

Peer-Reviewed Structured Abstract

Leveraging User Activity Insights to Enhance Notifications Overload in a Knowledge-Sharing Platform

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Summary

This study explores user engagement patterns to improve a platform's notification system and efficiency, designed to enhance knowledge sharing by enabling employees to contribute value through effective communication. As the platform grows, concerns about notification overload have increased due to the rising number of notifications. Using multiple linear regression and logistic regression models, the analysis revealed that users primarily engage within their declared interests, but also contribute significantly beyond these areas. These insights, combined with clustering analysis, help refine the platform's auto-tagging feature and introduce a response threshold to better identify the "right" users for notifications. Future research will focus on cross-category engagement, exploring user response duration, and analysing activeness and responsiveness scores. Additionally, expanding the dataset across different organizations will uncover further behavioural patterns, allowing for more effective notification targeting, reducing overload, and improving the overall user experience.

Background

In today's digital workplace, efficiently addressing internal queries through communication systems is crucial for operational efficiency and employee engagement. Knowledge-sharing platforms, which enable the transfer of expertise within organizations, are essential for maintaining competitiveness by improving productivity and driving innovation [1]. Large organizations rely on these platforms to facilitate collaboration without frequent in-person interactions [2]. However, as more users interact with these platforms, there is a growing risk of notification overload, which can overwhelm users and reduce engagement [3]. The current system on the knowledge-sharing platform notifies users based on the categories they select when creating their profiles. Users receive alerts for posts when the users' selected categories and knowledge-sharing categories match. However, as activity grows, it becomes essential to ensure this system continues to drive effective engagement. This research analyses user behaviour patterns to provide data-driven insights into optimizing notification strategies. By refining auto-tagging and notification methods, in addition to the existing system, users can also be routed with notifications based on the expertise they have demonstrated. This ensures that notifications align with user engagement patterns, reducing fatigue and improving the platform's efficiency in fostering collaboration.

Methodology

The study utilizes user behaviour data extracted from a database feature of a knowledge-sharing platform developed by a global tech company. This platform creates an ecosystem where employees can connect, support each other, and share expertise. The dataset spans a 2.5-year period, from 2021 to mid-2024, and includes 1,884 unique users and 129 knowledge-sharing posts. Before engaging in the detailed analysis of the research design, it is important to examine the preliminary insights derived from the dataset, which involved analysing how users interacted with posts based on their selected areas of interest, as illustrated in Table 1 and Figure 1.

Description	Size
- Number of Unique User ID	1884
- Knowledge-Sharing posts on the platform	129
- Posts that received a response	114
- Posts that did not receive a response	15
- User respondents for by each user	220
- Responded within users' areas of interest matched category	195
- Responded Outside users' areas of Interest	25

Table 1. Summary of Knowledge Sharing Activity and User Responses

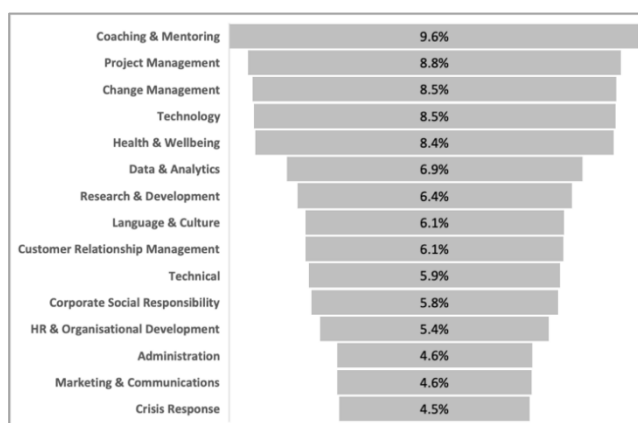


Figure 1. Distribution of User-selected Areas of Interest

Furthermore, Figure 1 illustrates the distribution of user-selected areas of interest on the platform, presenting 15 categories that users choose to indicate their interests. Building from these preliminary insights, three analytical models are employed. The first, multiple linear regression, explored the relationship between users' selected areas of interest and their engagement levels. This statistical validation examined whether the platform's framework supports engagement within declared areas of interest. Next, we examine user engagement patterns using logistic regression to determine whether users engage primarily within their declared areas of interest or go beyond them. This analysis helps identify whether users strictly follow their interests or engage in other categories. Finally, clustering analysis segments users based on their engagement behaviour, identifying those who engage beyond their declared interests. This insight helps refine notification strategies by targeting users who engage both within their selected categories, as the current system does, and beyond their declared areas of interest.

Results and Observations

The multiple linear regression analysis provided statistical validation of the current system, demonstrating that users with more selected areas of interest and higher contribution levels, as reflected through badge achievements, are significantly more likely to engage with knowledge-sharing posts. This statistical validation confirms that the platform successfully encourages engagement based on users' declared interests. However, the analysis also highlighted that users often engage beyond their selected interests, suggesting room for improvement in the notification system. To further explore this behaviour, logistic regression was conducted to assess the likelihood of users responding beyond their declared areas of interest. The results showed that for each additional post a user responds to, the likelihood of them engaging beyond their declared interests increases by 18.3%. This finding emphasizes the importance of recognizing user engagement patterns beyond their initial preferences, which can be leveraged to enhance the notification system by ensuring it targets the right users based on their actual engagement behaviour, not just their stated areas of interest. The clustering analysis also highlighted opportunities for refining the platform's notification system. By routing alerts not only based on category matching but also on users' demonstrated engagement across various categories, particularly those who consistently respond beyond their declared interests, the notification system can be optimized. Additionally, applying a response threshold, identified through the clustering analysis, ensures that notifications are sent to the most active and relevant users, enhancing the overall effectiveness of the platform's knowledge-sharing environment.

Conclusion

These findings offer key insights for enhancing the platform's notification system by incorporating both declared interests and real engagement behaviour. Users consistently engage beyond their declared areas of interest, showing that the current system can be further optimized to capture the full extent of their contributions. By integrating both the current system and targeting the right users based on their demonstrated engagement levels, notifications can be more effectively routed to those who are most likely to contribute meaningfully across multiple categories. Future research could focus on analysing response duration over the course of the year, exploring activeness and responsiveness scores to better understand how consistently and how quickly users engage across different categories. Additionally, incorporating badge-level recognition could further incentivize participation by highlighting users who contribute regularly. Furthermore, cross-feature engagement analysis could explore whether users actively responding from this knowledge-sharing posts are also participating in other platform features, allowing for a deeper understanding of their overall engagement patterns.

References

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