YouTube Project: Utilizing the YouTube Data API

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1. API Key Creation: Generating an API Key through the Google Cloud Console using my Google account.
2. Data Access Documentation: Referring to the documentation available on developers.google.com to comprehend accessing data from YouTube through the YouTube Data API.
3. Scraping, Analysis, and Visualization of Channel Statistics: Extracting data from various YouTube channels, including channel names, total video counts, overall views, and total subscribers. Conducting a comparative analysis of these channels to track their growth trajectories.
4. Video Data Extraction and Analysis: Extracting data from individual videos within specific channels, including video views, total comments, likes, and other relevant metrics. Following data extraction, conducting in-depth analysis and visualization.

In [ ]:
```
# Importing the libraries to use for working on the project.
from googleapiclient.discovery import build
import pandas as pd
import json
import seaborn as sns
import matplotlib.pyplot as plt
```

In [3]:
```
# API key retrieved from the Google Developers Console.
api_key = 'xXxXxXxXxX' # (here you use your own YouTube api key)

# Channels IDs obtained for analysis.
channel_ids = ['UC3t4HjrbrLD4vM13bc5Kgqg', # Projekte leicht gemacht
               'UCpNUYWW0kiqyh0j5Qy3aU7w', # Mısra Turp
               'UCq6XkhO5SZ66N04IcPbqNcw', # Keith Galli
               'UCzAF54cHk1ZO82af-8E3qOQ', # CareerFoundry
               'UCZe_ogqn3ZGC77M5gvk9dow', # KarriereFunk
               'UCLLw7jmFsvfIVaUFsLs8mlQ', # Luke Barousse
               'UC7cs8q-gJRlGwj4A8OmCmXg', # Alex the Analyst
               'UCDybamfye5An6p-j1t2YMsg'] # Mo Chen

# Set up the YouTube service to send requests to the API and retrieve the data f
youtube = build('youtube', 'v3', developerKey=api_key)
```

Channels Statistics

In [4]:
```
# Function created to retrieve channel details
def get_channel_stats_0(youtube, channel_ids):
    all_data = []
    request = youtube.channels().list(
              part='snippet,contentDetails,statistics',
              id= ','.join(channel_ids))
```

```
    response = request.execute()
    for i in range(len(response['items'])):
        data = dict(Channel_name = response['items'][i]['snippet']['title'],
                    Subscribers = response['items'][i]['statistics']['subscriber
                    Views = response['items'][i]['statistics']['viewCount'],
                    Total_videos = response['items'][i]['statistics']['videoCoun
                    Country = response['items'][i]['snippet']['country'])

        all_data.append(data)

    return all_data
```

In [5]:
```
# Dictionary checked in JSON format for improved readability
#stringpretty_json = json.dumps(channel_statistics, indent=4)
#get_channel_stats_0(youtube, channel_ids)
```

In [1]:
```
# jason formatter:
# https://jsonformatter.curiousconcept.com/
```

In [6]:
```
# Data imported into a DataFrame using Pandas.
channel_statistics = get_channel_stats_0(youtube, channel_ids)
channel_data = pd.DataFrame(channel_statistics)
channel_data
```

Out[6]:

	Channel_name	Subscribers	Views	Total_videos	Country
0	Luke Barousse	427000	21287039	156	US
1	Mo Chen	90000	3129943	108	GB
2	KarriereFunk	33700	6022805	762	DE
3	Mısra Turp	31100	1261436	143	NL
4	Alex The Analyst	737000	32076827	294	US
5	Projekte leicht gemacht	17000	1845056	75	DE
6	CareerFoundry	245000	12444171	371	DE
7	Keith Galli	214000	14784521	83	US

In [7]:
```
channel_data.dtypes
```

Out[7]:
```
Channel_name    object
Subscribers     object
Views           object
Total_videos    object
Country         object
dtype: object
```

In [8]:
```
# New column added to classify the channels into their respective channel types.
channel_data['Channel_Type'] = ['Education','Education', 'Education', 'Education
                                'Education','Education']
channel_data
```

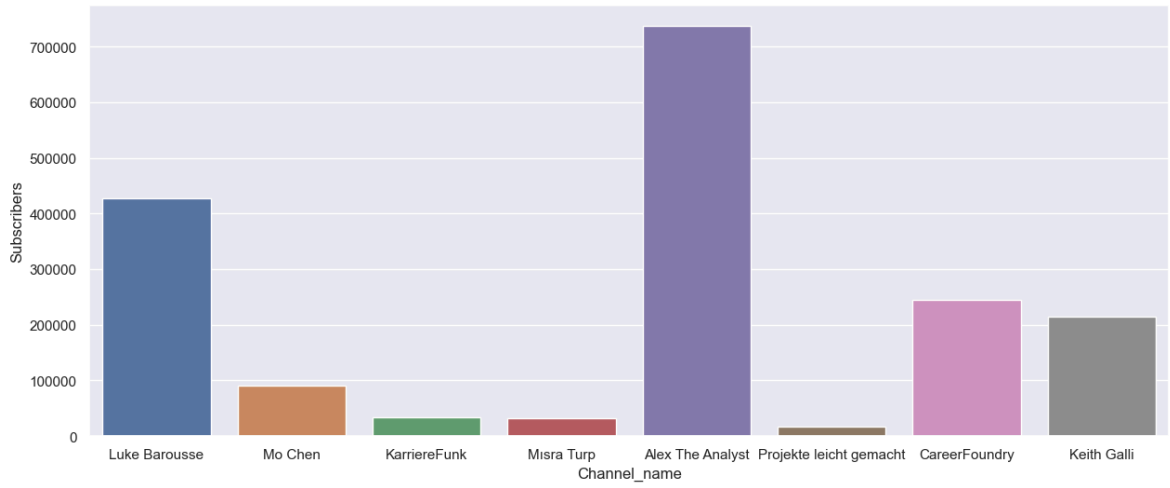
Out[8]:

	Channel_name	Subscribers	Views	Total_videos	Country	Channel_Type
0	Luke Barousse	427000	21287039	156	US	Education
1	Mo Chen	90000	3129943	108	GB	Education
2	KarriereFunk	33700	6022805	762	DE	Education
3	Mısra Turp	31100	1261436	143	NL	Education
4	Alex The Analyst	737000	32076827	294	US	Education
5	Projekte leicht gemacht	17000	1845056	75	DE	Education
6	CareerFoundry	245000	12444171	371	DE	Education
7	Keith Galli	214000	14784521	83	US	Education

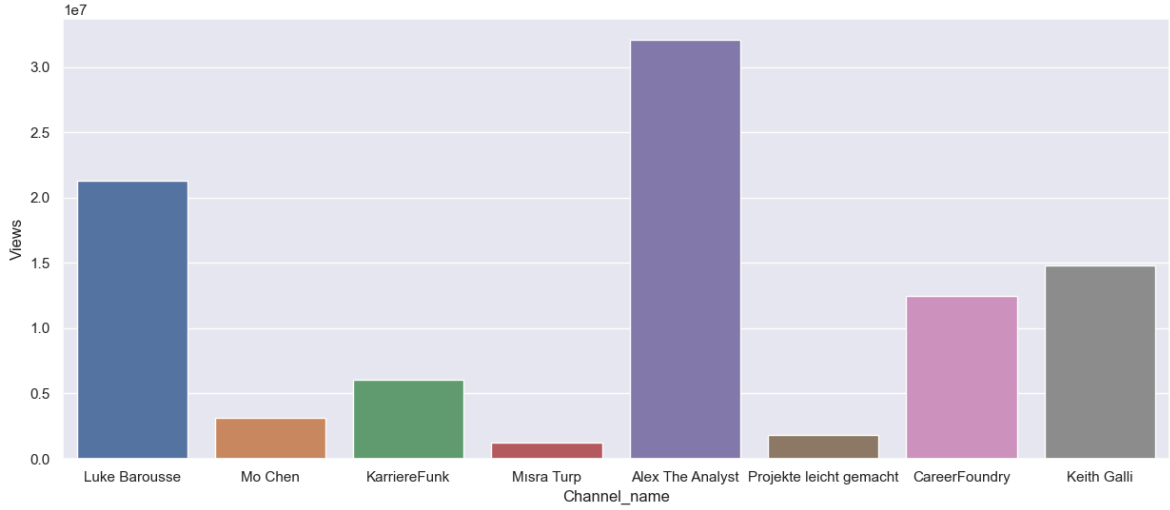
In [9]:
```
# Data types for Subscribers, Views, and Total Videos converted to integers for
channel_data['Subscribers'] = pd.to_numeric(channel_data['Subscribers'])
channel_data['Views'] = pd.to_numeric(channel_data['Views'])
channel_data['Total_videos'] = pd.to_numeric(channel_data['Total_videos'])
channel_data.dtypes
```

Out[9]:
```
Channel_name     object
Subscribers       int64
Views             int64
Total_videos      int64
Country          object
Channel_Type     object
dtype: object
```

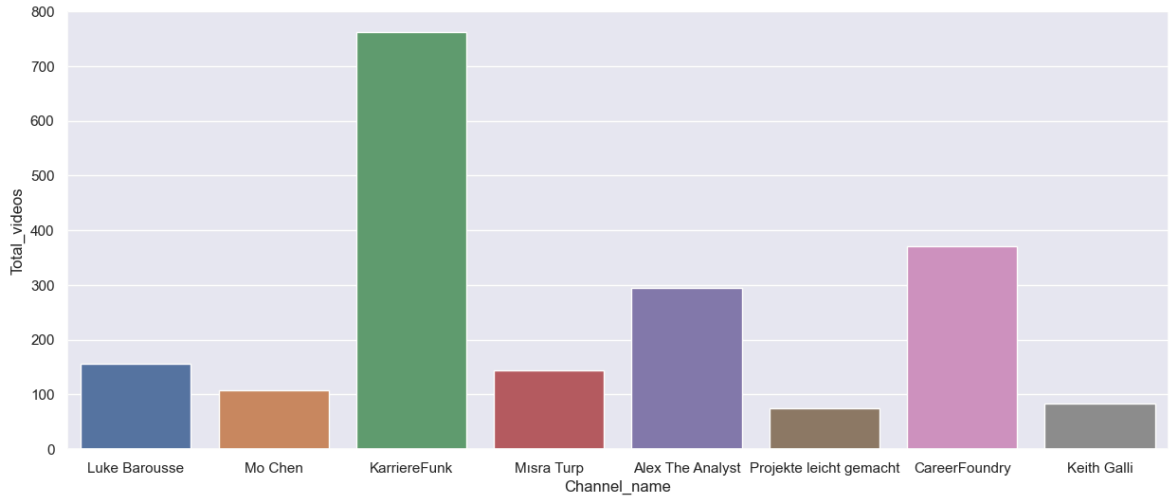
In [10]:
```
# Data visualized using Seaborn.
sns.set(rc={'figure.figsize': (15,6)})
ax = sns.barplot(data=channel_data, x='Channel_name', y='Subscribers', hue ='Cha
```



In [11]:
```
sns.set(rc={'figure.figsize': (15,6)})
ax = sns.barplot(data=channel_data, x='Channel_name', y='Views', hue ='Channel_n
```

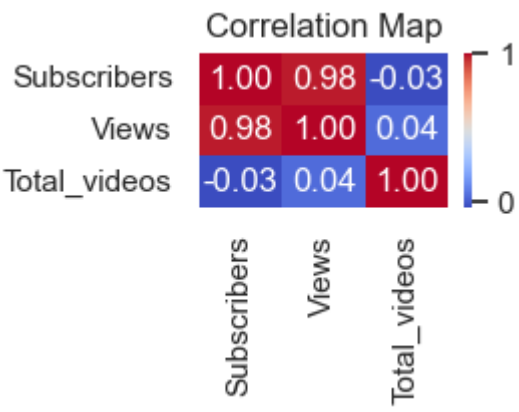


In [12]:
```
sns.set(rc={'figure.figsize': (15,6)})
ax = sns.barplot(data=channel_data, x='Channel_name', y='Total_videos', hue= 'Ch
#plt.xticks(rotation=45)Channel_name
```



In [13]:
```
# Correlation matrix generated for Subscribers, Views, and Total Videos
channel_data_int = channel_data.loc[:,['Subscribers','Views','Total_videos']]
correlation_matrix = channel_data_int.corr()

# Correlation heatmap visualized
plt.figure(figsize=(2,1))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Map')
plt.show()
```



In [14]:
```
correlation_matrix
```

Out[14]:

	Subscribers	Views	Total_videos
Subscribers	1.000000	0.978406	-0.033975
Views	0.978406	1.000000	0.040770
Total_videos	-0.033975	0.040770	1.000000

We observe no correlation between the number of videos and subscribers, as well as between views and the number of videos. However, a strong correlation is evident between Subscribers and Views on the correlation map.

In [16]:
```
channel_data_num2 = channel_data.select_dtypes(include="number")
channel_data_num2
```

Out[16]:

	Subscribers	Views	Total_videos
0	427000	21287039	156
1	90000	3129943	108
2	33700	6022805	762
3	31100	1261436	143
4	737000	32076827	294
5	17000	1845056	75
6	245000	12444171	371
7	214000	14784521	83

In [17]:
```
channel_data.columns
```

Out[17]:
```
Index(['Channel_name', 'Subscribers', 'Views', 'Total_videos', 'Country',
       'Channel_Type'],
      dtype='object')
```

In [18]:
```
# saving the dataset
channel_data.to_csv('meine_yt_kanaele.csv')
```

In [19]:
```
# Developing a new function to create a dataset, this time incorporating the pla
def get_channel_stats_1(youtube, channel_ids):
    all_data = []
    request = youtube.channels().list(
              part='snippet,contentDetails,statistics',
              id= ','.join(channel_ids))
    response = request.execute()
    for i in range(len(response['items'])):
        data = dict(Channel_name = response['items'][i]['snippet']['title'],
                    Subscribers = response['items'][i]['statistics']['subscriber
                    Views = response['items'][i]['statistics']['viewCount'],
                    Total_videos = response['items'][i]['statistics']['videoCoun
                    Country = response['items'][i]['snippet']['country'],
                    playlist_id = response['items'][i]['contentDetails']['relate
```

```
        all_data.append(data)

    return all_data
```

In [20]:
```
#get_channel_stats_1(youtube, channel_ids)
#jason formatter and validator = https://jsonformatter.curiousconcept.com/
```

In [21]:
```
# Utilizing Pandas to obtain a DataFrame with the new dataset
channel_statistics1 = get_channel_stats_1(youtube, channel_ids)
channel_data_1 = pd.DataFrame(channel_statistics1)
channel_data_1
```

Out[21]:

	Channel_name	Subscribers	Views	Total_videos	Country	pla
0	Keith Galli	214000	14784521	83	US	UUq6XkhO5SZ66N04IcP
1	Luke Barousse	427000	21287039	156	US	UULLw7jmFsvfIVaUFsI
2	KarriereFunk	33700	6022805	762	DE	UUZe_ogqn3ZGC77M5gv
3	Alex The Analyst	737000	32076827	294	US	UU7cs8q-gJRlGwj4A8Or
4	Mo Chen	90000	3129943	108	GB	UUDybamfye5An6p-j1t
5	Projekte leicht gemacht	17000	1845056	75	DE	UU3t4HjrbrLD4vM13bc
6	Mısra Turp	31100	1261436	143	NL	UUpNUYWW0kiqyh0j5Qy
7	CareerFoundry	245000	12444171	371	DE	UUzAF54cHk1ZO82af-8

In [22]:
```
# Selecting the playlist from the 'Projekte leicht gemacht' channel.
playlist_id = channel_data_1.loc[channel_data_1['Channel_name']=='Projekte leich
playlist_id
```

Out[22]:
```
'UU3t4HjrbrLD4vM13bc5Kgqg'
```

Video ids

In [23]:
```
# Function created to retrieve the video IDs from the playlist for the 'Projekte
def get_video_ids(youtube, playlist_id):

    request = youtube.playlistItems().list(
                part = 'contentDetails',
                playlistId = playlist_id,
                maxResults = 50)
    response = request.execute()

    video_ids = []

    for i in range(len(response['items'])):
        video_ids.append(response['items'][i]['contentDetails']['videoId'])

    next_page_token = response.get('nextPageToken')
    more_pages = True
```

```
    while more_pages:
        if next_page_token is None:
            more_pages = False
        else:
            request = youtube.playlistItems().list(
                        part = 'contentDetails',
                        playlistId = playlist_id,
                        maxResults = 50,
                        pageToken = next_page_token)
            response = request.execute()

            for i in range(len(response['items'])):
                video_ids.append(response['items'][i]['contentDetails']['videoId

            next_page_token = response.get('nextPageToken')

    return video_ids
```

In [24]:
```
video_ids = get_video_ids(youtube, playlist_id)
```

In [ ]:
```
# A list of video IDs for the channel 'Projekte leicht gemacht'.
video_ids
```

Details von Video

In [96]:
```
# Function created to retrieve details from videos of the 'Projekte leicht gemac
# and comments
def details_von_video(youtube, video_ids):

    all_video_stats = []

    for i in range(0, len(video_ids), 50):

        request = youtube.videos().list(
               part='snippet,statistics',
               id=','.join(video_ids[i:i+50]))
        response = request.execute()

        for video in response['items']:
           video_stats = dict(Title = video['snippet']['title'],
                              upload_date = video['snippet']['publishedAt'],
                              Views = video['statistics']['viewCount'],
                              Likes = video['statistics']['likeCount'],
                              Comments = video['statistics']['commentCount']
                              )
           all_video_stats.append(video_stats)

    return all_video_stats
```

In [97]:
```
# Creating a DataFrame with the new data using Pandas.
dt_video = details_von_video(youtube, video_ids)
videos_df = pd.DataFrame(dt_video)
videos_df
```

Out[97]:

	Title	upload_date	Views	Likes	Comments
0	"Projekte leicht gemacht" stellt sich vor!	2024-01-09T16:07:13Z	2283	37	1
1	👉 Der Design Thinking Prozess	2022-10-06T03:30:05Z	8548	112	4
2	❓ Was ist Design Thinking? Die Methodik einfac...	2022-09-29T03:30:24Z	5136	102	5
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07T03:30:16Z	26897	495	19
4	Ressourcenplanung und Kapazitätsplanung im Pro...	2022-03-10T04:30:02Z	20780	327	4
...	...	...	...	...	...
70	Das Pomodoro-Prinzip: Die wichtigsten Fragen u...	2020-05-14T06:15:00Z	3078	118	4
71	Morphologischer Kasten einfach erklärt [Kreati...	2020-05-14T06:15:00Z	34114	685	22
72	Was ist ein Projekt? (Teil 2) – Die Projektme...	2020-05-14T06:00:08Z	26514	747	16
73	Was ist ein Projekt? (Teil 1) – Eine anschaul...	2020-05-13T09:37:15Z	31835	648	9
74	Stakeholdermanagement - Eine kurze Zusammenfas...	2014-03-24T08:57:53Z	24408	176	8

75 rows × 5 columns

In [98]:
```
# Data types for upload date, Views, Likes, and Comments successfully converted
videos_df['upload_date'] = pd.to_datetime(videos_df['upload_date']).dt.date
videos_df['Views'] = pd.to_numeric(videos_df['Views'])
videos_df['Likes'] = pd.to_numeric(videos_df['Likes'])
videos_df['Comments'] = pd.to_numeric(videos_df['Comments'])
videos_df
```

Out[98]:

	Title	upload_date	Views	Likes	Comments
0	"Projekte leicht gemacht" stellt sich vor!	2024-01-09	2283	37	1
1	👉 Der Design Thinking Prozess	2022-10-06	8548	112	4
2	❓ Was ist Design Thinking? Die Methodik einfac...	2022-09-29	5136	102	5
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07	26897	495	19
4	Ressourcenplanung und Kapazitätsplanung im Pro...	2022-03-10	20780	327	4
...	...	...	...	...	...
70	Das Pomodoro-Prinzip: Die wichtigsten Fragen u...	2020-05-14	3078	118	4
71	Morphologischer Kasten einfach erklärt [Kreati...	2020-05-14	34114	685	22
72	Was ist ein Projekt? (Teil 2) – Die Projektme...	2020-05-14	26514	747	16
73	Was ist ein Projekt? (Teil 1) – Eine anschaul...	2020-05-13	31835	648	9
74	Stakeholdermanagement - Eine kurze Zusammenfas...	2014-03-24	24408	176	8

75 rows × 5 columns

In [99]:
```
# Top videos ranked by number of likes.
top_25_Videos = videos_df.sort_values(by='Likes', ascending=False).head(25)
top_25_Videos
```

Out[99]:

	Title	upload_date	Views	Likes	Comments
10	Kritischer Pfad, Gesamtpuffer und freier Puffe...	2021-12-02	118204	3220	83
12	Netzplan einfach erklärt: Ein Beispiel mit Vor...	2021-11-18	169352	3159	90
41	Projektmanagement-Grundlagen: Hier wird Projek...	2021-01-07	98190	1756	45
47	Konflikteskalation nach Glasl: Die 9 Eskalatio...	2020-11-05	108651	1735	41
45	Das Eisbergmodell der Kommunikation einfach er...	2020-11-19	77880	1289	39
5	Das Vier Ohren Modell: Praxisnahe Erklärung un...	2022-02-24	62959	1235	23
13	Netzplan vs. Gantt: Was brauchst du wirklich?	2021-11-04	48171	1235	45
15	Projektstrukturplan erstellen: Alles was du wi...	2021-10-07	62337	1202	36
39	Das Harvard-Konzept einfach erklärt: Das effek...	2021-01-28	62852	1178	26
23	Die SWOT Analyse einfach erklärt | Inklusive B...	2021-06-16	48848	1165	45
9	Organisationsformen im Projektmanagement: Matr...	2021-12-16	49284	1149	50
32	Das Johari-Fenster einfach erklärt - Praxisbei...	2021-03-25	47913	1067	29
35	Das Ishikawa Diagramm einfach erklärt: So funk...	2021-02-25	40002	861	13
7	Der PDCA Zyklus einfach erklärt – 2 anschaulic...	2022-01-27	43050	845	18
44	Die Nutzwertanalyse einfach erklärt | Einfache...	2020-11-26	38141	775	30
72	Was ist ein Projekt? (Teil 2) – Die Projektme...	2020-05-14	26514	747	16
19	Phasen der Teamentwicklung nach Tuckman: Alles...	2021-07-15	35211	689	12
71	Morphologischer Kasten einfach erklärt [Kreati...	2020-05-14	34114	685	22
73	Was ist ein Projekt? (Teil 1) – Eine anschaul...	2020-05-13	31835	648	9
16	Magisches Dreieck im Projekt einfach erklärt –...	2021-09-23	33674	628	22
37	Bedürfnispyramide Maslow einfach erklärt: Beis...	2021-02-11	34366	578	18

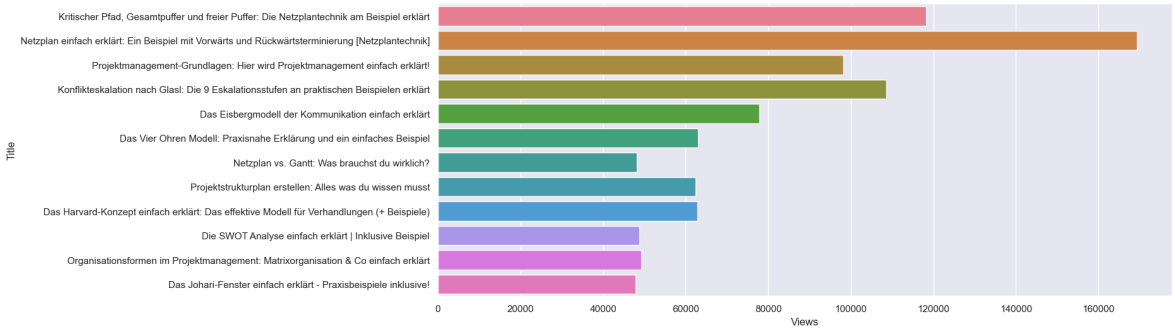
	Title	upload_date	Views	Likes	Comments
55	Ziele SMART formulieren – Die SMART-Formel ein...	2020-09-10	30208	567	17
64	Risikoanalyse einfach erklärt: Der Risikowert ...	2020-06-18	33050	536	21
28	Teamrollen Belbin: Wie du hochperformante Team...	2021-05-06	29173	508	5
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07	26897	495	19

In [100…
```
top_12_Videos = videos_df.sort_values(by='Likes', ascending=False).head(12)
top_12_Videos
```

Out[100…

	Title	upload_date	Views	Likes	Comments
10	Kritischer Pfad, Gesamtpuffer und freier Puffe...	2021-12-02	118204	3220	83
12	Netzplan einfach erklärt: Ein Beispiel mit Vor...	2021-11-18	169352	3159	90
41	Projektmanagement-Grundlagen: Hier wird Projek...	2021-01-07	98190	1756	45
47	Konflikteskalation nach Glasl: Die 9 Eskalatio...	2020-11-05	108651	1735	41
45	Das Eisbergmodell der Kommunikation einfach er...	2020-11-19	77880	1289	39
5	Das Vier Ohren Modell: Praxisnahe Erklärung un...	2022-02-24	62959	1235	23
13	Netzplan vs. Gantt: Was brauchst du wirklich?	2021-11-04	48171	1235	45
15	Projektstrukturplan erstellen: Alles was du wi...	2021-10-07	62337	1202	36
39	Das Harvard-Konzept einfach erklärt: Das effek...	2021-01-28	62852	1178	26
23	Die SWOT Analyse einfach erklärt | Inklusive B...	2021-06-16	48848	1165	45
9	Organisationsformen im Projektmanagement: Matr...	2021-12-16	49284	1149	50
32	Das Johari-Fenster einfach erklärt - Praxisbei...	2021-03-25	47913	1067	29

In [101…
```
ax1 = sns.barplot(x='Views', y='Title', hue= 'Title', data= top_12_Videos)
```



In [102…
```
videos_df
```

Out[102…

	Title	upload_date	Views	Likes	Comments
0	"Projekte leicht gemacht" stellt sich vor!	2024-01-09	2283	37	1
1	👉 Der Design Thinking Prozess	2022-10-06	8548	112	4
2	❓ Was ist Design Thinking? Die Methodik einfac...	2022-09-29	5136	102	5
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07	26897	495	19
4	Ressourcenplanung und Kapazitätsplanung im Pro...	2022-03-10	20780	327	4
...	...	...	...	...	...
70	Das Pomodoro-Prinzip: Die wichtigsten Fragen u...	2020-05-14	3078	118	4
71	Morphologischer Kasten einfach erklärt [Kreati...	2020-05-14	34114	685	22
72	Was ist ein Projekt? (Teil 2) – Die Projektme...	2020-05-14	26514	747	16
73	Was ist ein Projekt? (Teil 1) – Eine anschaul...	2020-05-13	31835	648	9
74	Stakeholdermanagement - Eine kurze Zusammenfas...	2014-03-24	24408	176	8

75 rows × 5 columns

In [104…
```
# A new column has been added to display the abbreviated month when each video w
videos_df['Month'] = pd.to_datetime(videos_df['upload_date']).dt.strftime('%b')
videos_df
```

Out[104…

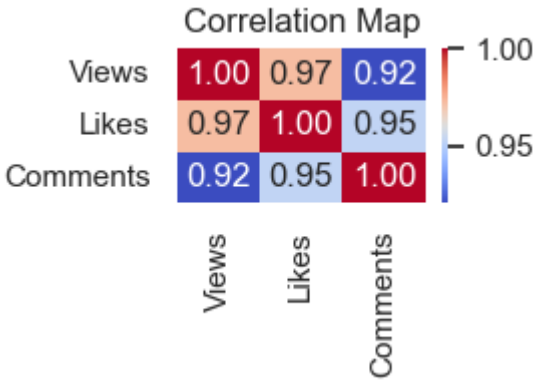
	Title	upload_date	Views	Likes	Comments	Month
0	"Projekte leicht gemacht" stellt sich vor!	2024-01-09	2283	37	1	Jan
1	👉 Der Design Thinking Prozess	2022-10-06	8548	112	4	Oct
2	❓ Was ist Design Thinking? Die Methodik einfac...	2022-09-29	5136	102	5	Sep
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07	26897	495	19	Apr
4	Ressourcenplanung und Kapazitätsplanung im Pro...	2022-03-10	20780	327	4	Mar
...	...	...	...	...	...	...
70	Das Pomodoro-Prinzip: Die wichtigsten Fragen u...	2020-05-14	3078	118	4	May
71	Morphologischer Kasten einfach erklärt [Kreati...	2020-05-14	34114	685	22	May
72	Was ist ein Projekt? (Teil 2) – Die Projektme...	2020-05-14	26514	747	16	May
73	Was ist ein Projekt? (Teil 1) – Eine anschaul...	2020-05-13	31835	648	9	May
74	Stakeholdermanagement - Eine kurze Zusammenfas...	2014-03-24	24408	176	8	Mar

75 rows × 6 columns

In [105…

```
# Correlation matrix generated for subscribers, views, and total videos.
videos_data_int = videos_df.loc[:,['Views','Likes','Comments']]
correlation_matrix1 = videos_data_int.corr()

# Visualization of the correlation heatmap
plt.figure(figsize=(2,1))
sns.heatmap(correlation_matrix1, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Map')
plt.show()
```



In [106…

```
correlation_matrix1
```

Out[106…

	Views	Likes	Comments
Views	1.000000	0.972084	0.920492
Likes	0.972084	1.000000	0.952776
Comments	0.920492	0.952776	1.000000

We observe a correlation between the number of likes and comments, as well as between views and the number of likes and comments. However, a strong correlation is evident between Subscribers and Views on the correlation map

In [115…

```
# A new column has been added to display the engagement rate for each video, ind
# giving a like or writing a comment
videos_df['Engagement_rate'] = ((videos_df['Likes'] + videos_df['Comments']) / v
videos_df.head(25)
```

Out[115...

	Title	upload_date	Views	Likes	Comments	Month	Engageme
0	"Projekte leicht gemacht" stellt sich vor!	2024-01-09	2283	37	1	Jan	1.
1	👉 Der Design Thinking Prozess	2022-10-06	8548	112	4	Oct	1.
2	❓ Was ist Design Thinking? Die Methodik einfac...	2022-09-29	5136	102	5	Sep	2.
3	ABC Analyse: Schrittweise am einfachen Beispie...	2022-04-07	26897	495	19	Apr	1.
4	Ressourcenplanung und Kapazitätsplanung im Pro...	2022-03-10	20780	327	4	Mar	1.
5	Das Vier Ohren Modell: Praxisnahe Erklärung un...	2022-02-24	62959	1235	23	Feb	1.
6	Weiterbildung als Erfolgsfaktor im Projekt [ak...	2022-02-10	1262	35	2	Feb	2.
7	Der PDCA Zyklus einfach erklärt – 2 anschaulic...	2022-01-27	43050	845	18	Jan	2.
8	Spannendes zum Stand des Projektmanagements [a...	2022-01-12	1914	38	4	Jan	2.
9	Organisationsformen im Projektmanagement: Matr...	2021-12-16	49284	1149	50	Dec	2.
10	Kritischer Pfad, Gesamtpuffer und freier Puffe...	2021-12-02	118204	3220	83	Dec	2.
11	Anordnungsbeziehungen im Netzplan: Die Feinhei...	2021-11-18	14747	295	8	Nov	2.
12	Netzplan einfach erklärt: Ein Beispiel mit Vor...	2021-11-18	169352	3159	90	Nov	1.
13	Netzplan vs. Gantt: Was brauchst du wirklich?	2021-11-04	48171	1235	45	Nov	2.
14	Das Cynefin Framework einfach erklärt: Wann br...	2021-10-21	14171	223	6	Oct	1.
15	Projektstrukturplan erstellen: Alles was du wi...	2021-10-07	62337	1202	36	Oct	1.
16	Magisches Dreieck im Projekt einfach erklärt –...	2021-09-23	33674	628	22	Sep	1.

	Title	upload_date	Views	Likes	Comments	Month	Engageme
17	Personal Kanban: Mehr schaffen und weniger ver...	2021-09-08	16650	410	11	Sep	2.
18	Programm oder Portfolio? – ultrakurz erklärt #...	2021-07-22	1746	34	6	Jul	2.
19	Phasen der Teamentwicklung nach Tuckman: Alles...	2021-07-15	35211	689	12	Jul	1.
20	Was sind Stakeholder? – ultrakurz erklärt #shorts	2021-07-08	2809	65	2	Jul	2.
21	Eat That Frog: Der einfache Zeitmanagement-Tri...	2021-07-01	7655	218	13	Jul	3.
22	SMARTe Ziele – ultrakurz erklärt #shorts	2021-06-24	1899	53	3	Jun	2.
23	Die SWOT Analyse einfach erklärt | Inklusive B...	2021-06-16	48848	1165	45	Jun	2.
24	Präventive und korrektive Maßnahmen – ultrakur...	2021-06-10	2069	63	0	Jun	3.

In [109…
```
average_engagement_rate = round(videos_df['Engagement_rate'].mean(),2)
average_engagement_rate
```

Out[109…
```
2.25
```

We observe that the channel 'Projekte leicht gemacht' has an average engagement rate of 2.25%. This indicates that 2.25% of the viewers who watch the channel's content interact by leaving a comment or giving a like to the videos.

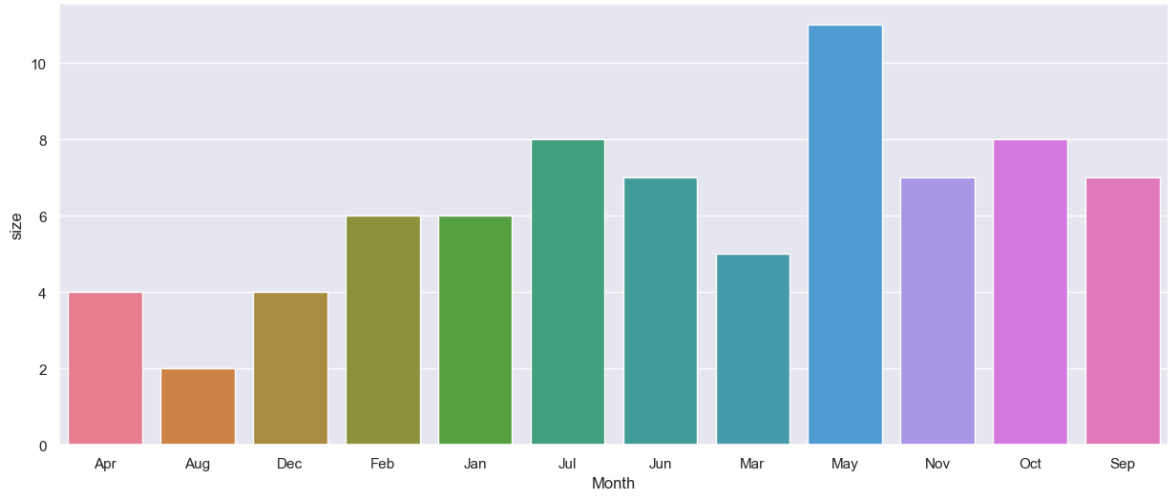
In [111…
```
# Grouping the data by month to obtain a table showing the number of videos publ
videos_per_mont = videos_df.groupby('Month', as_index=False).size()
videos_per_mont.sort_values('size',ascending=False)
```

Out[111…

	Month	size
8	May	11
5	Jul	8
10	Oct	8
6	Jun	7
9	Nov	7
11	Sep	7
3	Feb	6
4	Jan	6
7	Mar	5
0	Apr	4
2	Dec	4
1	Aug	2

In [112…

```
ax2 = sns.barplot(data=videos_per_mont,x='Month', y='size', hue='Month')
```



May, July, and October are the months when the channel uploads the most videos.

In [113…

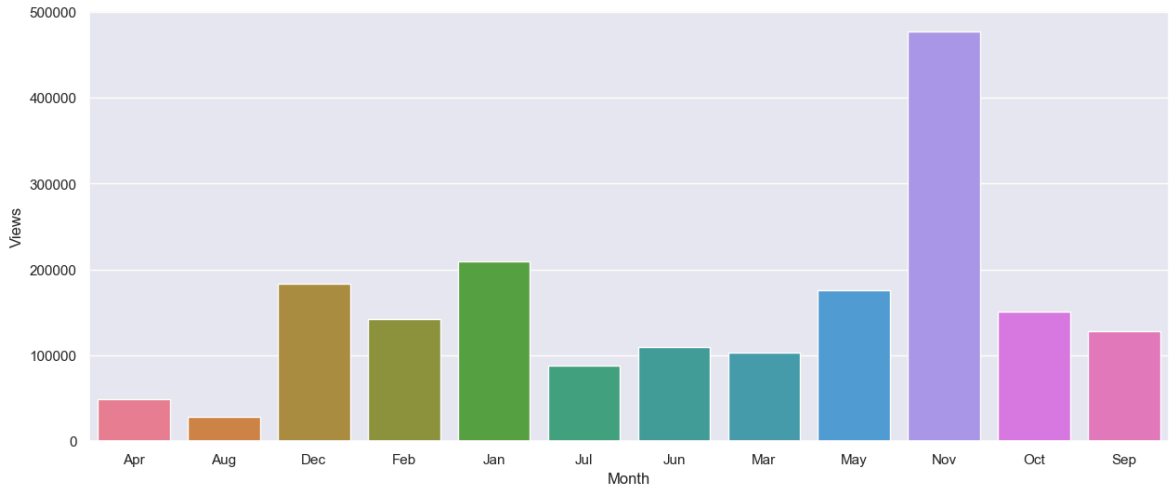
```
# Grouping the data by month to obtain a table showing the total views per month
views_per_month = videos_df.groupby('Month')['Views'].sum().reset_index()
views_per_month.sort_values('Views',ascending=False)
```

Out[113…

	Month	Views
9	Nov	476873
4	Jan	209637
2	Dec	183114
8	May	176139
10	Oct	150460
3	Feb	141937
11	Sep	128017
6	Jun	109477
7	Mar	103448
5	Jul	88309
0	Apr	49345
1	Aug	28722

In [114…

```
ax3 = sns.barplot(data= views_per_month, x='Month', y='Views', hue='Month')
```



While posting more videos in a specific month does not necessarily translate to more views. Also, there isn't a consistent correlation between the date when a video is uploaded and the number of views over time.

November, January, and December are the months with the most views.

In the case of November, the explanation for why it is significantly larger than the other months of the year is that a video was published specifically in November that seems to have caught the attention of the audience (Netzplan einfach erklärt: Ein Beispiel mit Vorwärts und Rückwärtsterminierung [Netzplantechnik] with 169,000 views)

In [ ]:

```
# saving the dataset
```

In [47]:

```
videos_df.to_csv('Video_Details(Projekte leicht gemacht).csv')
```