



## Pattern of social media engagements by the learners of a library and information science MOOC course: an analytical study

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This study aims to highlight the popularity of Emerging Trends & Technologies in Library & Information Services (ETTLIS) course and investigate the learners' involvement using the YouTube Channel and Discussion Forum of the course. The authors statistically analyzed the learner's engagement in the course by using social media channels. It was found that the learners' active participation in the online discussion forum saw an increase from time to time, and the performance of social media involvement also got popularized through the YouTube channel. The paper, based on social media analytics of the course ETTLIS, suggests the possibility of the development of a set of stable performance indicators based on online engagements in LMS platforms.

**Keywords:** MOOCs; Learning management system; Social media analytics; Altmetrics

### Introduction

Massive Open Online Courses (MOOCs) are very popular and have currently attracted public attention for their potential as a new pedagogical forum. There are several MOOCs platforms (including SWAYAM, Coursera, edX) offering an excessive number of courses throughout the world. With the advantage of the SWAYAM<sup>1</sup> platform, the MHRD with the help of AICTE, as a national coordinating agency, provided an opportunity to IIT Delhi to introduce a new course, called the Emerging Trends & Technologies in Library & Information Services (ETTLIS).

The objective of ETTLIS course is to provide an understanding of modern trends, technologies, and professional developments in the field of library systems and services. Despite the expeditious development of different courses and the higher degree of involvement by an enormous number of learners, we still need to understand as how much worthy these new courses are through MOOCs platform, based on different metrics. However, it is also felt that the structure of the online courses needs to be modified more like the traditional courses. Therefore, understanding learners' interests is an essential parameter for analyzing and evaluating their potentials, and their curiosity may help us design the future course

structure more systematically and efficiently. Learners' feedback and their involvement in the course might benefit us to develop more useful and significant course modules and to engage more accomplished resource persons.

The paper statistically analyzes the understanding of learner's interest in the ETTLIS and how actively they have been engaged in the discussion forum of the course. The authors collected all the data from the YouTube social media channel and Discussion Forum of the ETTLIS course to analyze their likeness and engagement in this course. Specifically, we tried to identify how actively learners participated in this course, watching lecture modules, taking assessments to test, appearing in the examination, and engaging in a discussion forum where they could seek help, provide suggestions, and have discussions.

After systematically analyzing all the learners' interests, firstly, we found that each of the learners actively participated in this course and shown positive responses throughout their conversation by communicating with each other. Secondly, it was found that the performance of the internal assessments is quite high for most of the learners. It means that the learners were sincere in their studies to pass the internal and external examinations of the course. Our findings

also focus on the different patterns of interactions or style of engagements and how many topics of discussion were involved in their conversation. These analyses might help us to know about the popularity of the library and information science profession as well.

### **Review of literature**

This section briefly reviews the earlier literature on MOOCs and related online courses and with special reference to social media analytics. The first MOOC was developed by edX and the consortium led by MIT and Harvard<sup>12</sup>. There are numerous studies conducted by various authors on MOOCs. Similarly, many studies also focus on the library and information science domain.

#### *MOOCs for LIS professional development*

In this digital era, MOOCs are growing exponentially and changing towards current trends and technologies. By following the same direction, open distance learning is also evolving worldwide using MOOCs platforms. A study conducted by Oladejo and Gesinde<sup>2</sup>, focuses on current trends in Open and Distance Learning (ODL) from an African perspective. The study highlights some of the policy recommendations which included to invest more in ODL through meaningful budgetary allocations and cost-sharing at higher levels of education, creation of partnerships and networking among ODL institutional providers within the continent, private telecommunication sector, and Non-Governmental Organizations (NGOs).

Pathak and Das<sup>3</sup> have highlighted some the issues in the LIS profession with special reference to the north-east part of India. Kaushik<sup>4</sup> defined the concepts and different arguments related to this profession in the MOOCs platforms. A study conducted by Ecclestone<sup>5</sup> finds that MOOC is not just a massive online course, but can also play an essential role as a professional development platform for the librarians. By following the same direction, Stephens and Jones<sup>6</sup> have conducted a study where they empirically addressed that the students use the MOOCs platform for professional development. There is a significant opportunity for LIS programs to serve the profession on a large-scale basis.

Stephens and Jones<sup>7</sup> examined the role and different perceptions of librarians and information professionals participating in LIS MOOCs. In a recent survey, Dey<sup>8</sup> explains various forms of MOOCs, and the opportunities of MOOCs in India. The author also explains the library and library professional's

participation in MOOCs and different roles for enduring professional development. A recent case study conducted by Hasan and Naskar<sup>18</sup>, highlighted the LIS MOOCs course, Emerging Trends & Technologies in Library & Information Services (ETTLIS), launched by the IIT Delhi Central Library and its usefulness for the new generation of library professionals.

#### *Social media analytics on MOOCs*

Several studies have been conducted on MOOCs platform. However, only a few studies have been carried out on learner's behavior regarding online courses. Some of these studies focus on patterns of interaction on the course forum by considering the students' conversation. The usefulness of the discussion forum as a supplement of learning has earlier been explored by few authors. Davies and Graff<sup>9</sup> examined a course on the frequency of online interaction of 122 undergraduate students at the end of the year. They found that an online interactive forum was linked to achieving passing grades.

Vonder well and Zachariah<sup>10</sup> explored the factors that influenced learners to participate in an online course. They have identified students' needs for learning by monitoring the pattern of participation. A similar study was conducted by Anderson et al<sup>11</sup>, where they developed a conceptual framework for understanding as how users currently engage with MOOCs and also examined different behavioral patterns of the students by investigating in the discussion forum. A fascinating study was conducted by Kizilcec et al<sup>13</sup>, where they identified learner trajectories as longitudinal patterns for characterizing learner engagement with MOOCs. The authors in this paper mainly focus on the dynamic process of interactions and uncover prototypical categories by clustering on engagement patterns.

Palmer et al<sup>14</sup> presented a case study in which they formally assessed online discussion areas by the undergraduate engineering management unit. They observed that the discussion forums play a significant role in qualifying for the assignment marks. It has been found that due to many reasons, students used to leave the online course during the middle of the session, and it is difficult to measure as to why the students dropped out of the course after enrolling. To measure this impact, Rosé et al<sup>15</sup> used a survival model by considering different social factors of students. Kellogg, Booth and Oliver<sup>16</sup> conducted another study on MOOCs by examining the social

network perspective, and authors assumed that the robust online community forum could solve the students' problem. A recent research has been conducted by de Lima and Zorrilla<sup>17</sup> to analyze students' behavior concerning their degree of commitment, participation and contribution in a MOOC, based on a social learning approach.

## Experimental Data

### Data Collection

The study focuses on an online course named "Emerging Trends & Technologies in Library & Information Services (ETTLIS)" offered via the SWAYAM platform. The 2019-20 edition of this MOOC was 16 weeks long and launched with the National Resource Centre in Library and Information Science (NRC) at Central Library, IIT Delhi. To analyze the learners' real-time involvement, the authors chronologically retrieved the data from the YouTube channel of the course and the SWAYAM Discussion Forum of the course. The collected data mainly contains the following information: (i) learners' information from YouTube channel of the course, i.e., the learners who were involved in the ETTLIS course, regularly watching the video modules, watching time, subscribers of the videos and impressions rate, and (ii) learners' conversation with ETTLIS SWAYAM Discussion Forum, i.e., list of messages and the topics they discussed in the discussion forum of the course.

### Datasets

A total of 2980 learners/students were enrolled/registered in the ETTLIS course to enhance

their professional competencies, ICT skills, professional development, and career progression and to improve the quality of library services. All the different datasets were collected by following varied time range. For instance, we started receiving our first datasets from 15th September 2019 to 31st December 2019, as shown in Table 1, keeping in view the course started on 1<sup>st</sup> September 2019. We started collecting our second datasets from 1st September 2019 to 30th April 2020, as shown in Table 2. Similarly, the datasets on different engagement styles were collected from 15th September 2019 to 30th April 2020, as shown in Figures 2-8.

Table 1 demonstrates the final figure of learners' involvement in social media over the weeks. The table contains the number of learners who viewed the video modules, subscribed to the channel, and shown their impressions and likes/dislikes on the video contents. Table 2 demonstrates the final figure of learners' engagement in the discussion forum and the set of unique topics included in their conversation. The table also demonstrates the total number of posts received from the learners, and how many of them actually watched the conversation in the discussion forum.

## Results

This section explains about different patterns of learners' engagement by utilizing the social platform

Table 2 — Parameters of the datasets on Discussion Forum

Run Time (dd/mm/yyyy)	# of Unique Learners	# of Topics	# of Posts	# of Views
09/01/2019-30/04/2020	334	594	1115	9382

Table 1 — Parameters of the datasets on YouTube Channel

Weeks	Run Time (dd/mm/yyyy)	# of Video Modules	# of Views	# of Subscribers	# of Impressions	# of Shares	# of Likes
Week 1	15/09/2019-19/09/2019	3	7906	182	20772	371	189
Week 2	20/09/2019-23/09/2019	3	4149	43	14686	227	47
Week 3	23/09/2019-03/10/2019	2	3689	36	11787	214	50
Week 4	04/10/2019-20/10/2019	2	3899	29	15416	191	34
Week 5	21/10/2019-24/10/2019	2	3461	39	11301	172	44
Week 6	25/10/2019-03/11/2019	3	3492	24	12648	209	39
Week 7	04/11/2019-14/11/2019	2	2523	23	9780	150	36
Week 8	15/11/2019-18/11/2019	2	2334	8	9829	138	16
Week 9	19/11/2019-26/11/2019	3	3241	22	13502	197	59
Week 10	27/11/2019-02/12/2019	3	2160	6	9322	167	27
Week 11	03/12/2019-06/12/2019	3	2367	14	10085	179	23
Week 12	07/12/2019-13/12/2019	3	2189	15	9880	165	35
Week 13	14/12/2019-19/12/2019	3	2307	17	11766	153	41
Week 14	20/12/2019-22/12/2019	4	2358	15	11716	174	45
Week 15	23/12/2019-25/12/2019	3	1991	20	11481	132	26
Week 16	26/12/2019-31/12/2019	4	2968	11	14159	169	44

and discussion forum over the timestamp. Our analysis of involvement patterns include learners' engagement on YouTube, the success rate of users' engagement by watching content, subscription status, engagement by different sources, users' engagement from various geographical areas, engagement by different age group people, gender engagement, etc. We also explain as how learners actively participated in the discussion forum by considering several topics. To analyse, we performed several distribution methodologies for each engagement pattern.

**Patterns of learners' engagement in social media**

The purpose of analyzing learners' engagement patterns was to understand as how learners were engaged in a massive online course through social media, what kind of impression they left after watching video modules, how much learners like the modules, whether they have shared with different communities or not, etc. We also intend to check whether the learners keep their interest in a linear pattern or non-linear pattern while using social media platforms, which is graphically represented through different engagement styles.

**Engagement style through published video modules**

We began with the distribution of learners' success rate based on 16 weeks of video modules for each week (total 45 videos). Figure 1 shows the total number of views, subscribers, impressions, shares,

and likes on week-wise video modules of the ETTLIS course published on the YouTube channel.

To perform this analysis, we first normalized the obtained results by adding all the learners from each module based on each timestamp and keep all the numbers in fraction value. Specially, we scaled down our final value over the entire weekly modules from the range between 0 and 1. As we can see, the fraction of success of watching video modules decreases for each week compared to the first week or first-week modules. It indicates that the learners' interest in the initial stage of the learning process is always high. However, the success rate of rest of the video modules is followed by a substantial engagement style throughout the course. This is because people devoted their time in properly watching all the video modules for attending the internal/external examinations. If we analyze it in more detail, the impressions (i.e., video thumbnails) of these video modules have increased even in the last week. This means that the learners were pretty much satisfied with these modules, and it has left a positive impression on them.

**Engagement style through date-wise watching of videos**

There are different styles of engagements that users generally follow to watch several videos, but the patterns are not always the same. Some of the patterns show more detailed engagement by analysing the rate

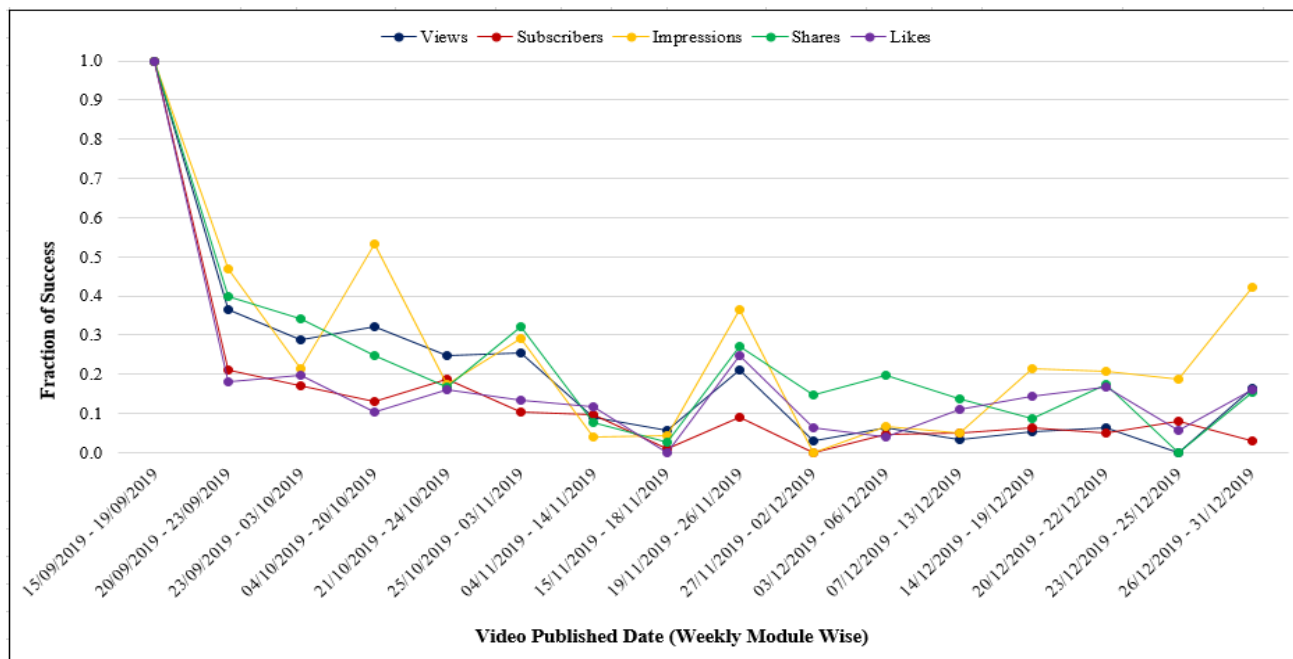


Fig. 1 — Distribution of learners' engagement on social media after publishing weekly video modules

of success based on the average view percentage and their watching time. Figure 2 shows the success rate on total views for the selected date range, estimated total hours of viewing time of video modules, and average minutes watched per view for the selected contents.

To calculate this figure, we simply followed the percentage formula on each metric's selected date range. In this graph, we can see the total number of views and total hours of watching time which has a continuously increasing trend, and at a specific range of time, the graph shows exponential growth. Eventually, it continues to decrease with the below-average rate. Although, the figure represents a more than average growth rate throughout the session, it has been observed that the exponential growth occurs just before the examination. Therefore, this growth rate proved it hypothetically correct that most of the students were more engaged in the coursework before the examination than the usual days. Besides that, this graph also indicates that after the examination, students gradually became detached with the course work and the graph falls to a below-average level.

**Engagement style through subscription**

In social media like YouTube, it is observed that there are different types of approaches of learners while watching a video. For instance, many uses to watch videos after subscribing to several YouTube channels. YouTube subscribers refer to the people or account

those subscribed to the channel. Our analysis shows the number of viewers watching the video modules without subscribing to our channel named ARP19AP78, as shown in Figure 3. In this figure, we can notice that more than 80% of viewers logged out or did not subscribe to the channel of the video modules they were viewing. Similarly, the total hours of viewing time of our contents was more than 80%. However, the average minutes watched per view for a selected content by the subscribers slightly differs from that of the non-subscribers (i.e., estimated average minutes watched per view for the selected content in case of non-subscribers is 9.3% which is more than that of the subscribers).

**Engagement style by using different sources**

Nowadays, people use to watch videos by using various sources. Similarly, YouTube uses traffic sources that provide an overview of different kinds of sources by which people can easily find their required videos. Traffic sources can help us to understand as how well various advertisement campaigns were performing. The types of traffic sources include External URL, YouTube channel page, YouTube suggested videos (found within YouTube by clicking a thumbnail), YouTube search, YouTube playlist, etc.

Figure 4 shows YouTube analytics based on different sources. Our analysis shows that the learners have used various traffic sources for watching our

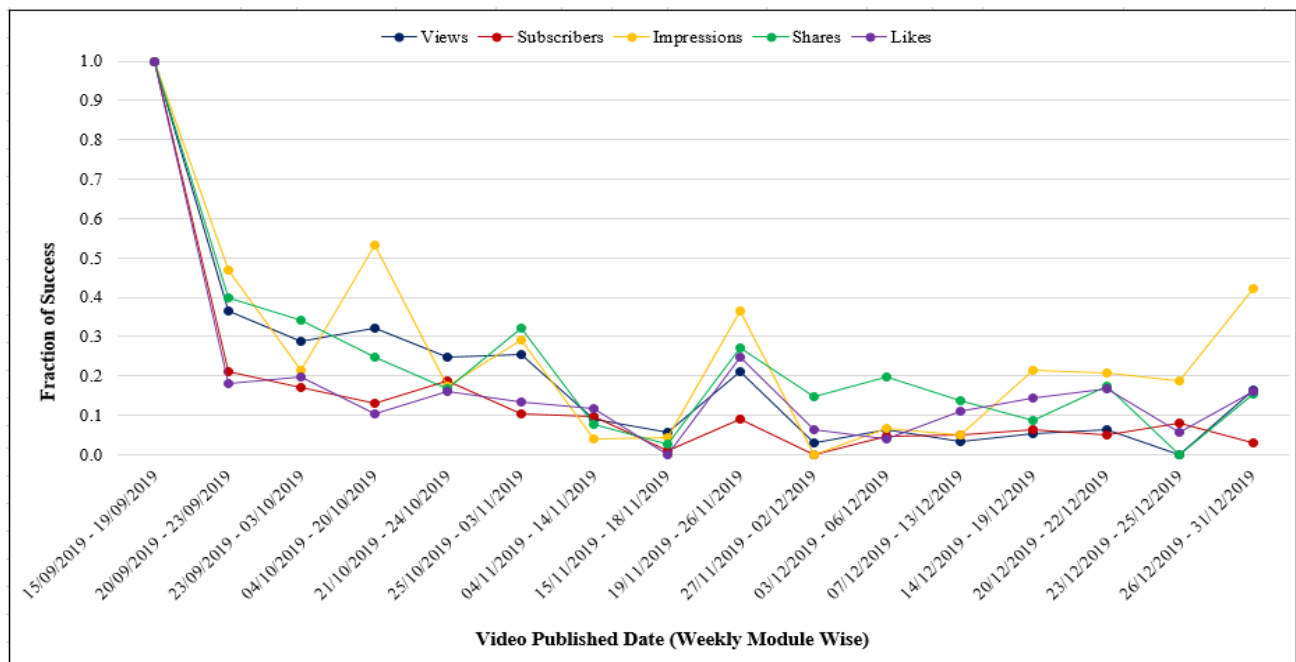


Fig. 2—Weekly success rate of users' engagement by watching contents, duration of watching contents, and estimated average watch per view

video modules. As we can see, the number of views through external URL (i.e., traffic from websites and apps that embed our videos or link to our videos on YouTube) were more impactful than the other sources. It means, most of the people generally use the regular search engine to watch different videos instead of watching direct from YouTube channel. However, the average percentage watched per view is not much different across all the sources.

**Engagement style over different geographic locations**

Engagement style over the different geographic regions is a critical analysis to know about the

popularity of the course. This analysis tells us as how many people pay attention to our course, nationally as well as internationally. For Figure 5, we simply followed the percentage formula on selected countries for each metric. As we can see, the number of views and total hours of watching time from India is more as compared to other countries. However, the average percentage watched per view is not much different across all the nations.

**Engagement style on the basis of age groups**

Depending upon the context, engagement style based on age groups plays a vital role in identifying the topic of interest. Our analysis clearly shows two

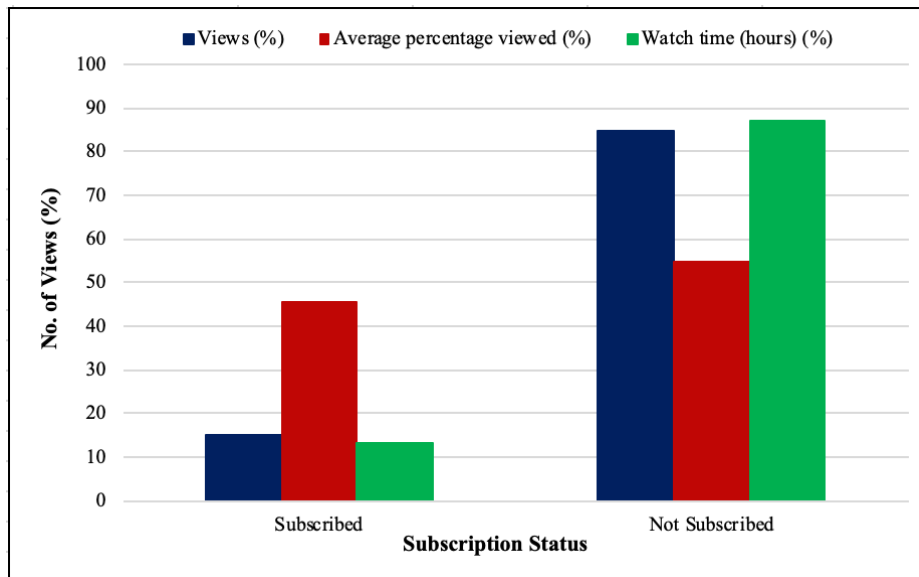


Fig. 3—Contents viewing patterns by both subscribed and non-subscribed users

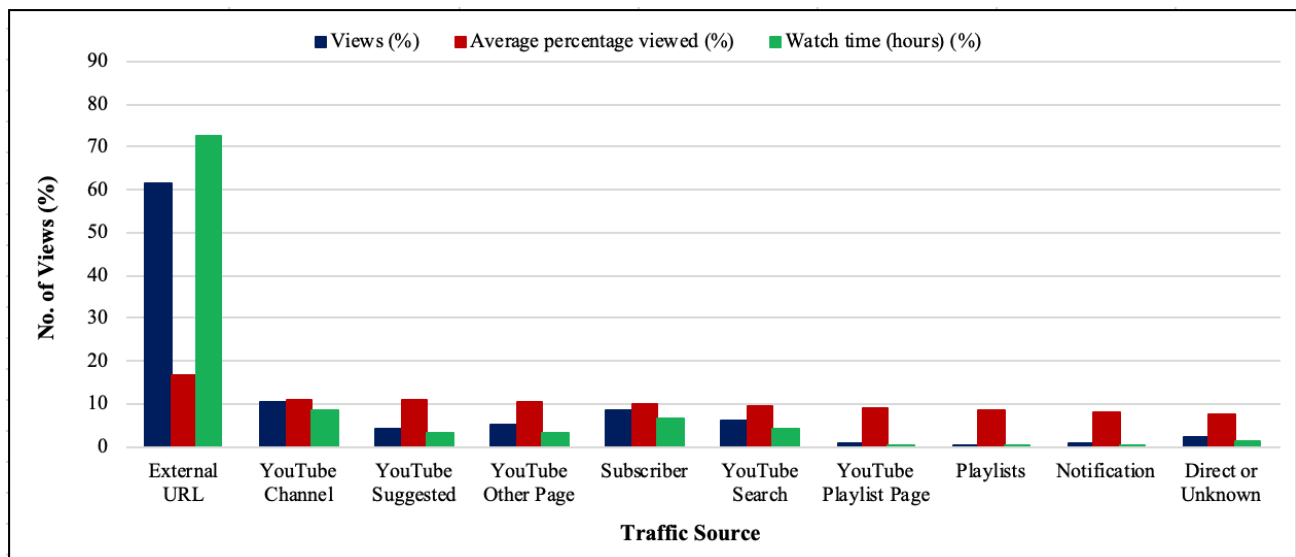


Fig. 4 — No. of views using different sources for watching the video modules, watch time, and estimated average watch per view

different exciting observations based on the number of views and total watching time. We can observe from Figure 6, that the age group between 35 and 44 years shows more engagement than other age groups. As a refresher course for teaching, most of the learners attempt to include an orientation program or a refresher course into their profile to increase the academic score for further promotion. On the other side, learners with age groups between 25 and 34 were also engaged in this course.

**Gender distribution**

It can be seen from Fig. 7 that males dominated the number of views and total watching time. Interestingly, the average percentage watched per view shows a

different situation where female learners were more than the male learners. The male learners have outperformed the female learners, in terms of social media engagement in this course. However, it may also be assumed that average engagement appeals more to women than men. A study conducted by Chan et al.<sup>19</sup> found that women's preference for collaboration is more than men. Similarly, Rebecca<sup>20</sup> shows that when group work is included in a MOOC, women participate more than men.

*Patterns of learners' engagement in discussion forum*

The purpose of analyzing learners' engagement patterns in the discussion forum helps us understand the mechanism of learners' interaction with each other

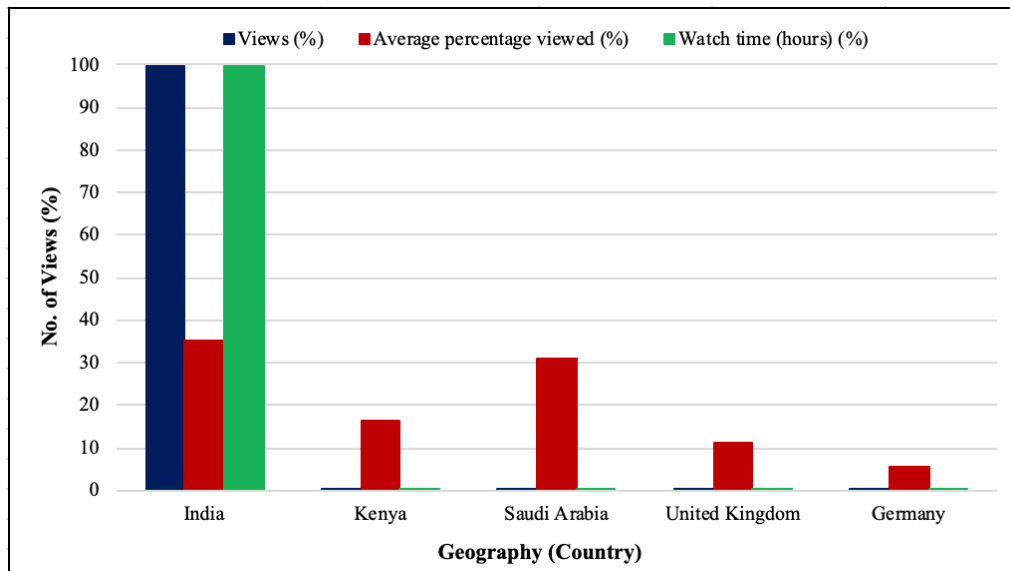


Fig. 5 — No. of views from different countries watching the video modules, watch time and estimated average watch per view

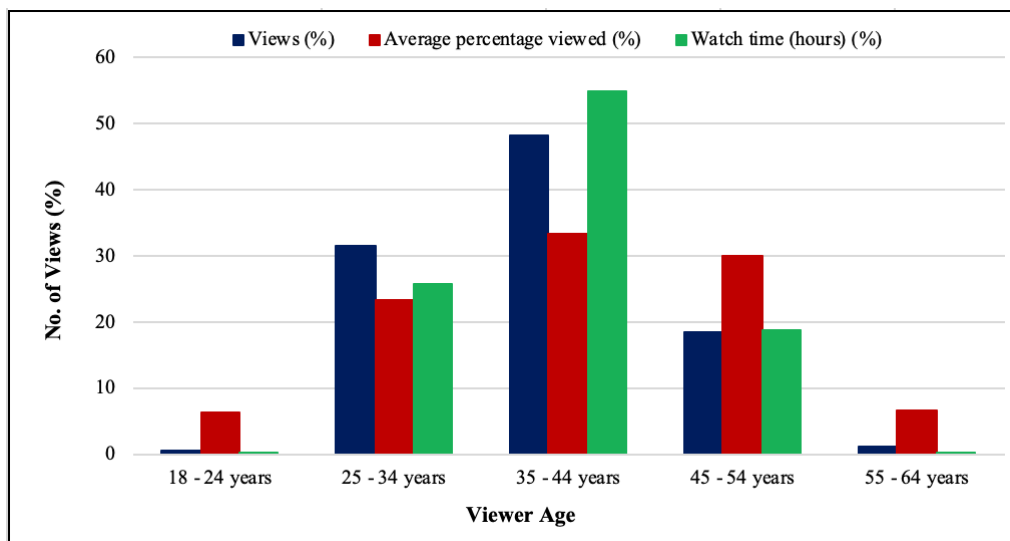


Fig. 6 — No. of views by different age groups watching the video modules, watch time, and estimated average watch per view

and their conversational structure. In this discussion forum, we have covered different types of questions based on learners' engagement. In particular, we would like to address the following questions:

- What types of learners visit the discussion forum?
- How actively learners interact on the forum?
- Does the forum have a more engagement structure, in which a single learner posts his/her queries repeatedly?

- Can we identify forum usage strength based on conversational posts?
- Does the forum comprise highly active learners who initiate conversation and low-activity learners who follow up or contributes less?

To answer the above questions, we computed two different analyses on learners' engagement and conversational strength, as shown in Figures 8 and 9. In the discussion forum, only registered users can

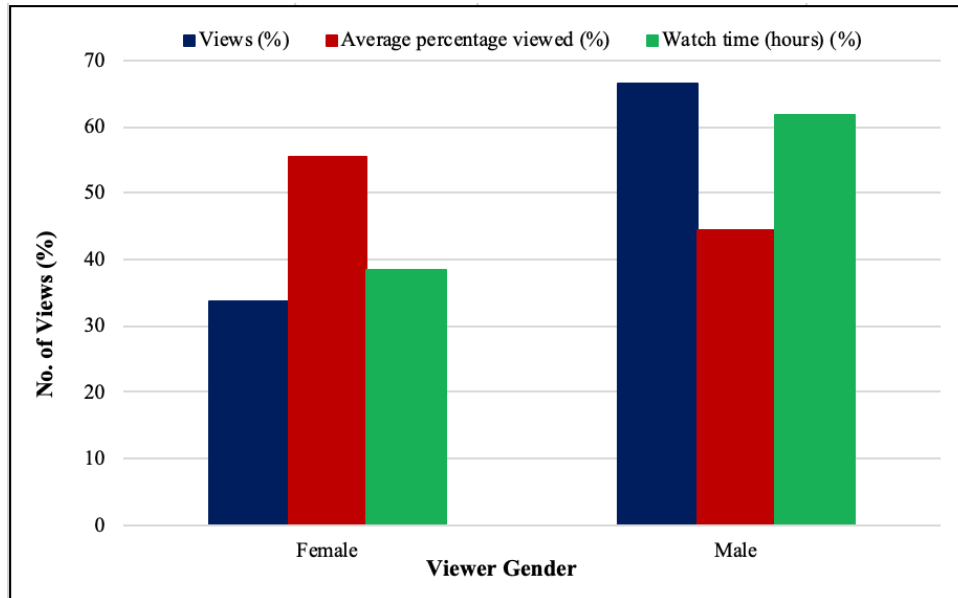


Fig. 7 — Gender-wise distribution of views on video modules

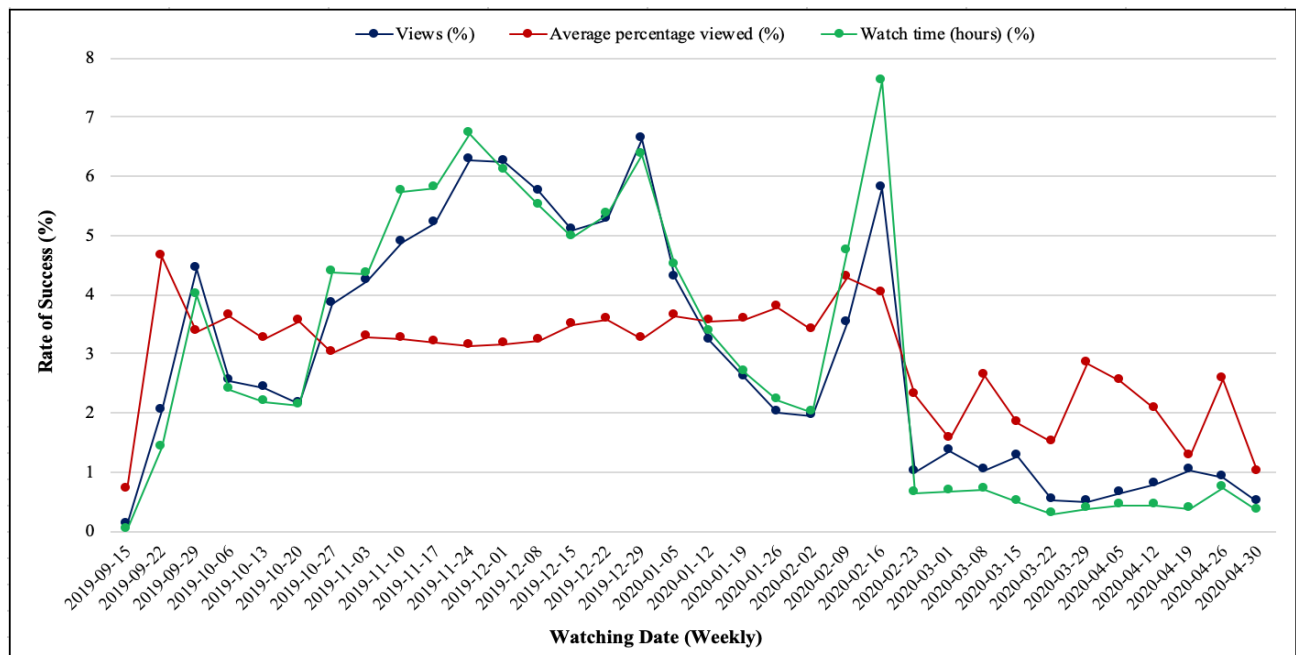


Fig. 8—Week-wise distribution of learners' engagement on different topics in the discussion forum



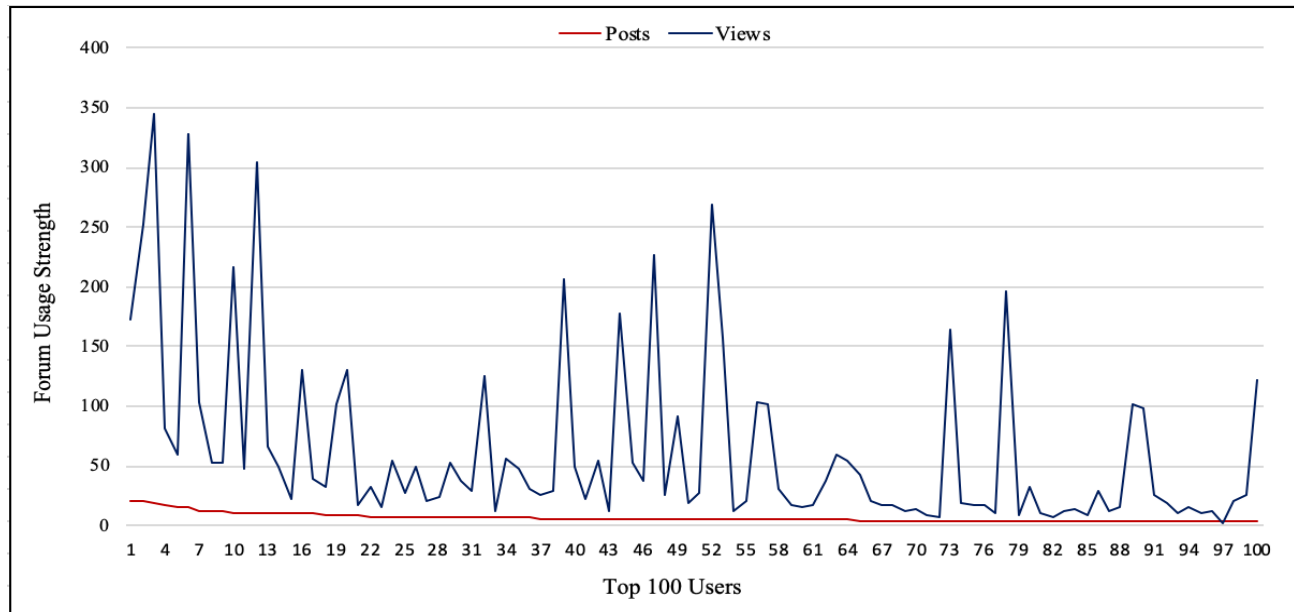


Fig. 9—Number of views over the conversational posts in the discussion forum

share and view their posts and can reply to someone's query. We computed the distribution of engagement style based on the conversations and posting topics from starting to ending date of the course.

Figure 8 shows that the users actively participated by posting their queries, and a significant number of learners were involved in watching the conversation in the forum. In this graph, we can see that the number of posted topics and the number of views increases in the entire week. However, the number of views is highly impacted by some specific time range, like at the initial stage, before the examination time and even after the examination. It means, many users were actively engaged in this discussion forum.

The course forum contains different types of engagement patterns of learners, and also a small set of people contributed several times to a long conversation. We graphically represented the top 100 users who actively participated and increased the usage strength in the forum, as shown in Figure 9. In a typical scenario, a higher number of views were reflected when substantial contributions were posted. Apart from that, the discussion forum comprises highly active learners, even with fewer contributions over the different topics.

## Discussion

As per the current datasets, 1784 learners have completed their assessments and out of 16

assessments, 993 learners completed  $\geq 10$  assessments, 243 learners completed  $\geq 5$  assessments and 548 learners completed at least  $\geq 1$  assessment and rest of the learners did not attend a single assessment, as shown in Figure 10.

As we can see from the graph, 1195 learners, have not participated in any assessment. Our assumption says that the number of learners who did not attend in any evaluation has no intention to attend the final examination. Another critical observation shows that more learners actively participated in all the assessments. Our findings reveal that the learners achieving high or medium passing grades, got engaged more actively with the course. Henceforth, given the current findings, the next step would be to try to focus on online interaction, which might enhance the learners' active engagement in the online course.

Furthermore, we may need to analyze the dynamics of online interaction more carefully so that it can make learners more engaged in this course. The purpose of the present study was to explore as to what engagement style is more impactful in this online course. Our current study indicates that the technology interface and social interaction influenced learners to participate in an online forum and into this refresher program actively. In order to create learners' active engagement, it is crucial to develop social interaction and a well-organized interface.

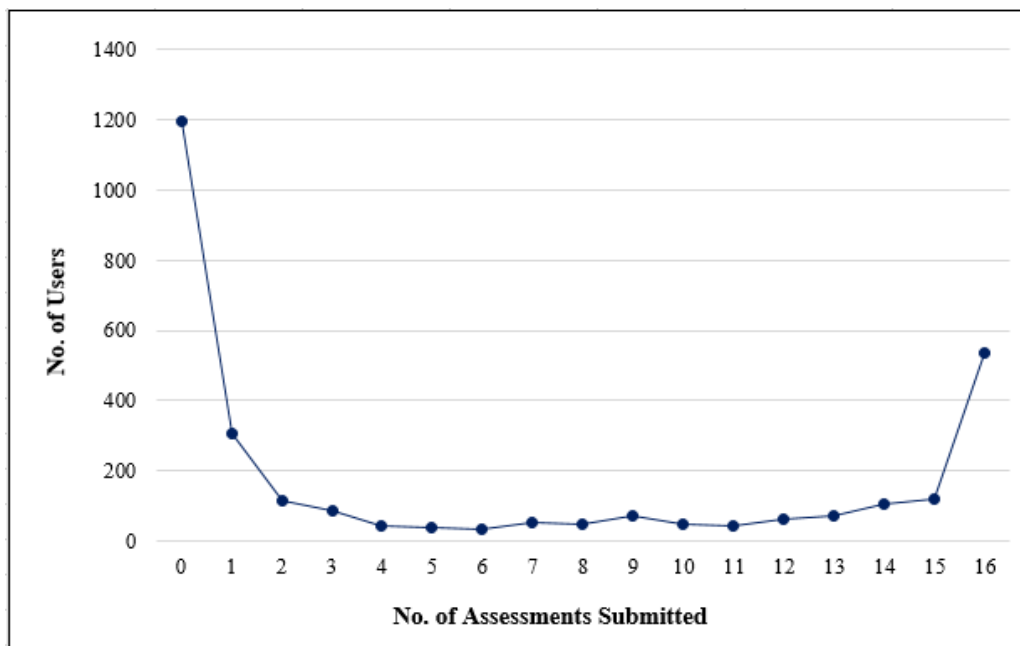


Fig. 10 — Distribution of users over a number of submitted assessments

### Conclusion

This study provides a suitable template to develop a set of performance indicators, based on learners’ participation and experience in online discussions forum and YouTube engagements against week-wise video streaming. As evident from the analysis, the learners were engaged more frequently while more contents were made available. It is also found that online discussion platforms facilitate the collaborative learning of learners. Given a chance, the learners also help the course coordinators to improve or enrich the course contents, assignments, and reading references through their timely suggestions and comments. Asynchronous learning can also occur while participants keep themselves engaged in online discussions on YouTube and Learning Management System (LMS) platforms.

However, if possible, in the future, we can compare our findings with a similar type of study of another online course to obtain a set of stable performance indicators for the future generation of SWAYAM courses. In this way, this study contributes to the monitoring and evaluation of online courses offered by the Indian institutions on SWAYAM, NPTEL, and related LMS platforms. A range of further studies can also be undertaken to compare academic interactions between the experienced and mature learners vis-à-vis young learners in online discussions on YouTube and LMS platforms.

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