ONLINE LEARNING DATA ANALYSIS REPORT

INTRODUCTION

Project Overview: This analysis explores online learning data from 2004 to 2021 across Spain, France and India, focusing on identifying trends and highest engagement years, and insights to inform educational policy and support data driven decisions.

OBJECTIVE

- Identify the trends in online learning engagement from 2004 to 2021 for each country
- Determine the year with the highest and lowest online learning data for Spain, France and India.
- Provide visualizations and insights to support and understanding of each country's growth in online learning over the years.

DATA PREPARATION

- **Data Description:** The dataset includes online learning data from 2004 to 2021 for several countries. This analysis focuses on Spain, France and India.
- **Data Cleaning:**
- Checked for null and NaN values to ensure data completeness.
- Checked for duplicate to ensure a more accurate result.
- Changed the datatype of the Month column to datetime for accurate time-based analysis.
- Created a Year column by extracting the year from the Month column, to be able for get more insights on the online learning growth of each country by year.

```
[111]: import pandas as pd

[ ]: data=pd.read_csv("Online_Learning_Data.csv")
     data
```

Viewing Columns

```
[113]: data.columns
```

```
[113]: Index(['Month', 'Argentina', 'Brazil', 'Colombia', 'France', 'Germany',
       'India', 'Indonesia', 'Iran', 'Italy', 'Mexico', 'Peru', 'Philippines',
       'Poland', 'Russia', 'South Africa', 'Spain', 'Turkey', 'Ukraine',
       'United Kingdom', 'United States of America'],
      dtype='object')
```

Checking for duplicates

```
[ ]: data.drop_duplicates()
```

Checking for Null Values

```
[ ]: data.isnull().sum()
```

Checking for Nan

```
[ ]: data.isna().sum()
```

Inserting a New Column (Year)

```
[116]: #inserting a new column
       data.insert(0,"Year",'')

[ ]: data

[118]: #Changing the month column datatype from Object to datetime
       data.Month=data["Month"].astype("datetime64[ns]")

[ ]: #checking data types
     data.dtypes

[120]: #Extacting year from month column and assigning it to the Year column
       data.Year=data["Month"].dt.to_period("Y")

[155]: data.head()
```

ANALYSIS

- **Trend Analysis:** Calculated total online learning engagement for each country to determine trends over time.
- **Peak and Low Points:** Identified the year with the highest and lowest engagement data for each country
- **Comparative Analysis:** Compared the trends between Spain, France and India to see variations in adoption patterns.

Getting the total data from 2004-2021 for each country

[122]:
```
countries= ["Spain","France","India"]
total = data.groupby("Year")[countries].sum()
```

[152]:
```
total
```

[152]:

Year	Spain	France	India
2004	275	235	529
2005	374	126	797
2006	140	183	636
2007	182	166	527
2008	270	109	461
2009	266	132	449
2010	261	98	365
2011	258	118	313
2012	405	92	284
2013	485	91	278
2014	352	78	254
2015	345	91	261
2016	333	112	188
2017	226	97	176
2018	284	100	135
2019	319	126	139
2020	546	149	247
2021	233	79	181

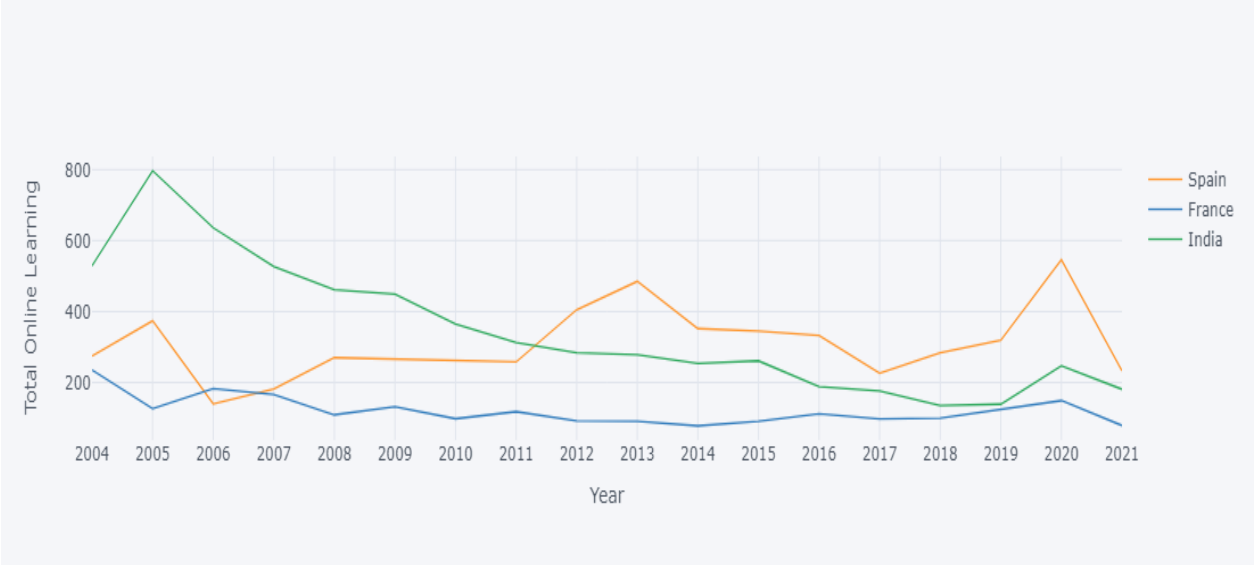
Checking for the Lowest and Highest year of Online Learning of Spain,France and India

[151]:
```
for country in countries:
    lowest_year=total[country].idxmin()
    highest_year=total[country].idxmax()
    lowest_value=total[country].min()
    highest_value=total[country].max()
    print(f"For {country}:")
    print(f" Lowest year:{lowest_year} with a sum of {lowest_value}")
    print(f" Highest year:{highest_year} with a sum of {highest_value}")
```

```
For Spain:
 Lowest year:2006 with a sum of 140
 Highest year:2020 with a sum of 546
For France:
 Lowest year:2014 with a sum of 78
 Highest year:2004 with a sum of 235
For India:
 Lowest year:2018 with a sum of 135
 Highest year:2005 with a sum of 797
```

VISUALIZATION

- Created an interactive line chart using plotly to visualize the trends from 2004 to 2021
- Each countries data is color-coded for clarity.



FINDINGS

Trends: The analysis shows different online learning engagement patterns across Spain, France and India from 2004 to 2021, with distinct peak and low years reflecting on various factors like internet accessibility, education policies, and technological growth in each country.

Insights:

- **Spain** demonstrated a steady growth pattern, with a peak in 2020 with a total engagement of 546, likely influenced by the global shift to online learning during the COVID-19 pandemic. The lowest year was 2006 with an engagement of 140.
- **France** had its highest engagement in 2004 with a total of 235, with a gradual decrease over time, as the lowest engagement year was in 2014 with a total of 78.

- **India** showed a high peak in 2005 with a total engagement of 797, and the lowest year in 2018 with a total of 135.

CONCLUSION

The analysis of online learning data from 2004 to 2021 for Spain, France and India shows distinct trends and engagement patters, emphasizing the influence of socio-economic factors and technological advancements on educational practices.

- Overall Insights:
  The varying peak and low years across these countries underline the importance of local context in shaping online learning trends. Factors such as government policies, technological infrastructure and cultural attitudes towards education may have played critical roles.

  These insights can inform educators and policymakers to better understand the landscape of online learning and devise strategies to enhance engagement in the future.

RECOMMENDATIONS

Based on the findings of this analysis, several recommendations can be made to enhance online learning engagement across Spain, France and India.

1. Invest in Infrastructure: Improve internet access and technological resources in underserved areas to enhance online learning opportunities.

2. Create policies that promote online education, including funding for digital initiatives and teacher training in technology.

3. Provide professional development for teachers to improve online teaching skills and engagement strategies.

4. Implement systems to assess online learning effectiveness regularly and refine programs based on data insights.

5. Develop engaging, high-quality online learning materials that cater to diverse learning styles and incorporate interactive elements.

6. Encourage ongoing education through accessible online courses for all age groups.