In [28]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

users_df = pd.read_csv("cleaned_datasets/users_details_dataset_cleaned.csv")
anime_df = pd.read_csv("cleaned_datasets/anime_dataset_cleaned.csv")
user_score_df = pd.read_csv("cleaned_datasets/user_scores_cleaned.csv")
```

EDA Ramachandran(50611273)

Hypotheses 1: What is the difference in the genres explored by users of different countries?

- This would help in getting a list of genres to suggest animes from to a user from a partiocular country

In [3]:

```
# Keep users that are in both CSVs
common_users = pd.merge(user_score_df, users_df, left_on=['user_id', 'Userna

user_score_df = user_score_df[user_score_df.set_index(['user_id', 'Username'
users_df = users_df[users_df.set_index(['Mal ID', 'Username']).index.isin(co
```

In [4]:

```
# Add column location
user_score_df['Location'] = user_score_df.user_id.map(users_df.set_index('Ma
user_score_df = user_score_df[~user_score_df["Location"].isna()]
user_score_df['Location'].unique()
```

Out[4]:

```
array(['United States', 'Australia', 'Norway', 'Canada', 'France',
       'Latvia', 'Sweden', 'Finland', 'Malaysia', 'Netherlands',
       'Belgium', 'Switzerland', 'Japan', 'United Kingdom', 'Lithuania',
       'Greece', 'Mexico', 'Singapore', 'Brazil', 'Iceland', 'Ireland',
       'Trinidad and Tobago', 'Croatia', 'Israel', 'Argentina', 'Germany',
       'Poland', 'Philippines', 'Portugal', 'Peru', 'Romania',
       'El Salvador', 'South Africa', 'Denmark', 'Venezuela', 'Mauritius',
       'Russia', 'Slovakia', 'Chile', 'Estonia', 'China', 'Puerto Rico',
       'Dominican Republic', 'Hungary', 'Bulgaria', 'Panama', 'Hong Kong',
       'Austria', 'Maldives', 'Italy', 'Turkey', 'Ukraine', 'Brunei',
       'Réunion', 'Antarctica', 'Iraq', 'Slovenia', 'New Zealand',
       'Armenia', 'Spain', 'India', 'Tunisia', 'Indonesia', 'Serbia',
       'Taiwan', 'Saudi Arabia', 'Kuwait', 'Malta', 'Bahrain', 'Jamaica',
       'Costa Rica', 'Paraguay', 'South Korea', 'Jersey', 'Bangladesh',
       'Thailand', 'Zimbabwe', 'Vietnam', 'Colombia', 'Oman', 'Cyprus',
       'Norfolk Island', 'United Arab Emirates', 'Ecuador', 'Belarus',
       'Cuba', 'Macau', 'Guadeloupe', 'Luxembourg', 'Jordan', 'Aruba',
       'Egypt', 'Isle of Man', 'Guam', 'Moldova', 'Honduras', 'Czechia',
       'Bahamas', 'Lebanon', 'Guatemala', 'Bolivia', 'Georgia',
       'Sri Lanka', 'Kazakhstan', 'North Korea', 'Uruguay', 'Montenegro',
       'Pakistan', 'Bermuda', 'Greenland', 'Guernsey', 'Qatar',
       'Åland Islands', 'Ivory Coast', 'Republic of the Congo',
       'Mauritania', 'Morocco', 'Angola', 'South Sudan', 'Nepal',
       'Suriname', 'South Georgia', 'Libya', 'Azerbaijan',
       'Faroe Islands', 'Kenya', 'Saint Lucia', 'Bosnia and Herzegovina',
       'Nauru', 'Seychelles', 'Grenada', 'Iran', 'Syria', 'Liechtenstein',
       'Algeria', 'Kyrgyzstan', 'Albania', 'Samoa', 'Mongolia',
       'French Guiana', 'Myanmar', 'Togo', 'Cayman Islands', 'Martinique',
       'Namibia', 'Bhutan', 'Barbados', 'Yemen', 'Uzbekistan',
       'French Polynesia', 'Madagascar', 'Nigeria', 'Afghanistan',
       'Nicaragua', 'Solomon Islands', 'Curaçao', 'Falkland Islands',
       'Dominica', 'New Caledonia', 'Ghana', 'Mozambique', 'Monaco',
       'Senegal', 'Cambodia', 'Chad', 'Palestine', 'Christmas Island',
       'Niue', 'Somalia', 'Haiti', 'Kosovo', 'Vatican City'], dtype=object)
```

In [5]:

```python
# Add column genre for anime's genre
user_score_df['Genres'] = user_score_df.anime_id.map(anime_df.set_index('ani
user_score_df = user_score_df[~user_score_df["Genres"].isna()]
```

In [6]:

```python
# group by countries to identify genres

def unique_genres(genres):
    return ', '.join(set(g.strip() for g in ', '.join(genres).split(',')))

# group by country and get unique genres
user_score_df_group = user_score_df.groupby(by="Location")[["Genres"]].agg(u
user_score_df_group

# Add column for genre counts
user_score_df_group["count"] = user_score_df_group["Genres"].apply(lambda x:
user_score_df_group.sort_values(by="count")
```

Out[6]:

	Genres	count
Location		
New Caledonia	Drama, Romance, Supernatural	3
Ghana	Fantasy, Drama, Action, Adventure	4
Kosovo	Comedy, Adventure, Action, Romance, Supernatur...	7
Madagascar	Comedy, Adventure, Romance, Supernatural, Sci-...	7
Mozambique	Comedy, Adventure, Action, Romance, Mystery, F...	7
...	...	...
Jersey	Hentai, Gourmet, Action, Ecchi, Award Winning,...	21
Japan	Hentai, Gourmet, Action, Ecchi, Award Winning,...	21
Jamaica	Hentai, Gourmet, Action, Award Winning, Ecchi,...	21
Brazil	Hentai, Gourmet, Action, Ecchi, Award Winning,...	21
Lebanon	Hentai, Gourmet, Action, Award Winning, Ecchi,...	21

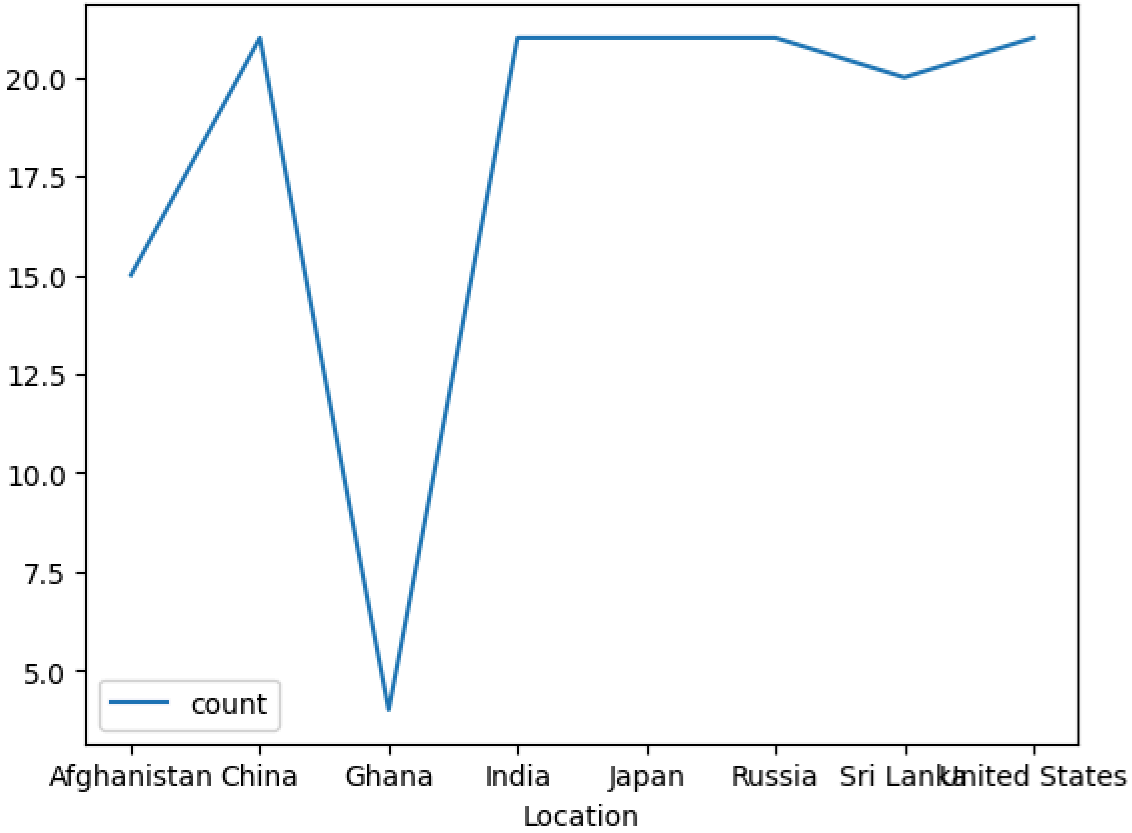
172 rows × 2 columns

In [9]:

```
user_score_df_group.reset_index(inplace=True)
user_score_df_group_filtered = user_score_df_group[user_score_df_group["Loca
user_score_df_group_filtered.plot(x="Location", y="count")
```

Out[9]:

```
<Axes: xlabel='Location'>
```



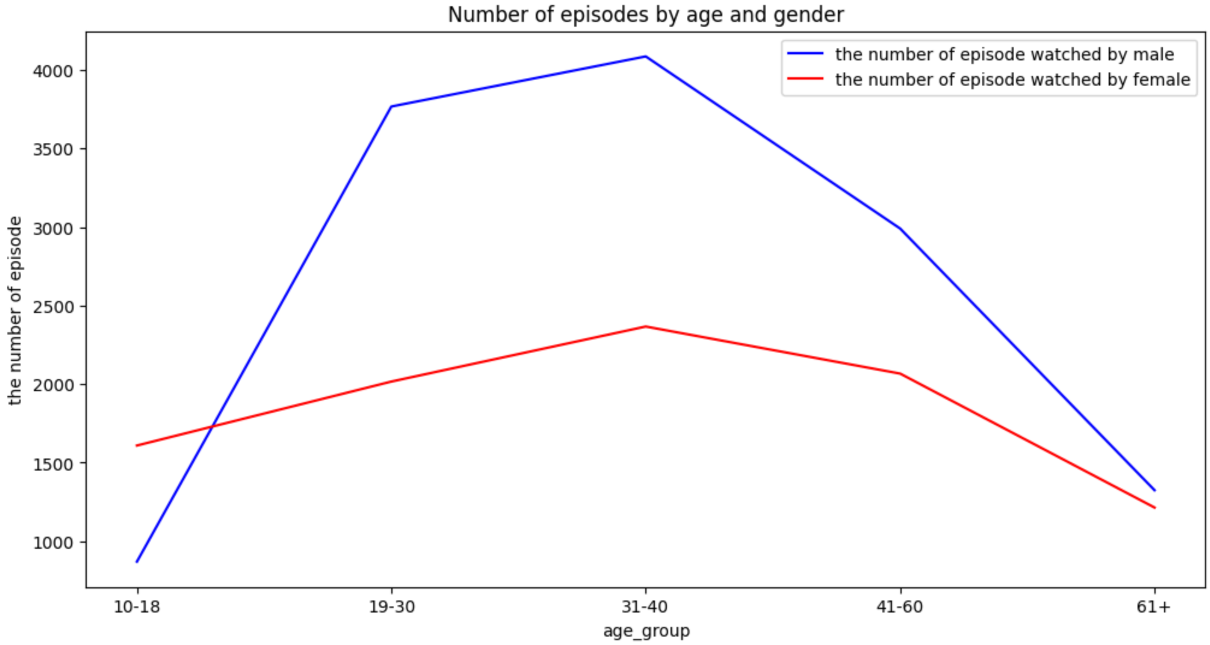
Inference: We can see that for different countries the number of genres explored is different. But it can also be seen that in most developed countries the genres explored is maximum, and for less developed countries it is low. So we can recommend animes from a variety of genre to a user from developed country, but from a niche genre for less countries.

Hypotheses 2: Is there a difference in episodes watched by a user based on gender and age?

In [41]:

```
users_df['Age'] = (pd.to_datetime("2024-01-01") - pd.to_datetime(users_df["E
age_boundaries = [10, 18, 30, 40, 60, float('inf')]
age_labels = ['10-18', '19-30', '31-40', '41-60', '61+']

users_df['age_group'] = pd.cut(users_df['Age'], bins=age_boundaries, labels=

users_df.dropna()
users_df = users_df[~users_df["Gender"].isna()]
user_df_male = users_df[users_df["Gender"]=="Male"]
user_df_female = users_df[users_df["Gender"]=="Female"]

users_male = user_df_male.groupby(by="age_group")["Episodes Watched"].mean()
users_female = user_df_female.groupby(by="age_group")["Episodes Watched"].me

users_male.reset_index(inplace=True)
users_female.reset_index(inplace=True)
plt.figure(figsize=(12, 6))
plt.plot(users_male['age_group'], users_male['Episodes Watched'], label="the
plt.plot(users_female['age_group'], users_female['Episodes Watched'], label=
plt.title("Number of episodes by age and gender")
plt.legend()
plt.xlabel("age_group")
plt.ylabel("the number of episode")
plt.show()
```

```
/var/folders/dz/fg9tl53x4y16ytgmdhwdt0kr0000gn/T/ipykernel_7026/2672423783.p
y:12: FutureWarning: The default of observed=False is deprecated and will be
changed to True in a future version of pandas. Pass observed=False to retain
current behavior or observed=True to adopt the future default and silence th
is warning.
  users_male = user_df_male.groupby(by="age_group")["Episodes Watched"].mean
().to_frame()
/var/folders/dz/fg9tl53x4y16ytgmdhwdt0kr0000gn/T/ipykernel_7026/2672423783.p
y:13: FutureWarning: The default of observed=False is deprecated and will be
changed to True in a future version of pandas. Pass observed=False to retain
current behavior or observed=True to adopt the future default and silence th
is warning.
  users_female = user_df_female.groupby(by="age_group")["Episodes Watched"].
mean().to_frame()
```



Inference: So, we can see that male and female have a similar tendency across age. But the number of anime episodes seen by male is much larger than females episode count. This can be used further when we have more info on relation between no. of episodes and animes and genre.