Problem statement:

We were given the following data sets each with a purpose, this datasets contains data of youtube, each data base has different titles and info, our task is to Extract this data, clean it analysis it and answer the following.

1. Perform Sentiment Analysis, and checkwhat are the most used positive words and negitive words
2. Check top 10 most usedemoji's in the comments.
3. Ceking for the most liked category
4. Find out whether audience is engaged or not

. Use UScomments dataset for analysing the sentiment analysis and emojy tasks

. Use the datasets in the additional data file for remaining task

1. Perform Sentiment Analysis, and check the most used positive words and negitive words in comments

Importing data for analysis

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df = pd.read_csv("UScomments.csv", error_bad_lines=False)  # Keeping error_bad_lines as false to skip the
                                                           # lines with improper data
```

```
C:\Users\PC\AppData\Local\Temp\ipykernel_10728\1061535121.py:1: FutureWarning: The error_bad_lines argument has been
deprecated and will be removed in a future version. Use on_bad_lines in the future.


  df = pd.read_csv("UScomments.csv", error_bad_lines=False)  # Keeping error_bad_lines as false to skip the
Skipping line 41589: expected 4 fields, saw 11
Skipping line 51628: expected 4 fields, saw 7
Skipping line 114465: expected 4 fields, saw 5

Skipping line 142496: expected 4 fields, saw 8
Skipping line 189732: expected 4 fields, saw 6
Skipping line 245218: expected 4 fields, saw 7

Skipping line 388430: expected 4 fields, saw 5

C:\Users\PC\AppData\Local\Temp\ipykernel_10728\1061535121.py:1: DtypeWarning: Columns (2,3) have mixed types. Specify
dtype option on import or set low_memory=False.
  df = pd.read_csv("UScomments.csv", error_bad_lines=False)  # Keeping error_bad_lines as false to skip the
```

Need to clean data while checking for duplicate and empty rows

In [3]:
```
df.info()  #checking the details of the dataset
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 691400 entries, 0 to 691399
Data columns (total 4 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   video_id      691400 non-null  object
 1   comment_text  691375 non-null  object
 2   likes         691400 non-null  object
 3   replies       691400 non-null  object
dtypes: object(4)
memory usage: 21.1+ MB
```

In [4]:
```
df.isnull().sum()   # checking for total null values per column
```

Out[4]:
```
video_id         0
comment_text    25
likes            0
replies          0
dtype: int64
```

In [5]:
```
df.dropna(inplace=True)    #dropping all the rows with null values
```

In [6]:
```
df.isnull().sum()         # verifying whether we got any null values or not
```

Out[6]:
```
video_id        0
comment_text    0
likes           0
replies         0
dtype: int64
```

In [7]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 691375 entries, 0 to 691399
Data columns (total 4 columns):
 #   Column        Non-Null Count   Dtype 
---  ------        --------------   ----- 
 0   video_id      691375 non-null  object
 1   comment_text  691375 non-null  object
 2   likes         691375 non-null  object
 3   replies       691375 non-null  object
dtypes: object(4)
memory usage: 26.4+ MB
```

In [8]:
```
df.head()
```

Out[8]:

	video_id	comment_text	likes	replies
0	XpVt6Z1Gjjo	Logan Paul it's yo big day !!!!!	4	0
1	XpVt6Z1Gjjo	I've been following you from the start of your...	3	0
2	XpVt6Z1Gjjo	Say hi to Kong and maverick for me	3	0
3	XpVt6Z1Gjjo	MY FAN . attendance	3	0
4	XpVt6Z1Gjjo	trending 😉	3	0

In [9]:
```
from textblob import TextBlob as tb  # importing textblob to serigate the positive and negitive comments
```

polarity will give us values between -1(negitive) to 0(neutral) to 1(Positive) values based on the polarity we can confirm whether a comment is positive or not

In [10]:
```
tb("Logan Paul it's yo big day !!!!!").sentiment.polarity   # Testing textBlob
```

Out[10]:
```
0.0
```

In [11]:
```
polarity = []
for i in df["comment_text"]:
    polarity.append(tb(i).sentiment.polarity)  # Appending polarity values of each comment in to a list
```

In [13]:
```
polarity
```

Out[13]:
```
[0.0,
 0.0,
 0.0,
 0.0,
 0.0,
 0.0,
 0.0,
 0.0,
 0.0,
 0.8,
 -0.13571428571428573,
 0.0,
 0.2,
 -0.023333333333333352,
 0.5,
 0.0,
 0.8,
 -0.2916666666666667,
 0.0,
 0.25,
```

In [14]:
```
df["polarity"]=polarity
```

In [15]:
```
positive_comment_filter = df['polarity']==1   # seperating the comments which are positive
```

In [16]:
```
negitive_comment_filter = df['polarity']==-1   # seperating the comments which are negitive
```

In [17]:
```
import wordcloud
from wordcloud import STOPWORDS, WordCloud     # importing wordcloud to seperate the words which dosent have sentiment
```

In [18]:
```
set(STOPWORDS)
```

```
 'each',
 'else',
 'ever',
 'few',
 'for',
 'from',
 'further',
 'get',
 'had',
 "hadn't",
 'has',
 "hasn't",
 'have',
 "haven't",
 'having',
 'he',
 "he'd",
 "he'll",
 "he's",
 'hence'
```

In [19]:
```
positive_comment = df[positive_comment_filter]   # Getting comments which are positive
```

In [20]:
```
negitive_comment = df[negitive_comment_filter]   # Getting comments which are positive
```

In [21]:
```
total_positive_comment = ' '.join(positive_comment['comment_text'])   # Converting all the comments to strings
```

In [22]:
```
total_negitive_comment = ' '.join(negitive_comment['comment_text'])   # Converting all the comments to Strings
```

In [23]:
```
wordcloud = WordCloud(stopwords=set(STOPWORDS)).generate(total_positive_comment)  # generating wordcloud with all the
```

In [24]:
```
plt.imshow(wordcloud)      # showing wordcloud
plt.axis(False)
```

Out[24]:
```
(-0.5, 399.5, 199.5, -0.5)
```

Here are the most used positive words in a poster

In [25]:
```
wordcloud = WordCloud(stopwords=set(STOPWORDS)).generate(total_negitive_comment) # generating wordcloud with all the p
```

In [26]:
```
plt.imshow(wordcloud)
plt.axis(False)
```

Out[26]:
```
(-0.5, 399.5, 199.5, -0.5)
```

Here are the most used negitive words in a poster

2. Check top 10 most usedemoji's in the comments.

In [27]:
```
import emoji               # importing the emoji to handle emojis
from emoji import EMOJI_DATA
```

In [28]:
```
emo = []
for i in df['comment_text']:                    # seperating all the emojis from comments
    if i in emoji.EMOJI_DATA:
        emo.append(i)
```

In [29]:
```
from collections import Counter
```

In [30]:
```
a = []
for i in range(10):                                    # Seperating top 10 repeted emoji's(just fig)
    a.append(Counter(emo).most_common(10)[i][0])
```

In [31]:
```
a           # Most used emoji's
```

Out[31]: ['💔', '❤', '👍', '😍', '😂', '♥', '💔', '💜', '🔥', '🐍']

In [32]:
```
c = []
for i in range(10):                                   # Seperating top 10 repeted emoji's(Just counts)
    c.append(Counter(emo).most_common(10)[i][1])
```

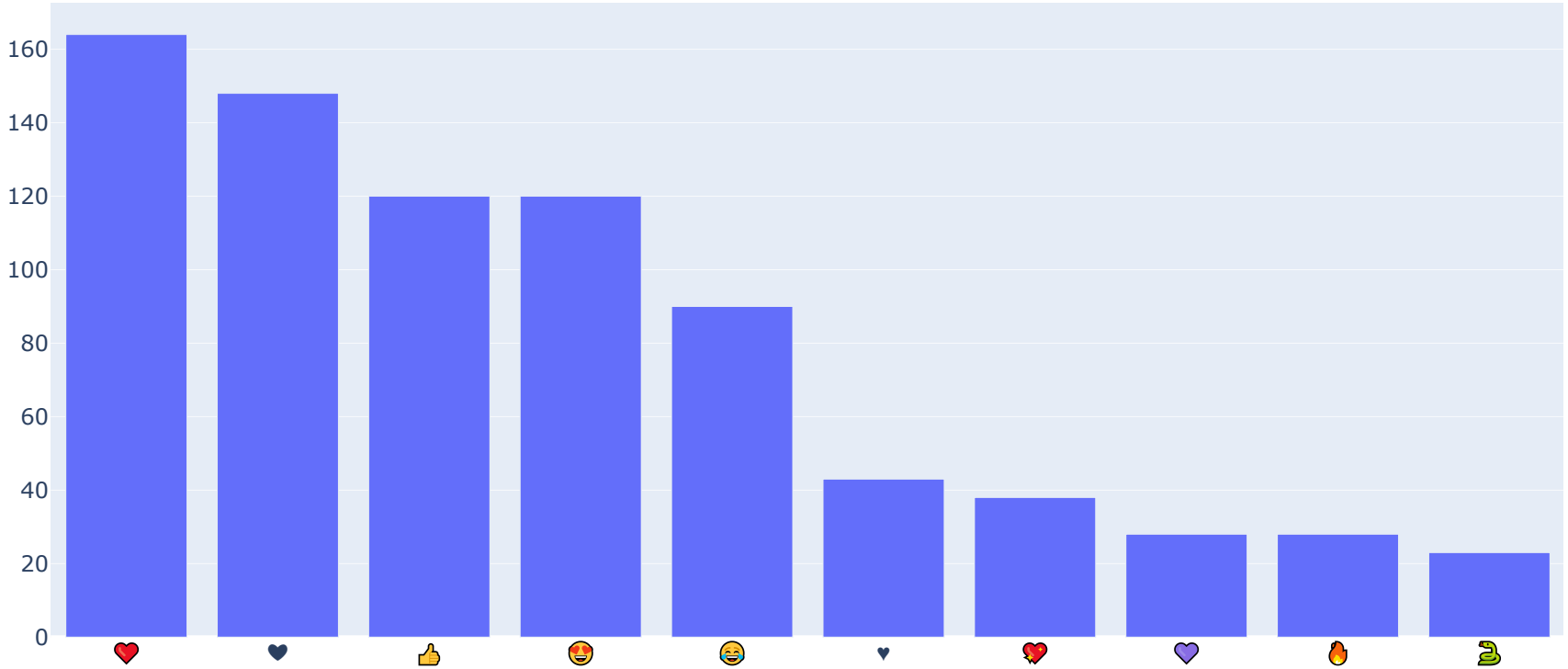
In [33]:
```
c
```

Out[33]: [164, 148, 120, 120, 90, 43, 38, 28, 28, 23]

In [34]:
```
import plotly.graph_objs as go
from plotly.offline import iplot              # importing plotty to plot a bar graph to compare the counts of top 10 em
```

In [35]:
```
trace = go.Bar(x=a, y=c)
```

In [36]:
```
iplot([trace])
```



Here is a report of top 10 most used emoji's

Need to use a different data set

data is in CSV formatt, but the category name is given in a different json format

3. cheking for the most liked category

In [1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
```

In [2]:
```
%matplotlib inline
```

In [3]:
```
import os    # Imported the OS to handle files
```

In [5]:
```
files = os.listdir(r'C:\Users\PC\Desktop\Data Analitys project\youtube comment\additional_data')   # File path where datasets are store
```

In [6]:
```
files      # All the files in the directory
```

Out[6]:
```
['CAvideos.csv',
 'CA_category_id.json',
 'DEvideos.csv',
 'DE_category_id.json',
 'FRvideos.csv',
 'FR_category_id.json',
 'GBvideos.csv',
 'GB_category_id.json',
 'INvideos.csv',
 'IN_category_id.json',
 'JPvideos.csv',
 'JP_category_id.json',
 'KRvideos.csv',
 'KR_category_id.json',
 'MXvideos.csv',
 'MX_category_id.json',
 'RUvideos.csv',
 'RU_category_id.json',
 'USvideos.csv',
 'US_category_id.json']
```

In [13]:
```
files_csv = []                    # Making the list of all the csv files

for i in files:
    if '.csv' in i:
        files_csv.append(i)
```

In [14]:
```
files_csv            # All the CSV files are now under a different list
```

Out[14]:
```
['CAvideos.csv',
 'DEvideos.csv',
 'FRvideos.csv',
 'GBvideos.csv',
 'INvideos.csv',
 'JPvideos.csv',
 'KRvideos.csv',
 'MXvideos.csv',
 'RUvideos.csv',
 'USvideos.csv']
```

https://docs.python.org/3/library/codecs.html (https://docs.python.org/3/library/codecs.html) #standard-encodings%C2%B6

In [16]:
```
full_df = pd.DataFrame()                          # Creating a dataset out of all the CSV files
path=r'C:\Users\PC\Desktop\Data Analitys project\youtube comment\additional_data'
for i in files_csv:
    temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
    full_df = pd.concat([full_df, temp_df], ignore_index=True)
```

```
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
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C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
be removed in a future version. Use on_bad_lines in the future.


  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
C:\Users\PC\AppData\Local\Temp\ipykernel_8800\957244681.py:4: FutureWarning: The error_bad_lines argument has been deprecated and will
```

```
be removed in a future version. Use on_bad_lines in the future.

  temp_df = pd.read_csv(path + '/' + i, encoding = 'iso-8859-1', error_bad_lines=False)
```

In [17]:
```
full_df              # Concatinating all the datasets together
```

Out[17]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	views	likes	disl
0	n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	17158579	787425	43
1	0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	1014651	127794	
2	5qpjK5DgCt4	17.14.11	Racist Superman | Rudy Mancuso, King Bach & Le...	Rudy Mancuso	23	2017-11-12T19:05:24.000Z	racist superman|"rudy"|"mancuso"|"king"|"bach"...	3191434	146035	5
3	d380meD0W0M	17.14.11	I Dare You: GOING BALD!?	nigahiga	24	2017-11-12T18:01:41.000Z	ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"...	2095828	132239	
4	2Vv-BfVoq4g	17.14.11	Ed Sheeran - Perfect (Official Music Video)	Ed Sheeran	10	2017-11-09T11:04:14.000Z	edsheeran|"ed sheeran"|"acoustic"|"live"|"cove...	33523622	1634130	21
...	...	...	...	...	...	...	...	...	...	
375937	BZt0qjTWNhw	18.14.06	The Cat Who Caught the Laser	AaronsAnimals	15	2018-05-18T13:00:04.000Z	aarons animals|"aarons"|"animals"|"cat"|"cats"...	1685609	38160	
375938	1h7KV2sjUWY	18.14.06	True Facts : Ant Mutualism	zefrank1	22	2018-05-18T01:00:06.000Z	[none]	1064798	60008	
375939	D6Oy4LfoqsU	18.14.06	I GAVE SAFIYA NYGAARD A PERFECT HAIR MAKEOVER ...	Brad Mondo	24	2018-05-18T17:34:22.000Z	I gave safiya nygaard a perfect hair makeover ...	1066451	48068	
375940	oV0zkMe1K8s	18.14.06	How Black Panther Should Have Ended	How It Should Have Ended	1	2018-05-17T17:00:04.000Z	Black Panther|"HISHE"|"Marvel"|"Infinity War"|...	5660813	192957	2

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	views	likes	disl
375941	ooyjaVdt-jA	18.14.06	Official Call of DutyÂ®: Black Ops 4 â□□Â Mult...	Call of Duty	20	2018-05-17T17:09:38.000Z	call of duty|"cod"|"activision"|"Black Ops 4"	10306119	357079	21

375942 rows × 16 columns

In [48]:
```
full_df['category_id'].unique()            # Checking for all the unique categors
```

Out[48]:
```
array([10, 23, 24, 25, 22, 26,  1, 28, 20, 17, 29, 15, 19,  2, 27, 43, 30,
       44], dtype=int64)
```

In [27]:
```
json_df = pd.read_json(r'C:\Users\PC\Desktop\Data Analitys project\youtube comment\additional_data/US_category_id.json')
```

In [42]:
```
json_df['items'][0]['snippet']['title']    # Using this logic to extract all the category names
```

Out[42]:
```
'Film & Animation'
```

In [43]:
```
category_id = {}
for i in json_df['items']:
    category_id[int(i['id'])] = i['snippet']['title']             # Using a Dictinory to pair the category id and the category name in
```

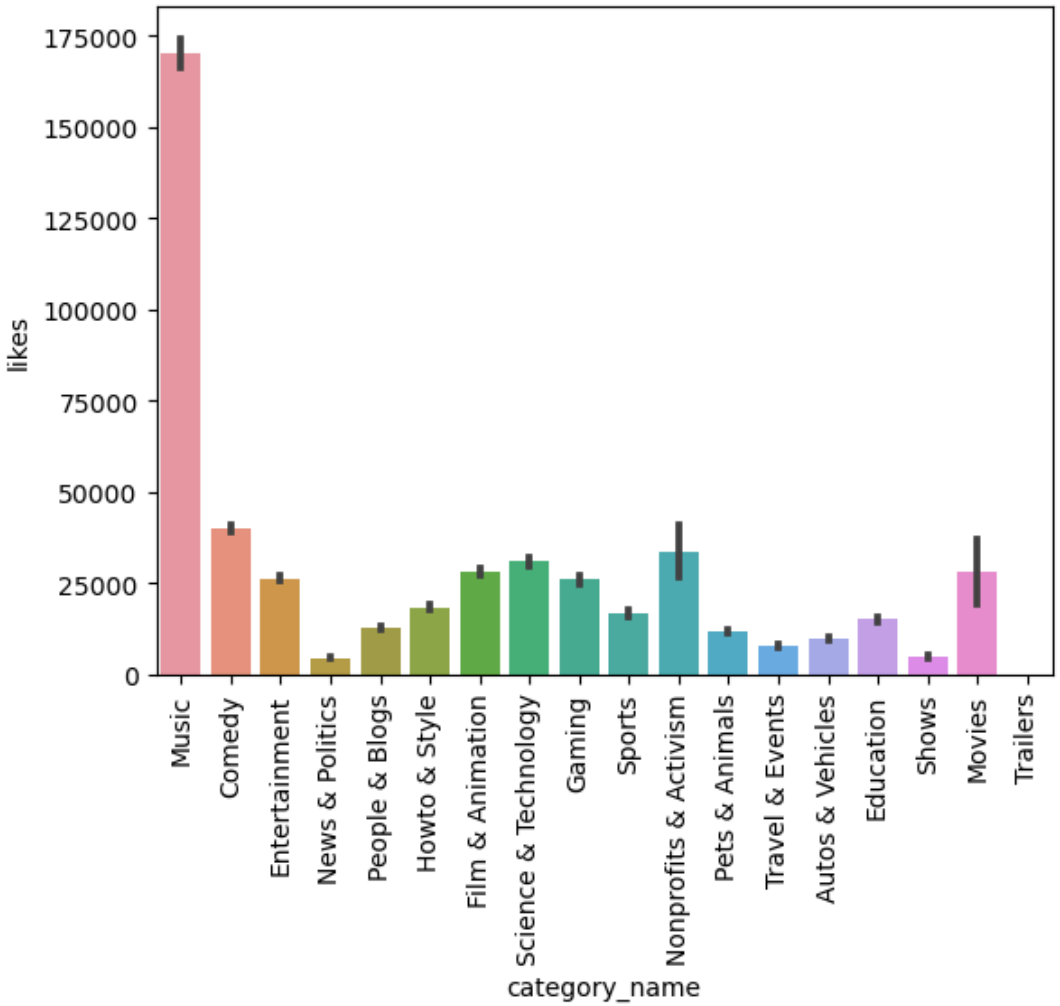
In [44]:
```
category_id     # Here are the category id's and there names
```

Out[44]:
```
{1: 'Film & Animation',
 2: 'Autos & Vehicles',
 10: 'Music',
 15: 'Pets & Animals',
 17: 'Sports',
 18: 'Short Movies',
 19: 'Travel & Events',
 20: 'Gaming',
 21: 'Videoblogging',
 22: 'People & Blogs',
 23: 'Comedy',
 24: 'Entertainment',
 25: 'News & Politics',
 26: 'Howto & Style',
 27: 'Education',
 28: 'Science & Technology',
 29: 'Nonprofits & Activism',
 30: 'Movies',
 31: 'Anime/Animation',
 32: 'Action/Adventure',
 33: 'Classics',
 34: 'Comedy',
 35: 'Documentary',
 36: 'Drama',
 37: 'Family',
 38: 'Foreign',
 39: 'Horror',
 40: 'Sci-Fi/Fantasy',
 41: 'Thriller',
 42: 'Shorts',
 43: 'Shows',
 44: 'Trailers'}
```

In [50]:
```
full_df['category_name'] = full_df['category_id'].map(category_id)
```

In [63]:
```
sns.barplot(data = full_df, x='category_name', y='likes')
plt.xticks(rotation='vertical')
```

Out[63]:
```
(array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
        17]),
 [Text(0, 0, 'Music'),
  Text(1, 0, 'Comedy'),
  Text(2, 0, 'Entertainment'),
  Text(3, 0, 'News & Politics'),
  Text(4, 0, 'People & Blogs'),
  Text(5, 0, 'Howto & Style'),
  Text(6, 0, 'Film & Animation'),
  Text(7, 0, 'Science & Technology'),
  Text(8, 0, 'Gaming'),
  Text(9, 0, 'Sports'),
  Text(10, 0, 'Nonprofits & Activism'),
  Text(11, 0, 'Pets & Animals'),
  Text(12, 0, 'Travel & Events'),
  Text(13, 0, 'Autos & Vehicles'),
  Text(14, 0, 'Education'),
  Text(15, 0, 'Shows'),
  Text(16, 0, 'Movies'),
  Text(17, 0, 'Trailers')])
```



Here is the most liked category's, as per the above graph Music is the most liked Category

4. Find out whether audience is engaged or not

In order to find whether the audiance are engaged or not let's find out the like and dislike percentage from the total views

In [66]:
```
full_df.head(2)
```

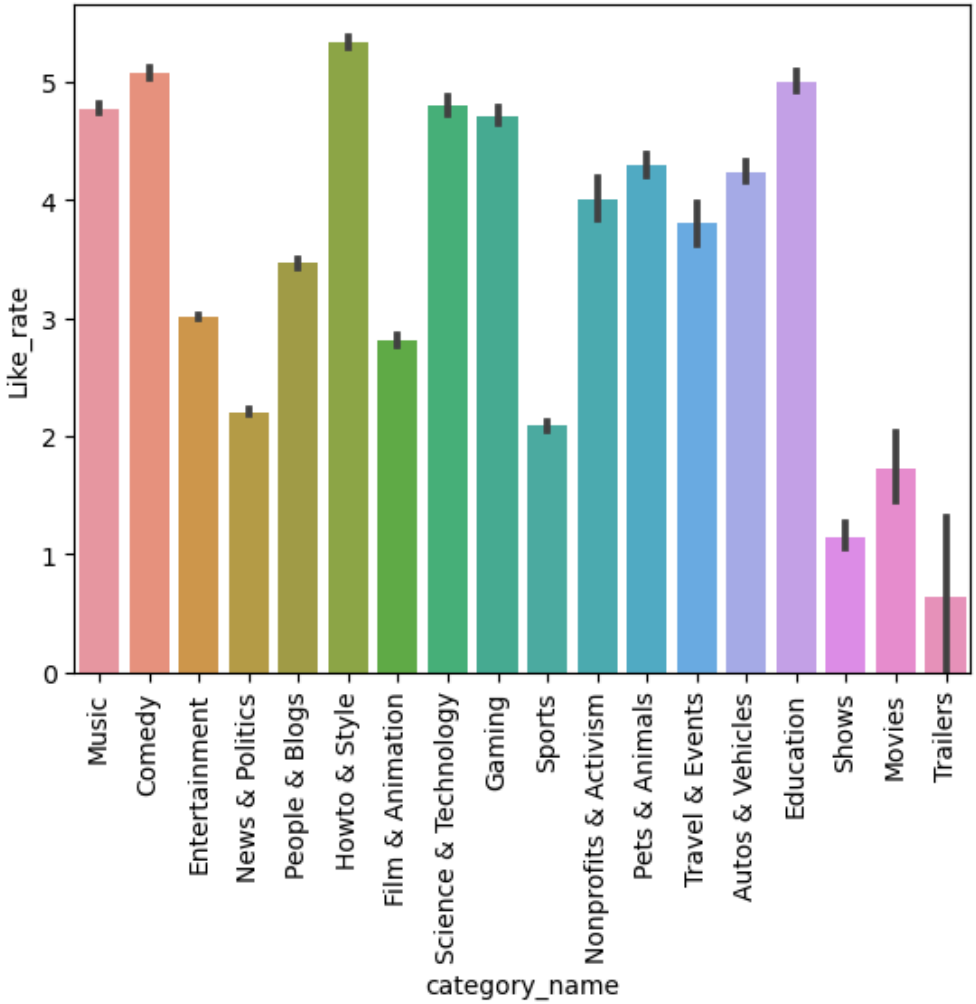
Out[66]:

video_id	trending_date	title	channel_title	category_id	publish_time	tags	views	likes	dislikes	comment
n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	17158579	787425	43420	
0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	1014651	127794	1688	

In [67]:
```
full_df['Like_rate'] = (full_df['likes']/full_df['views'])*100
full_df['dislikes_rate'] = (full_df['dislikes']/full_df['views'])*100
full_df['comment_rate'] = (full_df['comment_count']/full_df['views'])*100
```

In [72]:
```
sns.barplot(x='category_name', y='Like_rate' , data = full_df)
plt.xticks(rotation = "vertical")
```

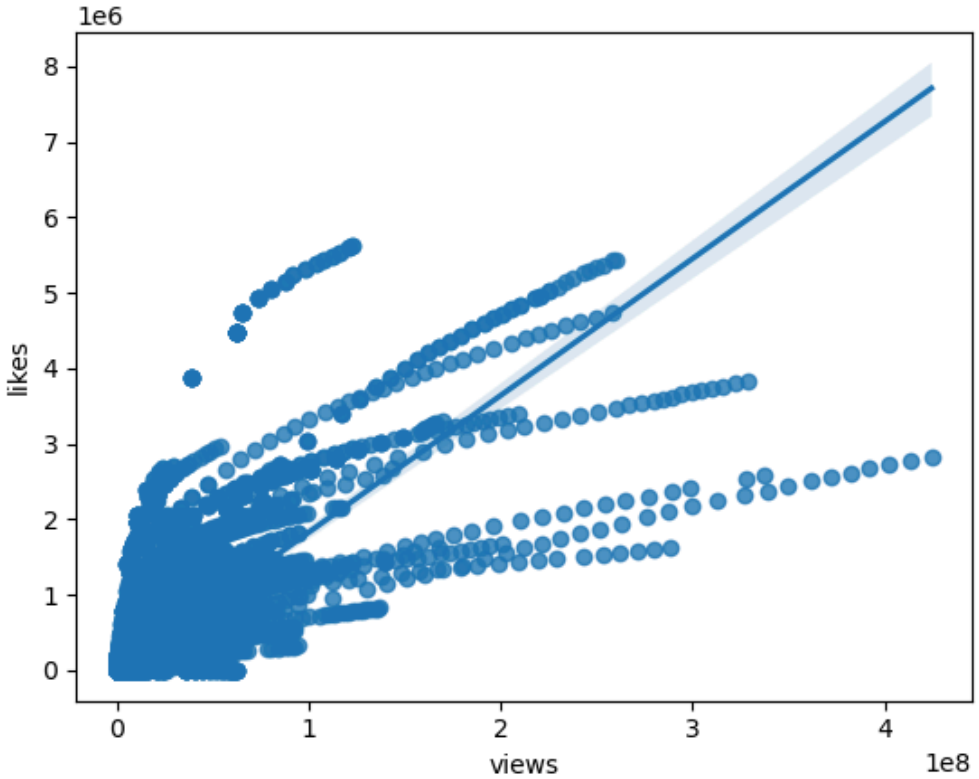
Out[72]:
```
(array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
        17]),
 [Text(0, 0, 'Music'),
  Text(1, 0, 'Comedy'),
  Text(2, 0, 'Entertainment'),
  Text(3, 0, 'News & Politics'),
  Text(4, 0, 'People & Blogs'),
  Text(5, 0, 'Howto & Style'),
  Text(6, 0, 'Film & Animation'),
  Text(7, 0, 'Science & Technology'),
  Text(8, 0, 'Gaming'),
  Text(9, 0, 'Sports'),
  Text(10, 0, 'Nonprofits & Activism'),
  Text(11, 0, 'Pets & Animals'),
  Text(12, 0, 'Travel & Events'),
  Text(13, 0, 'Autos & Vehicles'),
  Text(14, 0, 'Education'),
  Text(15, 0, 'Shows'),
  Text(16, 0, 'Movies'),
  Text(17, 0, 'Trailers')])
```


Like_rate
0
1
2
3
4
5
Music
Comedy
Entertainment
News & Politics
People & Blogs
Howto & Style
Film & Animation
Science & Technology
Gaming
Sports
Nonprofits & Activism
Pets & Animals
Travel & Events
Autos & Vehicles
Education
Shows
Movies
Trailers
category_name

5. Find out whether there is a relationship between likes and views

In [84]:
```
sns.regplot(data = full_df, x="views", y="likes")
```

Out[84]:
```
<Axes: xlabel='views', ylabel='likes'>
```



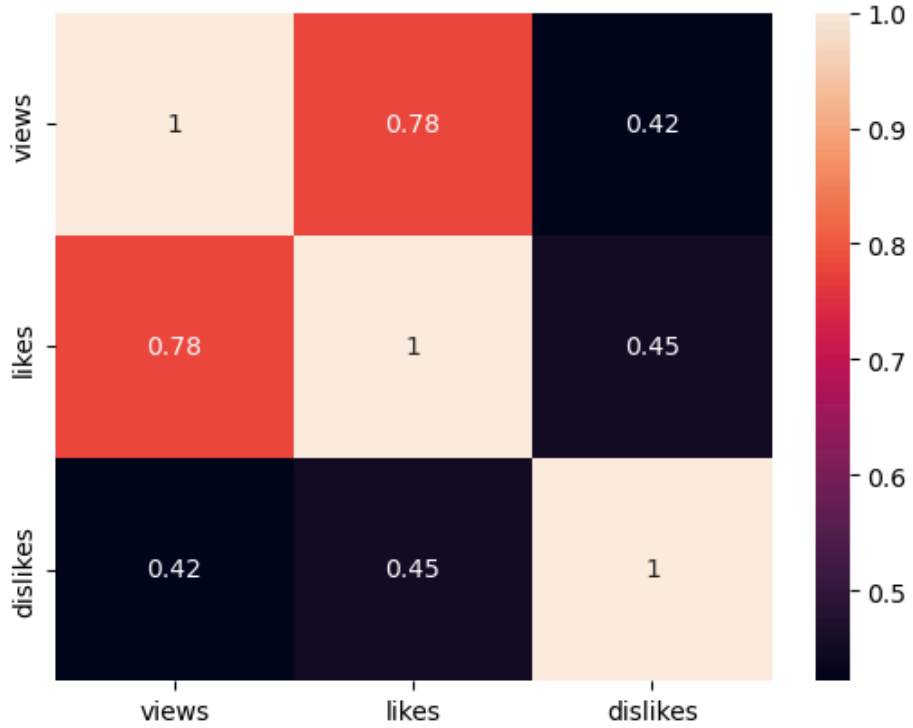
As per the above regression plot we can see that the relation between likes and views are linearly propotional

In [86]:
```
full_df.columns
```

Out[86]:
```
Index(['video_id', 'trending_date', 'title', 'channel_title', 'category_id',
       'publish_time', 'tags', 'views', 'likes', 'dislikes', 'comment_count',
       'thumbnail_link', 'comments_disabled', 'ratings_disabled',
       'video_error_or_removed', 'description', 'category_name', 'Like_rate',
       'dislikes_rate', 'comment_rate'],
      dtype='object')
```

In [94]:
```
sns.heatmap(data = full_df[['views', 'likes', 'dislikes']].corr(), annot = True)
```

Out[94]: <Axes: >



6. Which channels have the largest number of trending videos?

In [97]:
```
full_df.head(5)
```

Out[97]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	views	likes	dislikes	co
0	n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	17158579	787425	43420	
1	0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	1014651	127794	1688	
2	5qpjK5DgCt4	17.14.11	Racist Superman | Rudy Mancuso, King Bach & Le...	Rudy Mancuso	23	2017-11-12T19:05:24.000Z	racist superman|"rudy"|"mancuso"|"king"|"bach"...	3191434	146035	5339	
3	d380meD0W0M	17.14.11	I Dare You: GOING BALD!?	nigahiga	24	2017-11-12T18:01:41.000Z	ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"...	2095828	132239	1989	
4	2Vv-BfVoq4g	17.14.11	Ed Sheeran - Perfect (Official Music Video)	Ed Sheeran	10	2017-11-09T11:04:14.000Z	edsheeran|"ed sheeran"|"acoustic"|"live"|"cove...	33523622	1634130	21082	

In [107]:
```
full_df['channel_title'].value_counts().reset_index()
```

Out[107]:

	index	channel_title
0	The Late Show with Stephen Colbert	984
1	WWE	804
2	Late Night with Seth Meyers	773
3	VikatanTV	763
4	TheEllenShow	743
...	...	...
37819	DFC Orrivals	1
37820	haiblubbblubb	1
37821	SOYER	1
37822	GOLD CLAN	1
37823	Herr Zymny	1

37824 rows × 2 columns

In [108]:
```
import plotly.express as px
```

In [109]:
```
px.bar(data_frame=cdf[0:20] , x='channel_title' , y='total_videos')
```