In collaboration with X Education, a company grappling with subpar lead conversion rates at around 30%, this project aimed to devise a predictive model for enhancing the conversion process. With an ambitious objective of achieving an 80% lead conversion rate, the project unfolded in the following phases:

1. **Data Cleaning**: The initiative commenced by tackling missing values, dropping columns with excessive nulls, and imputing data using suitable strategies. Categorical columns were addressed based on their value distributions, while numerical categorical data were imputed using mode. Handling outliers, invalid entries, and low-frequency values ensured data quality.

2. **Exploratory Data Analysis (EDA)**: In-depth analysis of the dataset unearthed insights into the links between various attributes and the target variable. EDA unveiled pivotal variables like 'Lead Origin', 'Current Occupation', and 'Lead Source' influencing lead conversion likelihood.

3. **Data Preparation**: To ready the data for modeling, categorical features were transformed into dummy variables through one-hot encoding. The dataset was split into training and testing sets (70:30 ratio). Standardization was applied for feature scaling to ensure uniformity in scales. Highly correlated columns were removed, simplifying the dataset.

4. **Model Building and Selection**: Multiple models were constructed through Recursive Feature Elimination (RFE) and manual feature reduction, striving for an effective yet streamlined model. Model 7 emerged as the most promising after rigorous testing and variable reduction. The 17 variables within this model exhibited significance (p-values < 0.05) and lacked multicollinearity (VIF < 5).

5. **Model Evaluation and Optimal Cut-off Selection**: Performance evaluation encompassed confusion matrices and diverse cut-off points. A cut-off of 0.354 was chosen to strike a balance between accuracy, sensitivity, and specificity, aligning with the 80% conversion rate goal. Metrics focused on sensitivity-specificity to ensure alignment with the business objective.

6. **Predictions and Lead Scoring**: The final model, log_model7, forecasted lead conversion on both training and test datasets, maintaining consistent performance with accuracy metrics nearing 80%. Optimal cut-off-based lead scoring identified high-potential leads warranting assertive follow-up.

7. **Recommendations**: Informed by model insights, strategic recommendations were provided to augment lead conversion rates:
   - Allocate additional budget to promote the Welingak Website, leveraging its proficiency in attracting quality leads.
   - Introduce incentives or discounts for leads providing converting referrals, fostering lead recommendations.
   - Execute targeted marketing campaigns for working professionals, tapping into their elevated conversion potential owing to financial capacity and interest.

In summation, this project effectively addressed X Education's challenge of optimizing lead conversion rates. Employing data-driven insights, meticulous modeling, and thorough evaluation, actionable recommendations were formulated to propel the company toward achieving its ambitious conversion target.