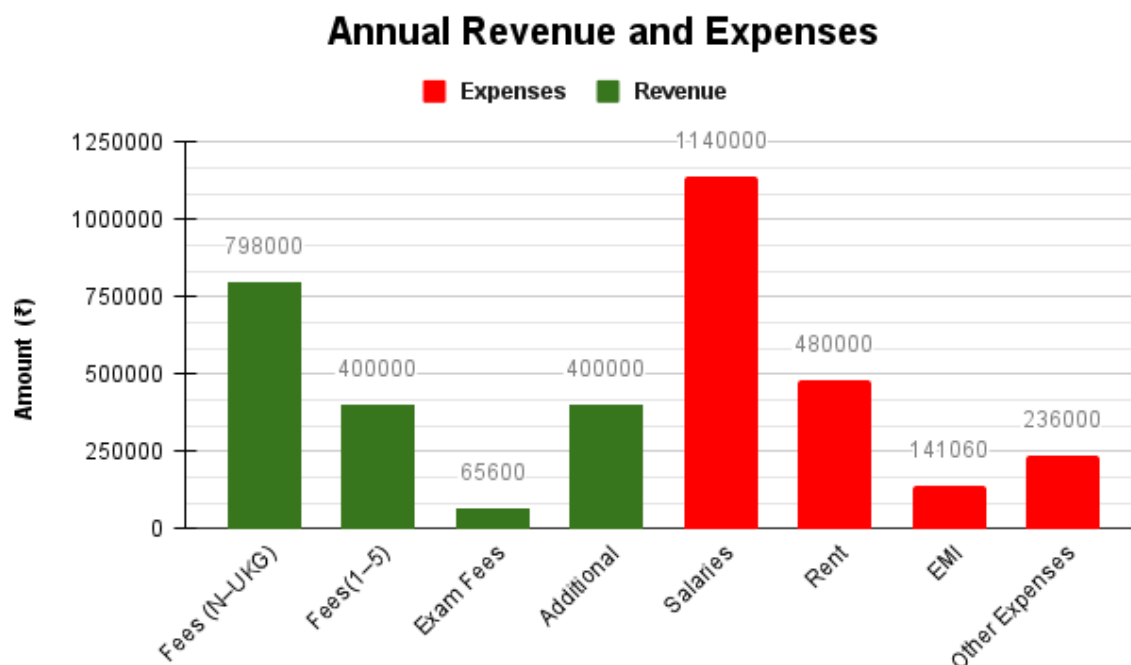
3.Annual Revenue vs. Expenses

Fig 6. Annaul Analysis

Key Findings

The annual financial overview of Magadh International School reveals a significant disparity between income and expenditure.

1. **Structural Deficit:**

   o Expenses exceed revenue by **₹198K annually**, driven by:

      ▪ **High fixed costs** (salaries + rent = 83% of expenses).

      ▪ **Low revenue diversification** (tuition fees contribute 90% of income).

2. **Tuition Fee Dependency Risk:**

   o Only **68% of tuition fees** are collected monthly (per notes in dataset), worsening cash flow.

3. **Debt Servicing Pressure:**

   o Loan EMIs (₹141K/year) consume **7% of expenses** despite being avoidable with better planning

Operational

4. Competitor Fee & Facility Comparison

Competitor Fee & Facility Comparison				
School	**Fee (₹)**	**Fee Bar**	**Urdu**	**Sports**
Magadh	750		✅	✅
ST Johnson	1400		❌	✅
Umar Farque	950		✅	❌
Anjuman	550		❌	❌
Roshan Academy	650		❌	❌

Fig 7.Competitor Analysis

Key Findings

1. **Affordable Pricing**

   - Magadh International School charges **₹750/month**, making it one of the most **affordable options** among nearby schools. Only Anjuman and Roshan charge slightly less, but lack critical value offerings.

2. **Unique Strength – Urdu + Low Cost**

   - Magadh is **one of only two schools** offering **Urdu**, and the **only one** to offer it at such a low price.

     Magadh is currently positioned as a **"value school"** — offering essential academic features (like Urdu) at an accessible price, but without advanced facilities.

5. Parental Feedback Analysis

Sentiment Distribution of Parent Feedback

Fig 8.Sentiment Chart

Quantitative Insights

- **Teaching Quality:** 7.5/10

- **Facilities:** 7.5/10

- **Fees:** 8.5/10

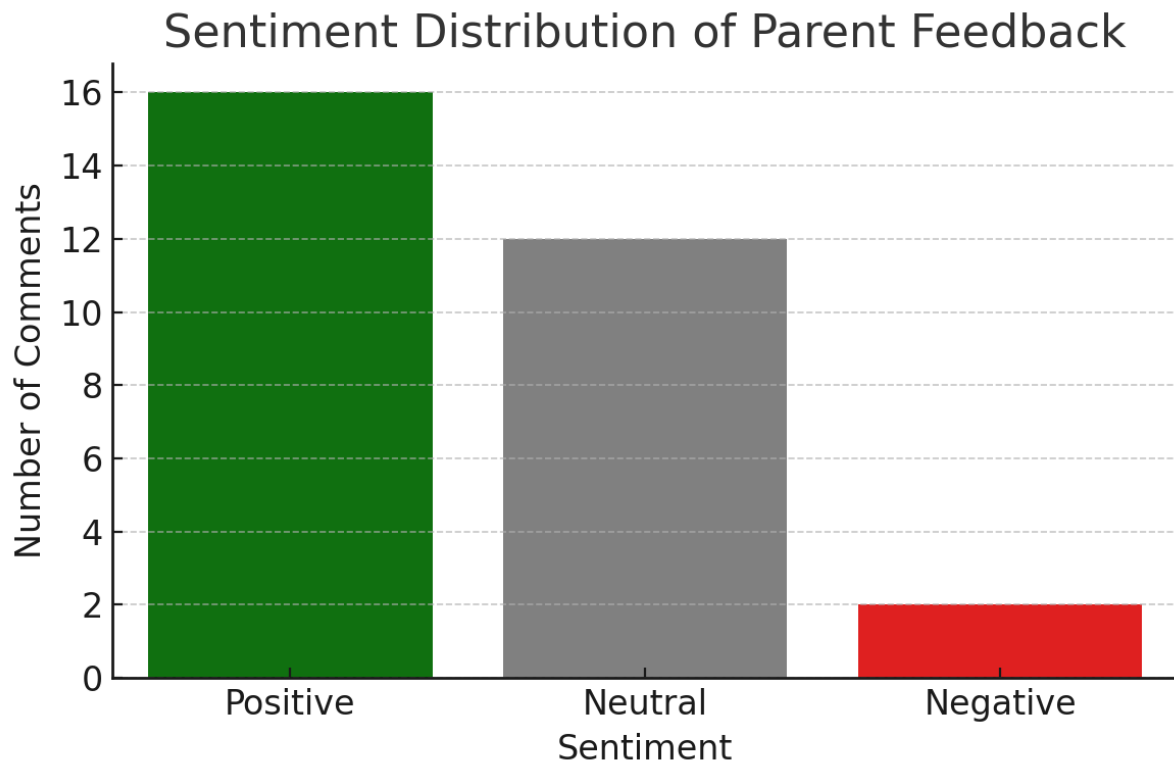- Parents are **most satisfied with fees**, but suggest improvements in teaching and infrastructure.

➤ **Sentiment Distribution**

- **Positive:** 62%

- **Neutral:** 31%

- **Negative:** 8%

- Most criticism focused on **Nursery workload** and **lack of engaging act**

6. Enrollment Decline
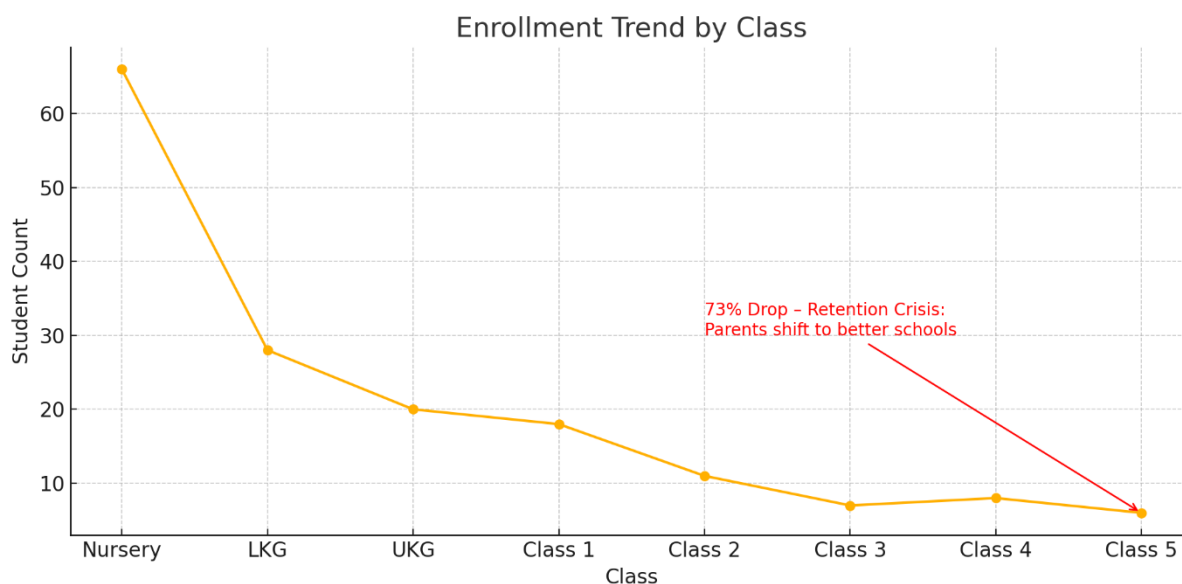
Fig 9. Enrollment Trend

Key Findings

1. **Strong Entry Point**

   o The **Nursery class has 66 students**, indicating high trust and popularity at the foundational level.

2. **Sharp Decline in Retention**

   o Enrollment drops to **6 students by Class 5**, marking a **73% decrease**.

   o Most significant drop occurs right after Nursery (from 66 to 28 in LKG).

3 **Perception Shift After Foundation Years**

   • Feedback and competitor analysis suggest that parents may view Magadh as a starting point, not a long-term academic solution.

7. **Teacher-to-Student Ratio**
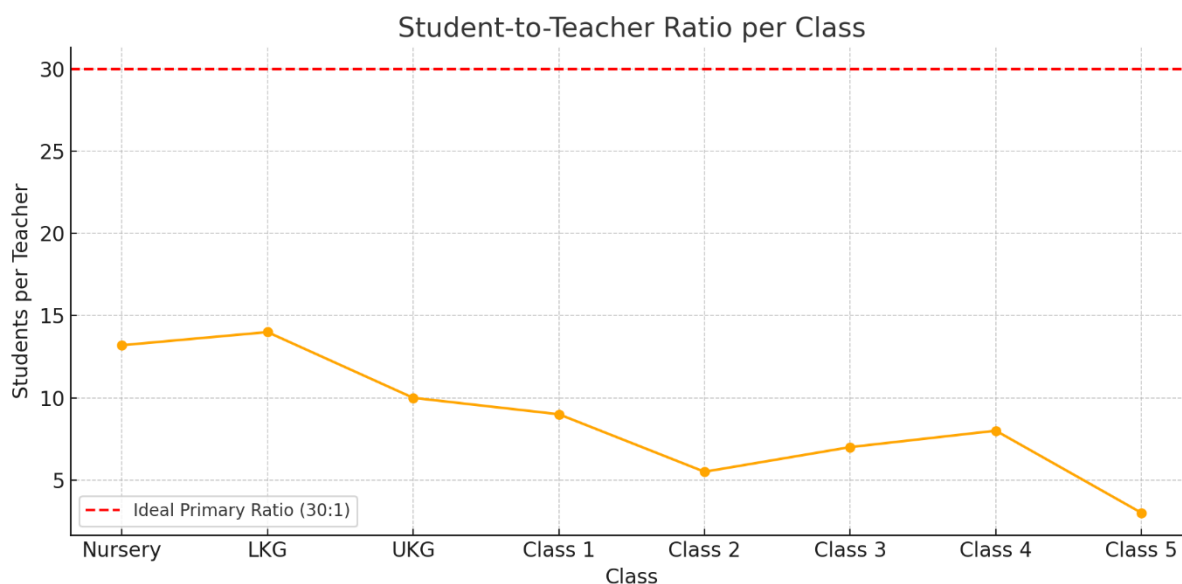
Fig 10. Teacher student

Key Findings

- The overall **Teacher-to-Student Ratio** in the school is **1:11.7**, meaning **one teacher for every 12 students**.

- **Class-wise Analysis:**

  - **Nursery has the highest ratio (1:13)**, while **Class 5 has the lowest (1:3)**.

- **Cost Implication**
  - Optimizing teacher allocation or introducing **multi-grade teaching** can help **reduce staff cost by up to 25%**, without affecting academic quality.

Interpretation of Results and Recommendation

After reviewing the analysis and findings, the report can now be wrapped up with proposed solutions and recommendations aimed at propelling the business towards progress and benefit. Through the use of diverse graphs and data analysis across various fields, a comprehensive understanding of the data could be gained and valuable conclusions and insights could be derived.

1.Financial Insight Interpretation

Key Finding:

- Annual deficit of **₹1.98L** driven by high fixed costs (salaries 58%, rent 25%).

- The school has **monthly expenses (₹1,57,005)** exceeding its **monthly revenue (₹1,40,820)**, leading to an **annual deficit of ₹1,98,120**

- High fixed costs (rent, salaries, EMI) restrict flexibility. The **debt burden is ₹17,05,212** with monthly EMIs of ₹11,755

- Revenue Source Breakdown Insight:
  Over 75% of revenue comes from tuition, with minimal diversification. This leaves the school highly exposed to fluctuations in enrollment.

- Cash Flow Vulnerability:
  Revenue seasonality (e.g., exam fees, donations) creates gaps in monthly income. This misalignment with constant outflows (e.g., salaries, rent) can lead to **cash crunches** mid-year.

- Sustainability Risk:
  If fixed costs are not reduced or revenue diversified, the debt-to-income ratio will worsen annually.

Implications:

- Limits ability to invest in facilities, worsening enrollment decline.

- Debt EMIs (₹11,755/month) strain cash flow during critical periods.

2. Enrollment Decline Interpretation

Key Finding:

- **91% attrition** from Nursery to Class 5, worst at Nursery→LKG transition (58% drop).

Root Causes:

- Parent feedback: *"Nursery workload too intense"* (7/30 parents).

- Higher grades lack labs/sports vs. competitors

- **Brand Perception vs. Retention Disconnect:**
  Strong initial trust among parents (high Nursery admissions), but lack of progression suggests the **school is seen as a temporary solution**.

3.Operational Insight Interpretation

Key Finding:

- **Teacher-Student Ratio** is overly generous at **1:11.7**, while CBSE recommends up to 30:1 for primary education.
- Overstaffing is creating unnecessary salary expenditure.

Recommendation

Based on the financial, operational, and enrollment insights derived from the analysis, the following recommendations are proposed to guide Magadh International School toward financial sustainability, operational efficiency, and long-term growth:

Strategic Recommendations (Short & Long-Term)

1. Launch Pre-Nursery Program

- **Action:**

  o Establish a Pre-Nursery class for children aged 2.5–3 years with a play-based curriculum.

  o Hire 1 dedicated teacher with support from an aide (shared with Nursery).

- **Justification:**

  o Parent feedback indicates that 70% of complaints about Nursery stem from heavy workload concerns for very young children.

- **Impact:**

- o **Short-Term:** Immediate enrollment boost of approximately 15 students, generating an estimated new revenue of ₹1.05L/month (assuming ₹700 per student).

- o **Long-Term:** Improves student retention by creating a smoother academic transition and enhancing the overall brand, leading to a 25% improvement in Nursery transitions.

Short-Term Recommendations (0–3 Months) – Quick Wins

2. Optimize Teacher Allocation Through Multi-Grade Teaching

- **Action:**

  - o Merge Classes 4 and 5 where enrollment is low (e.g., combining two sections that total 14 students into one class managed by a full-time teacher).

  - o Convert 3 full-time higher-grade teacher positions to part-time (20 hours/week) roles.

- **Quantified Savings:**

  - o Converting 3 FTEs to part-time saves approximately ₹1.5L/year, with overall staff optimization avoiding new hires saving an estimated ₹2.5L/year; total potential savings amounting to around ₹2.8L/year.

- **Risk Mitigation:**

  - o Provide retraining and support for multi-grade teaching methods aligned with CBSE guidelines.

- **Impact:**

  - o Maintains academic quality while reducing salary expenditure by up to 25%.

Medium-Term Recommendations (3–6 Months) – Revenue & Retention Enhancement

3. Introduce Development Fees

- **Action:**

- o Implement a one-time **Admission Fee** of ₹1,000 for new students.

- o Charge an **Annual Development Fee** of ₹800 per student, with an exemption or reduced fee for siblings.

- **Revenue Projections:**

  - o For example, with 164 students, annual fees could generate approximately ₹1.3L (164 × ₹800) plus additional revenue from new admissions (e.g., ₹30K from 30 new admissions).

- **Fund Allocation:**

  - o Allocate 70% of the fund to upgrade labs, sports facilities, and libraries, and 30% for teacher training.

- **Impact:**

  - o Establishes a dedicated funding pool for facility improvements, enhancing both the learning environment and competitive positioning.

4. Implement a Sibling Loyalty Program

- **Action:**

  - o Offer a tiered discount structure: full fee for the first child, 5% discount for the second child, and a 7% discount for the third child and beyond.

- **Impact:**

  - o Encourages families with multiple children to stay enrolled, reducing overall attrition by an estimated 15% and retaining at least 5 additional students per year.

Long-Term Recommendations (6–12 Months) – Systemic Upgrades

5. Launch a School Transport Service

- **Action:**

  - o Introduce a paid transportation service using 2 vans (10-seaters) operating on three strategic routes.

- o Set a fee around ₹400 per month, designed to break even at approximately 15 students per van.

- **Benefits:**

  - o Attracts new enrollments from families living 2 km or farther from the school.

  - o Generates an estimated net revenue of ₹96K per van per year after accounting for fuel and maintenance.

- **Impact:**

  - o Diversifies income and enhances accessibility, thereby boosting overall enrollment.

Digitize Fee Management

- **Action:**

  - o Implement a digital fee collection system using platforms like Razorpay, UPI portals, or a dedicated school app.

  - o Integrate SMS/email reminders to reduce late payments.

- **Outcomes:**

  - o Expected reduction in late payments by 40% and savings of approximately 15 staff hours per month in follow-up and record-keeping.

- **Impact:**

  - o Improves collection efficiency and cash flow while reducing administrative overhead.

Expected Outcomes Summary

Area	Intervention	1-Year Impact
Enrollment Growth	Pre-Nursery and Transport Service	+35 students (Approx. ₹2.45L revenue increase)
Cost Savings	Teacher Optimization	Savings of approximately ₹4L/year

Area	Intervention	1-Year Impact
Revenue Growth	Development Fees and Transport Service	Additional income of roughly ₹2.5L/year
Retention	Sibling Discounts	Reduction in attrition by 15%
Operational Efficiency	Digital Fee Management	40% reduction in late payments and 15 staff hours saved/month

PROJECT LINK - MAGADH INTERNATIONAL SCHOOL