

# WHAT DRIVES READERSHIP? AN ONLINE STUDY ON USER INTERFACE TYPES AND POPULARITY BIAS MITIGATION IN NEWS ARTICLE RECOMMENDATIONS



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## ONLINE STUDY

**Start:** 27th of October, 2020

**End:** 9th of November, 2020

**Use-Case:** Related News Articles



**Significant Key Events:** Vienna Terror Attack, Death of Sean Connery, COVID-19 Lockdown Announcement, US Elections Results 2020

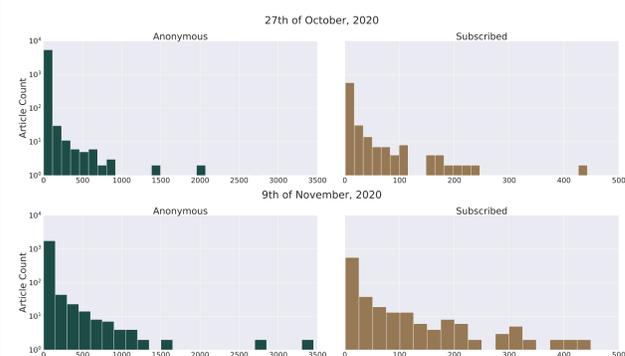
## CONCLUSION

**C1:** The probability of recommendations to be seen is the highest for desktop device

**C2:** The probability of clicking the recommendations (once they are seen) is the highest for mobile devices

**C3:** The reading behaviour of subscribed users is less prone to popularity bias when compared to anonymous users

**C4:** Personalized, content-based news recommendations result in a more balanced distribution of news articles' readership popularity, especially for anonymous users



**C5:** Significant key events cause for notable fluctuations of the recommender performance:

- Vienna Terror Attack on the 2nd of November was by far the most read news article

## EXPERIMENTS

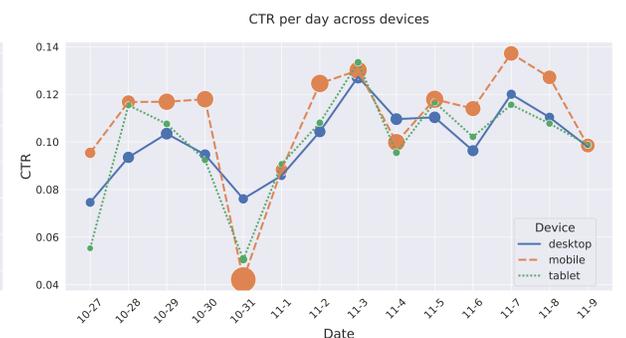
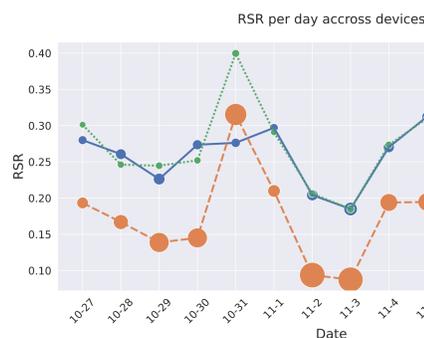
**RQ1:** How does the user interface type impact the performance of news recommendations?

**Recommendation-Seen-Ratio (RSR)** is defined as the ratio between the number of times the user actually saw recommendations (i.e., scrolled to the respective UI section) and the number of recommendations that were generated for a user.

**Click-Through-Rate (CTR)** is measured by the ratio between the number of actually clicked recommendations and the number of seen recommendations.



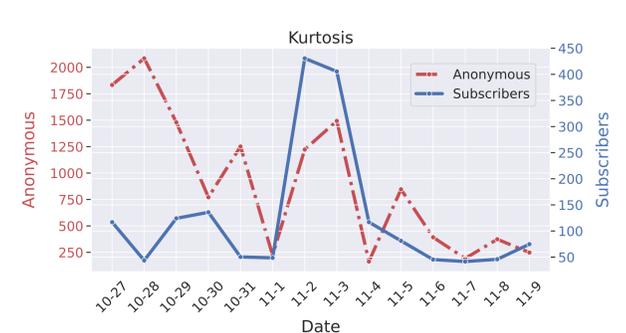
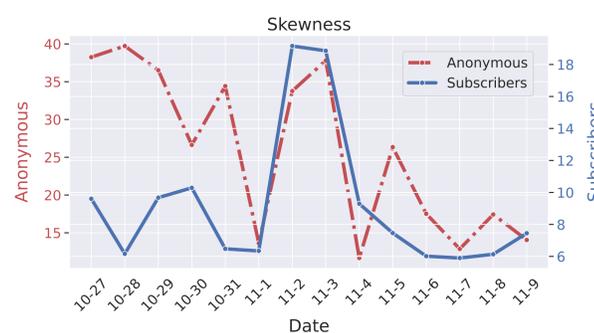
%	Desktop	Mobile	Tablet
RSR	26.88	17.55	26.71
CTR	10.53	13.40	11.37



**RQ2:** Can we mitigate popularity bias by introducing personalized, content-based news recommendations?

**Skewness** measures the asymmetry of a probability distribution. A high value depicts a right-tailed distribution, i.e., indicates biased news consumption wrt. popularity.

**Kurtosis** measures the "tailedness" of a distribution. Higher values indicate a higher tendency for popularity bias.



A large gap for exists between anonymous users and subscribers at the beginning of the study. Only most-popular recommendations were shown to the users at that time. A considerably lower difference between the user groups is achieved at the end of the study.

## DATA STATISTICS

**Interface Types:** Desktop, Mobile and Tablet

**User Groups:** Anonymous and logged-in Subscribers

Measure	User group	Desktop	Mobile	Tablet	Sum
No. of (users) / sessions	Anonymous	205,703	925,000	52,209	1,182,912
	Subscribers	(8,650) 14,136	(5,758) 7,712	(1,502) 1,873	(15,910) 23,721
	Sum	219,839	932,712	54,082	1,206,633
No. of distinct news articles	Anonymous	14,002	6,631	3,552	17,028
	Subscribers	2,977	1,904	1,353	3,238
	Sum	14,378	6,711	3,645	17,372
No. of reads	Anonymous	474,855	1,802,197	94,399	2,371,451
	Subscribers	168,035	110,268	17,113	295,416
	Sum	642,890	1,912,465	111,532	2,666,887