Signals Matter: Understanding Popularity and Impact of Users on Stack Overflow

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This paper proposes that certain non-trivial badges, reputation scores and age of the user on the site positively correlate with popularity and impact. Further, it proposes the presence of costly to earn and hard to observe signals qualitatively differentiates highly impactful users from highly popular users. Virtual rewards act as symbols of social status, despite having no explicit value of their own. Some rewards/ badges are hard to earn and hence are earned by few, while some are easier to earn and act as an incentive to learn. The reputation points of users on Stack Overflow along with community activity dynamics are good predictors of the long-term value of questions and answers. The paper solely focuses on answering two questions:

- According to Stack Overflow users, what social qualities do reputation scores and badges intend to signal?
- To what extent do these game elements actually signal or indicate the qualities that users expect them to?

A survey was conducted of Stack Overflow users to gauge their views about the game elements and the platform in general. It shows the importance of badges differently, yet badges and reputation scores have a subconscious impact on their future actions. It points towards the question of what user attributes they can signal and to what extent. Based on the survey results it was found that the respondents with low reputation consider reputation scores to be better indicators of user popularity than badges. The paper designs hypothesis based on the insights drawn from the survey:

- Reputation scores and Badges are positively correlated with popularity as well as impact of users.
- Reputation scores are better indicators of popularity as well as impact compared to Badges.

To test the hypothesis a linear regression model was made and it was observed that Reputation model is a good predictor of popularity. That is, users with high reputation points tend to attract other users to their profile pages. Also, reputation points are good predictors of impact. Yet, Badge Model improves upon Reputation Model because badges capture a more nuanced summary of the user's contribution.

Valuable contributions:

The paper provides evidence that badges add more explanatory power compared to reputation scores. Also, that some of the game elements also act as reliable digital signals of social qualities

such as popularity and impact. It reveals that certain non-trivial answer badges, high reputation scores and age of the user on the site indicate significant correlations.

This paper sheds light onto the role of virtual rewards in studying user qualities on crowd-learning platforms. It encourages further exploration of the role of game elements as symbols of social status in socio-technical systems.

Critique of the paper:

- Metrics for computing popularity and impact scores are reductive. They are biased towards estimates of the number of views on profile pages and user posts obtained via internal site analytics.
- The focus is specifically on reward-based features and do not incorporate content-based features.
- The past evidence has shown that women have faced significant barriers to participating on the site. This suggests that game elements may be biased against some users.

Future work/Improvements:

- Results can be more accurate if linguistic attributes of posts that affect performance are examined.
- The data set can be improved if some extra data is extracted only from female users and further compared with only male user data. This could show the correlation between the genders and how the game elements impact them.