



I'm Interested, but Can/Would Only Skim It: Studying Smartphone Users' Receptivity to News Notifications

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ABSTRACT

News notifications have become an important way for users to access news. But news notifications sent at an inopportune moment may not be processed sufficiently, which is one of the contributing reasons for misinformation dissemination. We built a news app called NewsMoment, and observed five users' receptivity to its news notifications. We found that these users 60% of the time only spent less than 30 seconds on notified news, regardless of their high interests in them. Furthermore, they mostly regarded themselves as having read the complete content. This suggests investigation of opportune moments for news notification delivery may be needed to improve users' processing of news.

CCS CONCEPTS

• Human-centered computing → Mobile phones.

KEYWORDS

News Notification; Opportune Moment; Mobile News Reading; Notification Receptivity

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1 INTRODUCTION

With the increasing popularity of smartphones, numerous studies have shown that it has become one of the most important channels for people to access news [7]. 22% of people in the U.S. reportedly access news via smartphone notifications[7], and news is also reportedly one of the top categories of smartphone notifications[6].

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Indeed, news notifications can keep smartphone users exposed to the latest news events.

Nevertheless, how much time would users actually spend on reading these pushed news? Researchers have provided evidence that many users tend to dismiss notifications without actually consuming the content (e.g. [9]). One major reason for this is that the delivery of notifications has not taken users' receptivity into enough consideration, causing that users, even if they do not simply dismiss the notifications, also do not necessarily have sufficient time or cognitive resources for processing the content, especially when at an inopportune moment [8]. Incomplete processing of news has been considered harmful to the society, as it is one of the major factors contributing to misinformation dissemination [5], i.e. users sharing misinformation without spending enough time processing and critically thinking about the news.

Finding opportune periods of users for reading content based on their schedules seems a promising approach [1]. However, when a news event would occur is hard to foresee; furthermore, the current practices of mobile news consumption have been found to be short, frequent, and throughout the day[4]; thus, finding a period committed to news reading may not fit mobile news audiences' current practices. Thus, the question is: can we identify opportune moments specifically for processing notified news content? To approach this question, it is necessary, firstly, to understand users' receptivity to news notifications, and how different contextual factors affect their receptivity levels.

In our research, we invited smartphone users to use *NewsMoment*, a news app we built, and observed how users responded to its news notifications and reading behaviors on the app. *NewsMoment* also delivered interval-based experience sampling method (ESM) questionnaires to obtain their *in situ* context and self-perceived receptivity to these notified news.

In this paper, we report our preliminary observations on five users' receptivity to news notifications. We show that even if users are interested in the news and find them relevant, they only spent less than 30 seconds reading the news 60% of the time, and less than 10 seconds 20% of the time; yet, 91% of the time, they self-perceived themselves having read more than 70% of the content despite the quick and rough reading. This finding suggests that content relevance may not be the major reason for shallow reading of news

[2]. As a result, our future work will seek to further understand the role of context, finding its relationship with users' receptivity to news notifications.

2 STUDY METHODS

We built an Android news app called *NewsMoment*, which aggregates news from nine popular news apps in our country and delivers news notifications at the pace aligning with those news apps. Users can customize from which of the nine apps they hope to receive news notifications. Meanwhile, *NewsMoment* blocks the news notifications from the nine news apps so that users will not receive duplicate news notifications about the same news event. Users' reading behaviors are logged in *NewsMoment*, including their actions and *viewport*, the position of the news page visible at any given time to the user [3]. By recording the occurrence of any changes in viewports, we can track and analyze users' reading progress and duration on any particular part of the news article. In this paper, due to the page limit, we mainly focus on the duration users spent on each news article. Finally, *NewsMoment* delivers ESM questionnaires 8-10 times per day, to obtain users' *in situ* context and self-perceived receptivity to notified news. The ESM prompts are sent randomly in 8-10 intervals, with at least one hour between any two ESM prompts. In an ESM questionnaire, users answer questions related to the news content, and their attitudes toward and actions on the sampled news, including completeness of their reading. We had recruited five Android users (all males, ages ranged from 21 to 27, mean = 24.2, SD = 2.28), who used news apps on their phones. During the study, they were asked to use *NewsMoment* to receive notifications and read news for five days.

3 PRELIMINARY RESULTS

The five users received 7-78 news notifications from *NewsMoment* per day ($M=36$, $SD=30.34$). 22.3% of the time they tapped into the news notifications. They read a total of 379 news articles and responded to 100 ESM questionnaires. All responses reported the experience of reading the news at the first time. Among these, 35% of the time the users reported that they read the notified news. However, they spent only less than 30 seconds reading these notified news 60% of the time, followed by 60 to 90 seconds (20%) and 30 to 60 seconds (17%). Even more, 20% of the time they merely spent less than 10 seconds. It is noteworthy that, however, from ESM responses, 60% of the time users thought they read about 90-100% of the content, and 31% of the time they thought they read 70-80%. In other words, most of the time (91%), participants perceived them to read the majority of the content, despite the short time they spent on the news articles. Furthermore, as shown in Figure 1, this trend was across all levels of interests and relevance of the article. This suggests that news content was not the major reason for news shallow reading [2]. While this may be because the articles may not take much time to "get the point", we consider their receptivity, i.e. how much cognitive resources and time they have, in the moment is another contributing factor.

4 CONCLUSION AND FUTURE WORK

Numerous researchers have expressed concerns in users' tendency of shallow reading of news caused by rapid and rough reading,

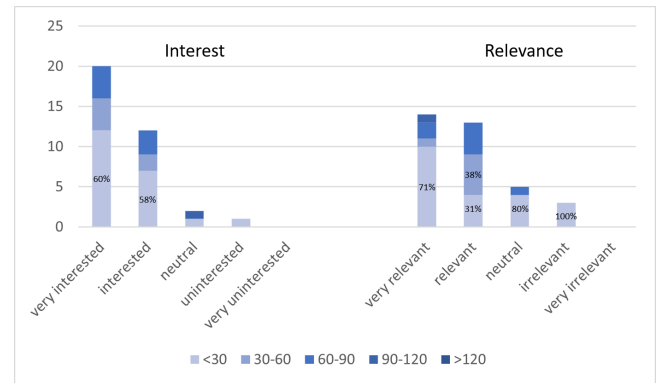


Figure 1: Reading time across all levels of relevance and interest of the news articles.

because it is one of the contributing reasons for misinformation dissemination [5]. Our preliminary results show that shallow reading on mobile devices seems to exist, even if users are interested in the news article. Nevertheless, we optimistically deem that considering users' receptivity may mitigate this problem. To take a further step to this solution, our future work is to understand the relationship between users' receptivity to news notifications, including their follow-up sharing behavior, and various contextual factors.

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REFERENCES

- [1] Tilman Dingler, Benjamin Tag, Sabrina Lehrer, and Albrecht Schmidt. 2018. Reading scheduler: proactive recommendations to help users cope with their daily reading volume. In *Proceedings of the 17th International Conference on Mobile and Ubiquitous Multimedia*. 239–244.
- [2] Nir Grinberg. 2018. Identifying modes of user engagement with online news and their relationship to information gain in text. In *Proceedings of the 2018 World Wide Web Conference*. 1745–1754.
- [3] Dmitry Lagun and Mounia Lalmas. 2016. Understanding and measuring user engagement and attention in online news reading. In *Proceedings of the ACM International Conference on Web Search and Data Mining*. 113–122.
- [4] Logan Molyneux. 2018. Mobile news consumption: A habit of snacking. *Digital Journalism* 6, 5 (2018), 634–650.
- [5] Meredith Ringel Morris, Scott Counts, Asta Roseway, Aaron Hoff, and Julia Schwarz. 2012. Tweeting is believing? Understanding microblog credibility perceptions. In *Proceedings of the ACM 2012 conference on computer supported cooperative work*. 441–450.
- [6] Nic Newman. 2016. News Alerts and the Battle for the Lockscreen. *University of Oxford* (2016).
- [7] Nic Newman, Richard Fletcher, Anne Schulz, Simge Andi, and Rasmus-Kleis Nielsen. 2020. Digital news report 2020. *Reuters Institute for the Study of Journalism* (2020), 2020–06.
- [8] Martin Pielot, Bruno Cardoso, Kleomenis Katevas, Joan Serrà, Aleksandar Matic, and Nuria Oliver. 2017. Beyond interruptibility: Predicting opportune moments to engage mobile phone users. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 1, 3 (2017), 1–25.
- [9] Martin Pielot, Amalia Vradi, and Souneil Park. 2018. Dismissed! a detailed exploration of how mobile phone users handle push notifications. In *Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services*. 1–11.