











instantly diffusing unproductive activity throughout the whole network. Furthermore, high-degree users in *BitcoinStackExchange*, *EnglishStackExchange* and *r/Austria* temporarily managed to reduce the influence of trolls as the number of negatively affected users decreases at certain amounts of connections (see areas marked with **A** in Figure 4). However, once the trolls connect to larger amounts of high-degree users, the number of affected users increases again. It appears as if the number of informed selected users and their activity is crucial for the trolls' ability to affect existing users in networks. For example, 10 users with high levels of activity at the time the trolls connect to them can better compensate for the trolls' detrimental content than 10 users with low activity.

To put this in a real-world context, we argue that a small amount of trolls either sends private messages to users in the periphery of collaboration networks or posts a new topic that addresses to highly active users. This experiment allows us to learn to which extent the users in networks can be exposed to trolls before they start to collapse.

## 5. CONCLUSIONS & FUTURE WORK

In this paper we simulated and investigated the impact of trolls in online collaboration networks. Our results showed that small amounts of trolls have a higher impact when connecting to users in the networks' periphery, as those users receive and exercise less peer influence and cannot compensate for the negative influence of trolls as well as highly connected and highly active users can. However, larger amounts of trolls influence activity levels more when performing informed selection of high-degree users. While these users—building the core of the networks—are able to compensate for the trolls' influence longer, overall activity is drastically reduced once high-degree users are infected and start spreading unproductive activity themselves. Additionally, there appears to be optimal upper thresholds of users that can be targeted by a single troll to maximize impact in the form of affected and infected users. If the number of the trolls (or the negative activity) is not large enough and activity is more equally distributed across users, increasing the number of targeted (i.e., connected to) users might even dampen the impact of trolls.

For future work we plan on further extending this analysis by crawling and adapting our model towards simulating empirically observed events of online vandalism (e.g., Wikipedia) and spam (e.g., deleted posts on StackOverflow or Reddit).

We strongly believe that the presented analyses of two different experiments regarding trolls represents a very important first stepping stone towards a new line of tools, methodologies and models to simulate the impact of internal and external factors on activity dynamics of collaboration networks.

## 6. ACKNOWLEDGEMENTS

Parts of this work were funded by the KONDE project of the Austrian Federal Ministry of Education.

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