Vivaran: A News Aggregation Framework for Organization Level News Consumption

ANONYMOUS AUTHOR(S)

Media ecosystems are increasingly rife with echo chambers and hyper-personalised filter bubbles. On the other hand, organisations are investing in various modes of interaction and learning for employees especially since the burgeoning growth of hybrid workplaces. To converge these two problems, we propose Vivaran, a curated organisational news aggregator which delivers long form articles alternate days and allows for engagement over these articles. We conducted a 6-week study to understand how Vivaran is used and received by employees. We found that Vivaran shows promise regarding designs leveraging organization level news consumption as a vehicle for quality news consumption, knowledge dissemination, wellness, and belonging for the employees. We outline several challenges faced and limitations of the study as well as the contributions these could make to the larger HCI community.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**.

Additional Key Words and Phrases: news consumption, long-form news, ...

ACM Reference Format:

Anonymous Author(s). 2018. Vivaran: A News Aggregation Framework for Organization Level News Consumption . In . ACM, New York, NY, USA, 11 pages. https://doi.org/XXXXXXX.XXXXXXX

1 INTRODUCTION

Several studies [4, 18, 19]have shown that there has been recent interest in employee learning and awareness across organisations, especially since the pandemic . Many organizations have a range of in house facilities for employee learning, e.g., organizational book clubs, seminars, and webinars [8, 14]. These programs are created with the ostensible hope of increasing positive interactions among employees, knowledge dissemination, and rapport.[1, 11]

Organizations also recognize the need of offering high quality reading materials for employees – while traditionally, newspapers and magazines stored in a physical space enabled this, the modern avatar is group news subscriptions. Organizations, especially those with a larger employee base, increasingly invest in newsletters that are released on a regular basis. In some cases, such newsletters stick strictly to updates about the organization, while others provide updates on the domain as a whole, or even on general news topics (e.g., corporate packages of newsletters . More often than not, the organizational newsletters receive sporadic attention due to multiple factors like employee workload, time scarcity among employees, and a general lack of interest in reading just organization specific news. Individual source subscriptions, on the other hand, often suffer from the lack of diversification of perspectives. There also exist news aggregators (like Google News and Apple News) which help them consume news on a wide variety of topics outside their organization. However, previous research has proven that such aggregators suffer from the disadvantages of hyper-personalization at the user level, which leads to formation of filter bubbles [15].

Manuscript submitted to ACM

To counter these problems, we propose a news aggregation service named *Vivaran*, which is tailored for organizations or communities of practice, with a human-in-the-loop framework for long form news curation that uses Microsoft Teams as its distribution channel.The proposed service aggregates news related to the organization in question, as well as news of general interest. It aggregates only longform news articles, which enables a detailed and in-depth understanding of the topics discussed, leaving the work of headline browsing to individuals and their established practices of consuming their daily news.

The goal of curating longform articles is to avoid algorithmically-driven elements of popularity such as clickbaiting or high-frequency social media forwarding, and instead seek pieces that research and discuss issues in a detailed fashion. A human-in-the-loop framework ensures that such articles are curated, quality checked, and selected by an experienced human editor within the organization, who has an adequate understanding of the reading interests of its employees. It also ensures that the news aggregation strictly adheres to established journalistic standards and practices. Finally, the goal of a Microsoft Teams based distribution channel is to integrate the product into the organizational flow, and allow social elements of engagement and commenting. Part of the goal of this system is to enable employee learning through discovery of newer topics through conversations, which may help employees in breaking their existing filter bubbles.

This paper discusses the pilot of Vivaran developed and deployed within an organization, and the initial findings from the study. The duration of the study was six weeks during which Vivaran feeds containing five articles each were released on alternate days. We recruited 73 participants for the study initially through an opt-in method, conducted a survey to understand their news preferences that 45 participants filled up, and finally conducted a post-study interview with 18 participants who consistently used Vivaran.

Our initial qualitative findings suggest that: (A) Vivaran shows clear indications of knowledge enhancement among the participants within the organization with its unique collection of high quality and credible articles that helped them discover several new news topics and perspectives, and (B) The conversational aspect ensured by the Teams based distribution channel leads to active communication and knowledge sharing among participants through news, in a professional set up, which leads to collaborations and building of team spirit within the organization. The editorially quality checked long form news aggregation within the organization also provided the participants with high quality and credible news articles, giving them with an in depth understanding of the issues discussed. We believe that the proposed framework, with assistance from an AI-based recommender system, can aid in countering echo chambers at an organization level, by providing employees with cross-cutting and novel news content, and active knowledge sharing opportunities in a professional set up. Additionally, it can act as a concierge service for organization level news aggregation, which can eventually lead to enhanced camaraderie among the employees through engagements and discussions, while also adding to the goal of knowledge enhancement through consumption of quality news on a wide variety of topics.

2 VIVARAN SYSTEM DESIGN

In this section, we describe the different components of Vivaran in detail.

2.1 Editorial curation

The choice of articles was critical to Vivaran. The curational groundwork began with conducting informal interviews with employees/researchers of the organization (target audience) and a survey, to understand their news consumption preferences and attitudes. A majority of the responses highlighted news avoidance due to a clutch of reasons, among them two with strong echoes: “information overload” and “negativity”, while other responses hinted at the interest in

considering a quality news product. Consequentially,to counter the issue of information overload and quality article recommendation, Vivaran curation adhered to two main principles: The organizational fit and credibility.

An article was seen to be fit for organizational consumption when it ticked a few boxes with respect to to its target audience: (a) It should interest those who are problem-solvers, driven, and ambitious, and (b) It should inform the audience on important issues even outside their area of work. Therefore, the broad subjects of Science and Technology, Sustainability and Environment, Arts and Culture, Gender, and Workplace Wellbeing were selected for the curation [1]. The organization being a research organization would be more inclined toward reading articles on *science and technology*, whereas subjects like *workplace wellness* and *arts and culture* inform the organization on other areas loosely connected to or outside of their area of work. A unique inclusion called *Serendipity* also tested the favourability of a new subject (beyond the five listed) among the target audience. Any article which the editor felt was important for the feed, and could aid in employee learning and connections, but did not map to the five subjects, was mapped to *Serendipity*.

To counter the problem of negativity, political articles were deliberately excluded from the cohort to minimize the risk of polarity/negativity in a professional set-up. This was also done to avoid difficult conversations and to encourage participants to comment/interact on the articles. The subjects were chosen to ensure every Vivaran edition benefited from a good mix of article variety.

Credibility was ensured through selection of a set of highly credible 87 news-sources by the human editor from which the stories were shortlisted. These included both small media sources like *Rest Of World* and *The Hakai Magazine* as well as behemoth media sources like The *New York Times, The Wall Street Journal,* and *The New Yorker*. Every edition of Vivaran consisted of five longform articles. A longform article refers to any news story that is of length 1,000 words or more, or a minimum of 6 minutes read. This decision intended to redirect readers away from the 'breaking news' proliferation, a contributor to news fatigue. Choosing longform was also a passing nod to slow journalism, an antidote to the 'breaking news' eco-system known to chips away at the quality of journalism. (Link) Further, Vivaran comprised text-only articles, a still popular and preferred format of news for readers according to the Reuters Digital Report 2022. (Link)

2.2 Distribution channel and user interface

We used Microsoft Teams (MS Teams) as the distribution channel to release the news feeds curated under Vivaran. Microsoft Teams is a group collaboration software used for remote collaboration. Teams provides users an interactive interface primarily for conversation and resource sharing. MS Teams also provides users the facility to create groups (each group is called a *team*), and add multiple channels to each group, enabling discussions on various topics of interest. There were two reasons behind selecting Teams as the distribution channel for Vivaran: First, being the primary mode for online communication within the organization, Teams could ensure a higher visibility of Vivaran feeds among participants as it is already integrated with their workplace and they do not have to visit another site to access Vivaran feeds. Second, Teams enabled user interaction with Vivaran feeds through comments, replies to comments, and reactions (like/laugh/angry etc.). This enabled us to ensure the conversational aspect of Vivaran, through which the participants could come together and share ideas over news in a professional set up.

On alternate days, Vivaran articles were released on a dedicated group (the *Vivaran Team*) within MS Teams, wherein each feed consisting of five articles for the day was released in a separate channel under the group. We had to create a separate channel for each day's feed under the Vivaran team, since MS Teams has a feature of updating the order

[1]The articles were tagged in the Vivaran feed with topics based on the editor's judgement. These topics belonged to the set of the five broad subjects discussed here.

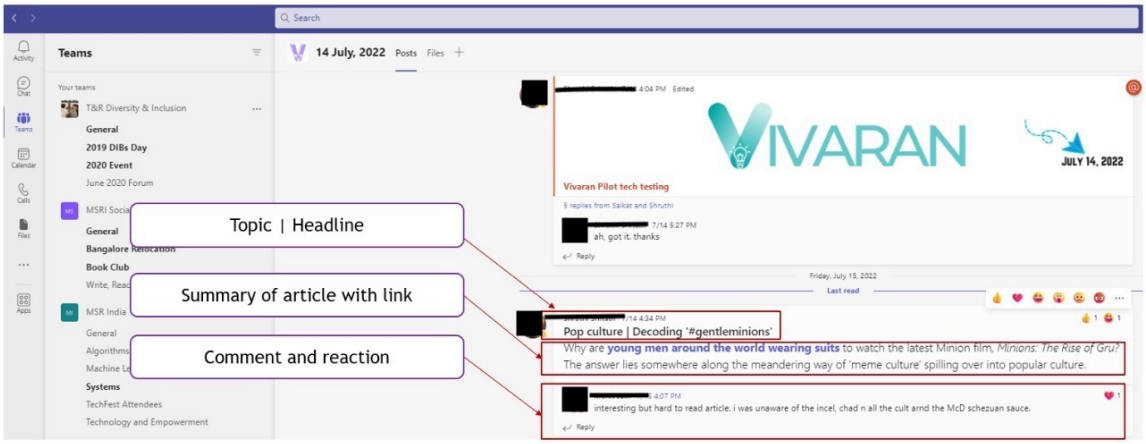


Fig. 1. Microsoft Teams based user interface of Vivaran

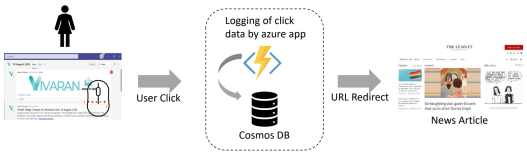
of messages (in this case, news articles) in case users comment on them – the message that receives the most recent comment is moved to the bottom. Thus, posting all feeds in one channel was infeasible, since it would mix the feeds up resulting in difficulty in usage. Figure 1 provides an idea of the MS Teams based interface for Vivaran.

As shown in figure 1, each message or article within a day's channel under the Vivaran team consisted of different components. The *topic* provided a brief idea to participants about the topic of the article, which was manually decided by the editor as discussed in the previous section. While a news article might belong to several topics, in the current phase, the editor tagged each article with a topic that was found to be most relevant. The *headline* was also manually decided by the editor, and differed from the actual title of the article. This was again a design decision to ensure that the participants get a brief idea about the article, provided that on Teams many of the actual headlines took too much space, leading to a clutter. This was followed by an editorially generated brief article *summary* (generally a couple of sentences long). Finally, a part of the summary text was hyperlinked to the actual article.

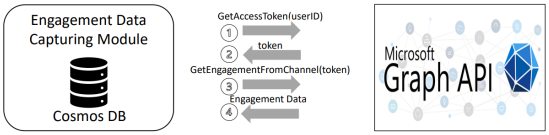
2.3 Backend

To understand the news consumption patterns of users, we collected user interaction data on clicks and other engagements (comments, replies, and reactions) on Vivaran articles. User clicks were captured through an app deployed on Microsoft Azure (a cloud computing platform developed by Microsoft). This helped us log the click data in a backend Cosmos database, before redirecting the user to the article page. We recorded the official email IDs of the users (using which they were logged on to Teams), the article URL they clicked on, and the timestamp of their click, using this click data capturing pipeline as shown in figure 2a.

Other user engagements were captured using the Microsoft Graph API, which provides the functionality to capture user interactions on each Teams message/article, along with the timestamp of interaction (Figure 2b). We collected user engagement data from all channels under the Vivaran Team at regular intervals of 12 hours (before archiving the channels). Once again, we capture the user's official email ID, the article ID on which the engagement is received, the type, content, and timestamp of engagement using this pipeline.



(a) Click data capturing pipeline



(b) Engagement data capturing pipeline

Fig. 2. User interaction data capture: Click data is captured using an Azure app in an online fashion, while engagement data is captured offline at regular intervals using the Graph API

3 STUDY DESIGN

We conducted a 6-week deployment study with Vivaran being used in the organisation. This study was approved by the Institutional Review Board. In the following sections, we describe the recruitment method, study procedure, data collection method, and analysis.

3.1 Participants

The participants were from all levels of seniority, from interns to directors.This also ensured that there was sufficient diversity in the user set that consented to participate in terms of their designations. This was also important since one of the primary goals of Vivaran is to improve workplace well-being and increasing interactions across employees online and offline, irrespective of their designations. The participants were aged between 21-51. We call the participants P1, P2,...., P18 in our analysis.

3.2 Method

We organized a workshop where the users were provided pointers on the novelty of the proposed framework. These included the different features of the system like its ability to aggregate news tailored to the needs of the organization, the distribution of news on a Teams based interface enabling active engagement, and the human-in-the-loop intervention ensuring quality and novelty of content. A set of sample articles were also provided to give them a feel of the system's output.Next, we requested people interested in reading Vivaran to "opt-in" the study and provide consent through an online form where we answered their questions related to participation.Participants who clicked on the Vivaran Team link on MS Teams were redirected to sign up for the study, and fill in the survey, which was a nine-minute survey to understand the online news consumption and topic preferences of the participants. Out of 92 people who clicked on the Team link, 73 signed up for the study and 45 of them filled the survey. We did not provide any incentives to participate. To mitigate the cold start problem in the beginning, we presented the users with a sample Vivaran issue, to give them an idea about what they can expect from Vivaran. The study period was 3 weeks, after which the users who had filled the survey and had at least clicked a Vivaran article were requested to participate in a semi structured interview elucidating

their experience with Vivaran. The interviews focused on understanding participants' general online news consumption habits, their experience with using Vivaran, and value addition to their news/content consumption ecosystem.

During the study period, the users received a set of five articles on the Vivaran Teams every Monday, Wednesday and Friday at 11:15 AM, barring holidays. For each feed, a new channel was created under the Vivaran Teams. The participants were notified about the new Vivaran issue/channel through the MS Teams notification that appears by default if a new channel is added to a Team. With each issue, there was also a reminder email that was sent out at 5PM on the same day, which summarised what the issue entailed, followed by a link of the new channel, and links to the previous two channels. We tracked the clicks, reactions, comments, and replies of participants on news articles along with their timestamps. This data is used for further analysis.

3.3 Data analysis

The survey data collected in the beginning of the study was used to inform editorial curation. After completing the 6 week study, we conducted interviews with 18 participants. We selected participants for interview such that low, medium and high clickers were evenly distributed. The interviews were analysed using a content analysis approach. Specifically, one researcher transcribed the interviews, and the transcriptions were analysed using a coding scheme based on three common values: (1) the content of the stories, (2) the engagement on the platform, and (3) the perception of the user interface. We supplemented the findings from the interviews with relevant insights from the log data to further understand the patterns.

4 FINDINGS

This section discusses our initial findings after Vivaran was launched within the organization, on the overall news consumption behavior of users, and the way it was impacted through Vivaran.

4.1 Content

Our post-study interviews establish the advantages and limitations of the type of news content Vivaran presented. We found that a set of participants discovered entirely new topics through Vivaran, which is an early indicator of dissolution of the filter bubble effect. Around 60% of the participants shared that they had discovered articles through Vivaran that they would usually not come across through their erstwhile favorite news sources, or would likely have missed. In some instances, users also discovered articles completely outside their interests, but ended up digging deeper into them:

> "*I would not read cryptocurrency articles on my own, but since there were a bunch of articles on Vivaran, I ended up reading a few and got hooked* - P1"

These findings provide a strong indication towards the knowledge enhancement and novelty of content that Vivaran can bring at the organization level, through recommendation of unique and interesting articles. Our quantitative analysis also corroborates this finding. From the cumulative distribution of number of topics clicked by the participants (figure 3c), we find that participants generally are interested on a significant variety of topics. The plot shows that the top 50 percentile participants in terms of number of topics clicked, clicked on at least eight Vivaran topics. These included a variety of topics including climate change, agriculture, history, health and wellness, and sports, along with topics related to research and technology that were closely related to workplace.

In terms of topic preferences, several participants stated that the articles they clicked were mostly in line with their general news interests:

> "So I would say 80 percent of the time I've clicked on a link in Vivaran, it's because it's loosely related to something I've read about or I'm interested about beforehand itself, though I might not have used that exact same source" - P2

This finding reflects on the inertia that the users generally face in diversifying their interests, and also the framework's human-centered tailoring of news feeds according to the news interests of the organization, which is essentially an editorial aggregation of the individual news interests. We also find this evidence quantitatively – above 50% of the topics clicked on were around science, technology, and research, which is commensurate with the common interests of a Computer Science Research organisation as shown in figure 3a. Vivaran presented articles on different issues around these topics, many of which were relevant to the research interests of the organization, e.g., articles on human computer interaction, cryptography, and machine learning and AI. The participants were also interested in a diverse set of topics related scientific and technological research, that were not directly connected to their workplace (for instance, on articles related to latest advancements in space science or mathematical puzzles). We found a significantly lesser number of reactions (21 reactions on the top 10 most reacted topics) on articles during the study period as shown in figure 3b. This is indicative of participants' unwillingness to react on the articles despite clicking on them. As revealed from some of the interview findings (presented in the next section), this might be because of the participants' unwillingness to get spotted by others within the organization through reactions. However, the plot shows that participants mostly reacted with articles related to current affairs within the city, science, and cullinary topics. We found that most articles related to such topics were fun-to-read, interesting articles that generated more reactions than articles written on a comparatively serious note.

Some users also connected with their colleagues by discussing these articles, belonging to both professional and popular topics, offline:

> "I really enjoyed the Zodiac killer article, since I had seen the movie it caught my eye, and I ended up discussing about this later with friends" - P3

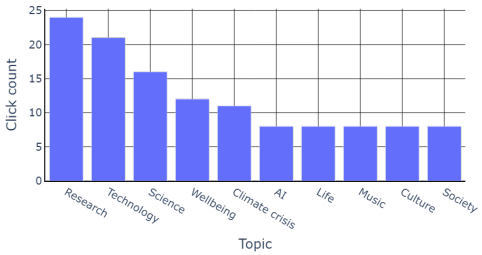
> "There was an article related to language technologies and I remembered that, it came up in a discussion when I was in a meeting with colleagues who work in this area of research" - P5

These findings are important as a primary contribution of the framework is to encourage such offline connections among colleagues over news, which leads to enhancement of team spirit and knowledge sharing within the orgaization.

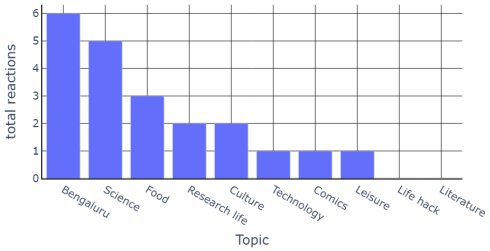
Finally, participants pointed out how they liked Vivaran curation as it provided them a one stop access to relevant and credible news. There existed an element of trust involved due to the fact that the news was being delivered from within the organisation. This is reflective of the advantage of an organization/community based news curation feature of the framework:

> "Usually I am skeptical about a news piece at the onset, but because it is being delivered by my organisation, I don't have to make the effort to do double fact-checks through various sources. Thus, the framework was indeed able to instill a sense of trust among the users through an organizational set up"- P8

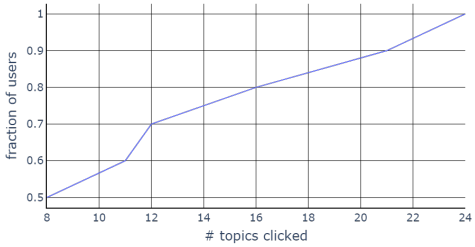
As expected, some participants also stated that a challenge was to find enough time to read the long, descriptive articles presented by Vivaran, despite their value addition:



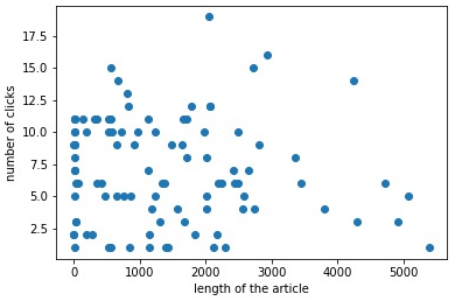
(a) Topic wise clicks



(b) Topic wise reactions



(c) CDF of number of topics clicked on



(d) Number of clicks vs. article length

Fig. 3. User interaction data capture

> "... what happens is these things catch your attention and then you follow up and it takes away from work and then you say, 'ohh I spent too much time reading and following this news'. These are long reads and then if you want to understand something that you go Google and find some more and you get context." – P10

The articles were longform and descriptive of variable length, we found more people reading shorter articles. As evident from figure 3d, most of the clicks are clustered in the low article length region in the plot, indicative of the aposteriori effect of increase in number of clicks on reducing article length.

4.2 Engagement

A key feature of the Vivaran framework is its facilitation of conversation among users over news. Around 34% of the articles released on Vivaran during the study period generated conversations, and the participants found them insightful as they helped them get an initial idea about the article's topic of discussion, nudging them to dig deeper:

> "So in some of these conversations, there's more information about the article or topic in discussion – it may be a recent update or the history behind it. The conversation actually gives you a background about it (the article)" – P10.

Some users also found the conversations and reactions on articles useful as they were a means of validating their own interests. They revisited the channel to find out the reactions and conversations on articles they had read or interacted with:

> "The conversations that do happen within the channel itself ... interests me, and that is also another reason why I go back to the channel to see if someone's commented on something that I was interested in." – P12

The interest in conversations was also boosted by the element of familiarity and trust towards people who were commenting, i.e., people found interests in the conversations since their colleagues and seniors were involved in them, unlike in social media where unfamiliarity with the commenter leads to a general lack of interest in the conversation. This is again an important advantage brought in by the organizational news aggregation set up:

> "If some random person on Twitter posts a comment about something, unless it's someone I actually know or care about, I see it as a random opinion. But here, people I knew and trusted commented." – P5

Participants also saw some of these conversations as potential opportunities of collaboration, since some of these discussions were on their common professional interests. This is an indication of the advantage that the conversational feature of Vivaran brings through knowledge sharing and potential research collaborations:

> "If that was something I was working on then through this [Vivaran] there can be a lot of collaboration opportunities. I saw how people werecommunicating through this channel [on various research topics], which was a point of interest to me. I now knew whom to approach and how to talk to them. It's just easier, much, much smoother way of collaborating with others. " – P6

However, we found that many users within the organization generally consumed news passively, and did not feel the need to engage with it, unless it was within their professional interests. This behavior was also in sync with their abstinence from interactions on social media, on social issues. This is indicative of the fear of being judged and labelled to an ideological extremity, provided the rise in polarisation of social and political discussions in the Indian society where people are labelled as left or right wing based on their discussions:

> "Even though I believe personally that the whole war is to a greater degree Russia's fault, I would not be very comfortable talking about it on office platforms." (on an article loosely connected to the Ukraine issue) – P11

This indicates users' unwillingness to comment or converse on issues that might lead to difficult conversations in a workplace setting. In general, users expressed that they either refrain from commenting on social media in general, or comment only if it's an issue they are closely associated with:

> "I think it's worth mentioning that there are many times where I don't even respond or like or comment because that's my habit ... I don't comment on any social media ... unless it's something that I'm really associated to..." – P11

5 DISCUSSION

Vivaran acts as a foundation to the task of online news aggregation that can serve the holistic news consumption requirements of an organization, by providing its employees with novel, high quality, and credible news content, enabling knowledge dissemination. Existing studies [8] have shown the importance of knowledge building activities in workplaces globally, even outside their area of work, which also includes organizational newsletters [16]. Vivaran adds to these efforts by additionally providing workplace users with a platform that helps them consume and discuss news, through active engagement and interactions on an online professional communication channel. Such interactions can not only aid in building team spirit among the users, but also aid them in accessing cross-cutting views and news

content, which might eventually aid in the dissolution of echo chambers and user level filter bubbles [5, 6, 10, 13], which often are a result of hyper-personalized news content. Unlike social media platforms where the lack of sufficient regulation leads to significant toxicity [9, 12] within user conversations, the current framework reduces this risk by enabling users converse and come together in a professional set up.

Vivaran also involves a human-in-the-loop intervention where the organization recruits an editor who curates the news on a regular basis dependent on the needs of the organization. This has two benefits. First, it adds an additional level of credibility to the news recommended through strict quality check and adherence to established journalistic standards. Second, the human-centered understanding of organizational news requirements leads to formation of a feed that inherently is tuned to the needs of the employees of the organization, in a nuanced fashion. A similar framework thus might add value to other organizations in terms of knowledge dissemination through news. However, a limitation of this approach is the cost associated with hiring a full time editor. Thus, integration of the framework with an AI based aggregation solution might be useful in future.

As established from our initial findings, Vivaran currently has some limitations. While several participants found the conversational aspect of Vivaran useful, some others found it difficult to participate in these conversations owing to their avoidance of difficult conversations. This finding is in line with the social media participation trends of some users where they tend to avoid conversations [7] owing to the polarization introduced on different social and political issues. While we selected the subjects of news curation carefully to ensure that topics with significant polarity are not introduced, it could not completely counter the inertia of users in avoiding conversations.

The content aggregated by Vivaran also had certain limitations, despite it being one of the contributions of the system. While it is true that many participants agreed on the novelty and quality of the content presented through Vivaran, some reported scarcity of time to be one of the hindering factors in the system's usage. Long form content undoubtedly demands a higher time commitment from the users, which is difficult in some cases. For this reason, we ensured that the articles present in the feed consisted of an editorially framed article title and short summary, which provided users a brief understanding of the article content. However, in some cases, the users still felt the need for shorter articles. We plan to experiment with this trade-off between article length and quality in the next version of the system.

As part of future work, we intend to perform a comparative analysis of the existing version of Vivaran with an AI assisted recommendation set up. This is indispensable as in the long term, we need to empirically establish the advantages that the proposed framework has over standard AI based recommender systems. Such an AI based system can be implemented in two set ups: (a) Where the AI recommender system selects a pool of articles for the organization, from which the human editor samples a smaller set of articles, and (b) Where the news recommendation at the organization level is purely AI based, without the intervention of a human editor, the contrast is studied [2] Another direction to pursue would be to understand how the currently proposed framework aids in solving the filter bubble problem which is widely studied [3, 17]. By observing the news consumption patterns of the organization over time through Vivaran, we can observe if the active engagement and uniform news presentation leads to significant reduction in echo chambers. To effectively counter problems encountered in MS Teams, we plan to implement a new version of Vivaran that embodies a dedicated webpage for the news feeds and also provides facilities for user engagement (reactions, comments, and replies). A comparative analysis of user experience with this new version can then be done with the existing one. Finally, while we presented some evidences of the benefits users experienced by using the proposed framework, it is important to perform a longitudinal analysis by running the system for a longer duration and conducting the user study with the corresponding data. This will be essential for generalization of Vivaran in other scenarios.

REFERENCES

[1] Lewis A Baker and Carol Spencely. 2020. Blending Microsoft Teams with Existing Teaching Environments to Increase Access, Inclusivity and Engagement. *Journal of the Foundation Year Network* 3 (2020), 3–20.

[2] Jack Bandy and Nicholas Diakopoulos. 2020. Auditing news curation systems: A case study examining algorithmic and editorial logic in Apple News. In *Proceedings of the International AAAI Conference on Web and Social Media*, Vol. 14. 36–47.

[3] Md Momen Bhuiyan, Carlos Augusto Bautista Isaza, Tanushree Mitra, and Sang Won Lee. 2022. OtherTube: Facilitating Content Discovery and Reflection by Exchanging YouTube Recommendations with Strangers. In *CHI Conference on Human Factors in Computing Systems*. 1–17.

[4] Nisha Chanana. 2021. Employee engagement practices during COVID-19 lockdown. *Journal of public affairs* 21, 4 (2021), e2508.

[5] Seth Flaxman, Sharad Goel, and Justin M Rao. 2016. Filter bubbles, echo chambers, and online news consumption. *Public opinion quarterly* 80, S1 (2016), 298–320.

[6] Richard Fletcher, Antonis Kalogeropoulos, and Rasmus Kleis Nielsen. 2021. More diverse, more politically varied: How social media, search engines and aggregators shape news repertoires in the United Kingdom. *new media & society* (2021), 14614448211027393.

[7] Antonis Kalogeropoulos, Samuel Negredo, Ike Picone, and Rasmus Kleis Nielsen. 2017. Who shares and comments on news?: A cross-national comparative analysis of online and social media participation. *Social media+ society* 3, 4 (2017), 2056305117735754.

[8] LinkedIn Learning. 2022. 2022 workplace learning report: the transformation of L&D: learning leads the way through the Great Reshuffle. (2022).

[9] Silvia Majo Vazquez, R Nielsen, Joan Verdu, Nandan Rao, N de Domenico, and Omiros Papaspiliopoulos. 2020. Volume and patterns of toxicity in social media conversations during the COVID-19 pandemic. (2020).

[10] Mykola Makhortykh and Mariëlle Wijermars. 2021. Can Filter Bubbles Protect Information Freedom? Discussions of Algorithmic News Recommenders in Eastern Europe. *Digital Journalism* (2021), 1–25.

[11] Louis Martin and Dave Tapp. 2019. Teaching with Teams: An introduction to teaching an undergraduate law module using Microsoft Teams. *Innovative Practice in Higher Education* 3, 3 (2019).

[12] Binny Mathew, Ritam Dutt, Pawan Goyal, and Animesh Mukherjee. 2019. Spread of hate speech in online social media. In *Proceedings of the 10th ACM conference on web science*. 173–182.

[13] Efrat Nechushtai and Seth C Lewis. 2019. What kind of news gatekeepers do we want machines to be? Filter bubbles, fragmentation, and the normative dimensions of algorithmic recommendations. *Computers in Human Behavior* 90 (2019), 298–307.

[14] David Ong and Manimekalai Jambulingam. 2016. Reducing employee learning and development costs: the use of massive open online courses (MOOC). *Development and Learning in Organizations: An International Journal* (2016).

[15] Ruchi Ookalkar, Kolli Vishal Reddy, and Eric Gilbert. 2019. Pop: Bursting News Filter Bubbles on Twitter Through Diverse Exposure. In *Conference Companion Publication of the 2019 on Computer Supported Cooperative Work and Social Computing* (Austin, TX, USA) *(CSCW '19)*. Association for Computing Machinery, New York, NY, USA, 18–22. https://doi.org/10.1145/3311957.3359513

[16] Shaun Randol. 2020. 8 Reasons Why You Need an Employee Newsletter. https://www.linkedin.com/pulse/8-reasons-why-you-need-employee-newsletter-shaun-randol/.

[17] Paul Resnick, R Kelly Garrett, Travis Kriplean, Sean A Munson, and Natalie Jomini Stroud. 2013. Bursting your (filter) bubble: strategies for promoting diverse exposure. In *Proceedings of the 2013 conference on Computer supported cooperative work companion*. 95–100.

[18] Martyna Joanna Surma, Richard Joseph Nunes, Caroline Rook, and Angela Loder. 2021. Assessing employee engagement in a Post-COVID-19 workplace ecosystem. *Sustainability* 13, 20 (2021), 11443.

[19] Shachi Yadav, Anshuman Dubey, Pulkit Chawla, and Saurav Jha. 2020. Employee engagement strategy for employees working in virtual environment in the IT industry.