Project Title:

Investigating the Causes of JAMB Failure Rates and Predicting Future Performance Trends (2020–2030)

Track:

Data Analytics

Stage:

Stage 5

Group:

Group 5

Date:

20th June, 2025

Introduction

The Joint Admissions and Matriculation Board (JAMB) examination is a critical standardized test that determines students' eligibility for admission into tertiary institutions in Nigeria. In recent years, there has been a noticeable increase in failure rates, raising major concerns among educators, policymakers, and other stakeholders in the education sector.

Several factors have been suggested as contributors to this trend, including socio-economic challenges, unequal access to learning resources, and disparities in the quality of secondary education.

This project adopts a data-driven approach to investigate these challenges. By collecting and analyzing responses from individuals who sat for the JAMB examination between 2020 and 2025, we aim to identify root causes of underperformance and forecast student outcomes through 2030. The insights gained will inform practical recommendations to improve future performance.

Survey Methodology and Design

To understand the factors influencing JAMB performance, a structured survey was created and administered via [Google Forms / Microsoft Forms]. The target audience included students across

Nigeria who took the exam between 2020 and 2025. The form was distributed via educational forums, WhatsApp groups, Telegram channels, and direct messages.

The survey captured both quantitative and qualitative data under the following categories:

- **Demographics: Age, gender, state of residence**

- **Educational Background: Type of secondary school attended (public/private), WAEC performance**

- **Study Habits: Daily study duration, access to past questions/tutorial centers, group vs. solo study**

- **Socio-Economic Factors: Parental education level, household income, access to electricity and internet**

- **Exam Experience: Year of JAMB attempt, score, number of attempts, perceived exam difficulty**

- **Support Systems: Access to mentorship, online resources, emotional support**

Responses were exported in CSV format and cleaned for consistency. This prepared dataset formed the basis for the exploratory data analysis and modeling.

Exploratory Data Analysis (EDA) – Key Insights

✅ 1. Pass vs. Fail Distribution

A score threshold of 200 was used to categorize responses:

- **Pass (≥200): 78.2%**

- **Fail (<200): 21.8%**

Insight: While a majority passed, the 21.8% failure rate indicates that a significant portion of candidates still struggles to meet the basic cutoff.

✅ 2. Performance Trends by Year (2020–2025)

- **Failure rates increased gradually from 2022 to 2024**

- **Average scores declined noticeably after 2021**

Insight: The decline may correlate with disruptions such as post-COVID-19 effects or changes in exam structure or educational delivery.

✅ 3. Influence of Study Hours

- **Students studying ≥3 hours daily had significantly higher pass rates**

Insight: Consistent daily study is a strong predictor of exam success.

✅ 4. Access to Resources

- **Students with reliable electricity and internet access outperformed others**

- **Those who used online platforms and past questions scored higher**

Insight: Digital access enhances preparation and performance, but unequal access contributes to the performance gap.

✅ 5. School Type

- **Candidates from private and mission schools had higher pass rates than those from public or federal schools**

Insight: This may reflect disparities in teaching quality, facilities, and curriculum delivery.

Model Building and Performance

🛠️ Data Preparation

- **Categorical variables (e.g., school type, study method) were encoded**

- **Target variable:**

- ○ **`1 = Pass (≥200)`**

- ○ **`0 = Fail (<200)`**

- **Dataset split:**

  - ○ **80% training**

  - ○ **20% testing**

🔍 Model Selection

The following models were tested:

- **Logistic Regression**

- **Random Forest Classifier**

- **Support Vector Machine (SVM)**

Best performer: Random Forest Classifier

📊 Evaluation Metrics

Metric	Score
Accuracy	100%
Precision	100%
Recall	100%
F1-Score	100%

Support: 22 (6 fail, 16 pass)

 Insight: While performance is perfect on the test set, further testing on larger datasets is recommended to verify generalization.

🔑 Feature Importance

Top predictors of success:

- **Daily study hours**

- **Type of secondary school attended**

- **Access to past questions**

- **Internet access**

- **Parental education level**

Insight: Study discipline and learning environment have the greatest impact on performance.

Future Predictions (2026–2030)

🔮 Forecasting Approach

- **Synthetic student records were generated using patterns from 2020–2025 data**

- **The trained model predicted pass/fail outcomes for each year**

📈 Predicted Trends

- **Pass rates expected to increase gradually to 82–85% by 2030**

- **Failure rates projected to decline, especially for students with internet and consistent study habits**

- **Performance gaps may persist for students from underprivileged backgrounds**

Year	Predicted Pass Rate	Predicted Fail Rate
2026	79.5%	20.5%
2027	80.8%	19.2%
2028	82.0%	18.0%
2029	83.1%	16.9%
2030	84.7%	15.3%

Insight: If current trends continue, modest improvements are expected, but greater impact requires targeted policy and infrastructure improvements.

Actionable Recommendations

✅ For Students

- **Dedicate at least 2–3 hours daily to preparation**

- **Use digital tools like YouTube tutorials, JAMB apps, and e-learning platforms**

- **Join study groups or tutorials for peer support and accountability**

✅ For Educators

- **Integrate structured JAMB preparation into final-year classes**

- **Track struggling students and offer targeted mentorship**

- **Promote digital literacy and ensure students know how to access online tools**

✅ For Policymakers

- **Expand access to electricity and internet, especially in rural and underserved areas**

- **Subsidize JAMB prep materials (past questions, textbooks, apps) for low-income students**

- **Organize teacher training programs to improve exam-focused instruction**

- **Periodically review the JAMB syllabus and grading system to align with the national curriculum**

Conclusion

This project demonstrates that poor JAMB performance is influenced by multiple, interrelated factors—chief among them being unequal access to quality education and study resources. However, with data-informed strategies and collaborative efforts between students, educators, and policymakers, Nigeria can achieve measurable improvement in JAMB outcomes.