Let's break down the **skills and Python libraries** needed for **descriptive** and **predictive analytics** separately, because the skill sets overlap but also have key differences.

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1. Descriptive Analytics

Goal: Summarize and visualize past data to understand what happened.

Skills Needed

- **Data Cleaning & Manipulation:** Handling missing values, duplicates, and inconsistencies.
- **Exploratory Data Analysis (EDA):** Understanding distributions, correlations, and trends.
- **Data Visualization:** Communicating insights clearly with charts and dashboards.
- **Basic Statistics:** Mean, median, mode, percentages, standard deviation, correlation.

Python Libraries

Task	Libraries
Data Manipulation	`pandas`, `numpy`
Data Visualization	`matplotlib`, `seaborn`, `plotly`
Basic Stats	`scipy.stats`, `numpy`
Reporting/Dashboards	`dash`, `streamlit`

Example Workflow:

1. Import data using `pandas`.
2. Clean it (handle missing values, remove duplicates).
3. Summarize with `groupby` and descriptive statistics.
4. Visualize trends using `seaborn` or `matplotlib`.

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2. Predictive Analytics

Goal: Forecast or predict future outcomes using historical data.

Skills Needed

- **All Descriptive Analytics Skills** (because you need clean, well-understood data first).
- **Machine Learning / Statistical Modeling:** Linear regression, classification, clustering, time-series forecasting.
- **Feature Engineering:** Selecting and transforming variables that improve predictive performance.
- **Model Evaluation:** Metrics like RMSE, accuracy, precision, recall, AUC.

Python Libraries

Task	Libraries
Machine Learning	`scikit-learn`, `xgboost`, `lightgbm`
Time Series Forecasting	`statsmodels`, `prophet`, `pmdarima`
Data Manipulation	`pandas`, `numpy`
Data Visualization	`matplotlib`, `seaborn`, `plotly`
Model Evaluation	`scikit-learn.metrics`

Example Workflow:

1. Preprocess data (`pandas` for cleaning, `numpy` for transformations).
2. Split data into training and testing sets.
3. Build predictive model (`scikit-learn` for regression/classification).
4. Evaluate performance (e.g., RMSE for regression, accuracy for classification).
5. Deploy predictions to guide business decisions.

Summary of Skill Overlap

Skill Area	Descriptive Analytics	Predictive Analytics
Data Cleaning	☐	☐
EDA	☐	☐
Visualization	☐	☐
Statistics	☐	☐ (plus advanced stats & probability)
Machine Learning	☐	☐
Forecasting	☐	☐

Skill Area	Descriptive Analytics	Predictive Analytics
Model Evaluation	☐	☐