Tweeting Educational Technology: A Tale of Professional Community of Practice

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ABSTRACT

This paper explores an Israeli professional community on Twitter practicing educational technology. Networking analysis of 42 users and 296 structural connections among them revealed that the adoption of Twitter was normally distributed and active participation was asymmetrical - 14.3% of users produced 80% of the tweets. Investment in participation was highly gratified by influence on the audience.

Keywords: Professional Communities of Practice, Twitter, Social Network Analysis, Participation, Diffusion of Innovations, Uses and Gratification

INTRODUCTION

Professional communities of practice have moved recently from online forums to social network platforms. The Diffusion of Innovation Theory (Rogers, 2003) suggests that adoption of an innovation over time is normally distributed: from innovators (2.5%) and early adopters (13.5%), through early (34%) and late majority (34%), to laggards (16%). This approach offers valuable insights for modeling the entire life cycle of innovation adoptions (Chang, 2010).

This paper investigates social networking behavior on an Israeli professional community of people working or studying the field of educational / information technologies and connected by Twitter. The stream of messages on Twitter allows community members to be peripherally aware of surrounding conversations and to consume information without active participation (Boyd, Golder, & Lotan, 2010). Therefore, compared to a "long tail" distribution of active participation in other social media (Blau, 2011) ranging near the 20:80 rule, according to which 20% of the participants produce 80% of the content, tweeting might be even more unequal. Structural connections between Twitter users are directed; participants can "follow" other users without being reciprocated (Boyd et al., 2010). These connections enable the exploration of behavior on Twitter in terms of user investment in participation by tweeting and following others, as well as gratification mechanisms - different forms of influencing the audience.

METHODOLOGY

The activities of 42 users and 296 structural edges (Leavitt, Burchard, Fisher, & Gilbert, 2009) among them during the period of 4.5 years (March 2007 - October 2011) were extracted, analyzed, and visualized using NodeXL, an open-source application for network analysis. The participants were located using relevant search queries in Hebrew and English, searching for Twitter accounts of known researchers and professionals in the field and checking followers of relevant academic institutions and professional organizations (Forkosh-Baruch & Hershkovitz, 2012). Only Twitter accounts with a minimal level of activity (at least 5 tweets or favoriting of tweets) during the three months before extraction of the data were included in this study (Cha, Haddadi, Benevenuto, & Gummadi, 2010). The data was analyzed in terms of user investment into the community (e.g., active participation by tweeting and passive participation by following others) and gratifications (e.g., influence on the audience, measured by 1- the degree of centrality into the network measured by the PageRank (Weng, Lim, Jiang, & He, 2010) - an analysis algorithm, named after Larry Page that assigns a numerical weighting to each element of a hyperlinked set of documents in order to assess its relative importance within the set, 2-number of followers (Cha et al., 2010), and 3-number/percentage of tweets marked as favorites).

FINDINGS

The evolution of the community during the period of investigation as analyzed through dynamic filters of NodeXL was consistent with the normal distribution curve (Figures 1-4), as proposed by Diffusion of Innovations Theory (Rogers, 2003).
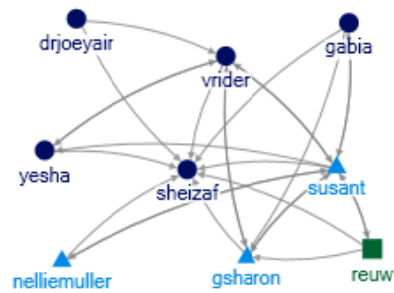

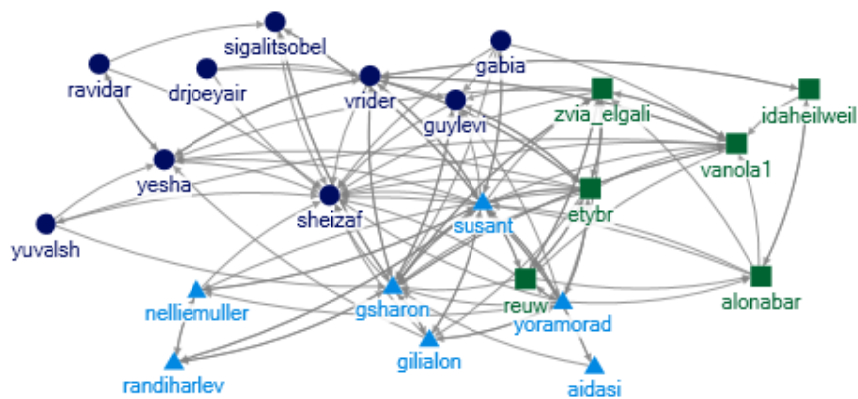**Figure1 1st year network (March 2008)**

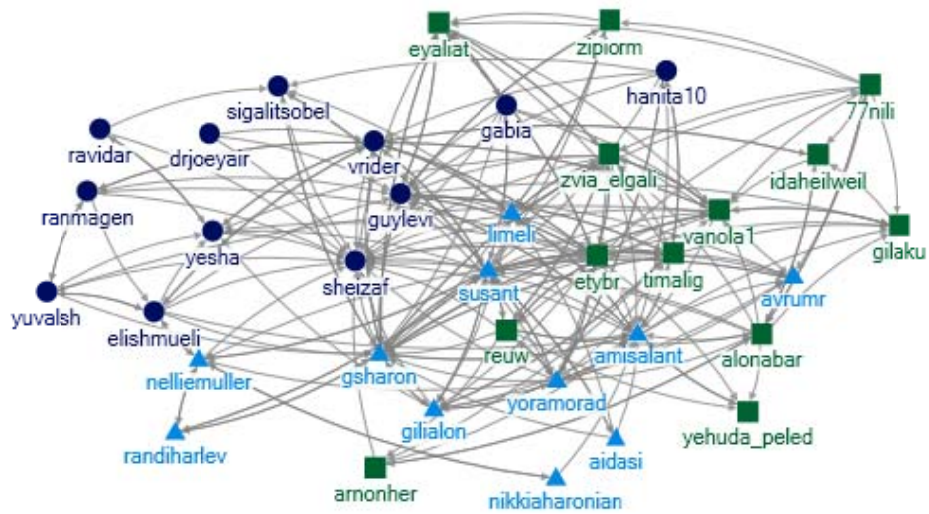**Figure 2 2nd year network (March, 2009)**

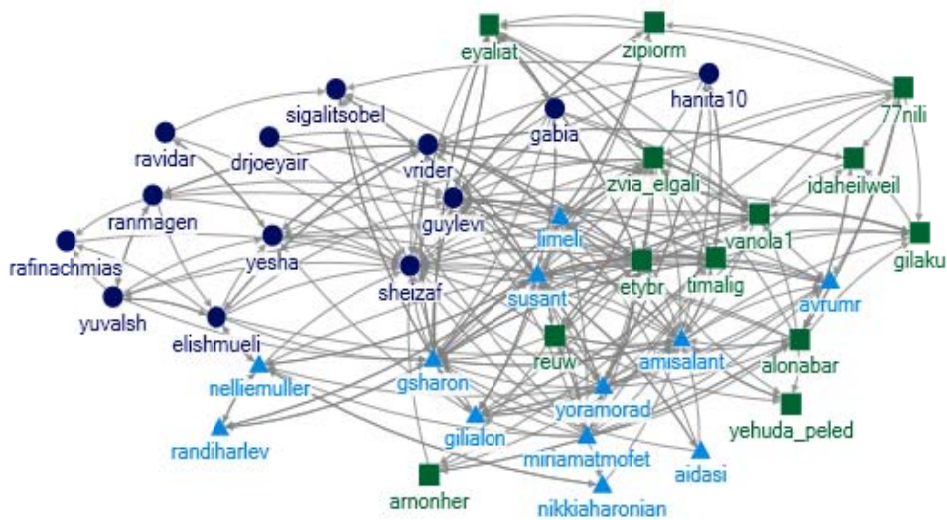**Figure 3 3rd year network (March, 2010)**

Figure 4 4.5 year network (October, 2011)

Consistent with the literature regarding the "long tail" distribution of content creation in other platforms (Blau, 2011; Zuckerman, Blau, & Monroy-Hernández, 2009), active participation in the community on Twitter was highly asymmetrical; six participants (14.3%) produce about 80% of the community tweets (Range: 3-10.035, Median: 70.5, Mean: 643.14, SD: 1685.83).

Investment in the community by tweeting and following others was gratified by influence on the professional audience (Table 1).

Table 1 Participation and Influence on the Audience: Spearman Correlations

	PageRank	Followers	Favorites	Favorites %
Tweeting	.39**	.75***	.75***	.48***
Following	.30*	.50***	.50***	.28*

*** $p<.001$, ** $p<.01$, * $p<.05$

As Table 1 shows, participation highly correlated with the measures of influence visible to others: the number of followers and favorite tweets. However, only medium correlations were found between participation and invisible influence: the degree of user's centrality in the community social network measured by PageRank.

CONCLUSION

The data of adoption of Twitter by the identified professionals can be mapped within a bell curve - from innovators to laggards. Active participation in the Twitter community of practice was highly asymmetrical, suggesting that consuming information satisfies the professional needs of most of the users. Participation was highly gratified by visible influence on the audience (the number of followers and favorite tweets), while only medium correlations were found with invisible form of influence (the degree of centrality in the community network). Future studies may use triangulation with surveys or interviews in order to gain a deeper understanding of participants' needs and how these needs guide different patterns of using Twitter for professional purposes.

REFERENCES

Blau, I. (2011). E-collaboration within, between, and without institutions: Towards better functioning of online groups through networks. *International Journal of e-Collaboration, 7*, 22-36.

Boyd, D., Golder, S., & Lotan, G. (2010). *Tweet, Tweet, Retweet: Conversational Aspects of Retweeting on Twitter.* Paper presented at the HICSS -43. IEEE Computer Society, Kauai, HI.

Cha, M., Haddadi, H., Benevenuto, F., & Gummadi, K. P. (2010). *Measuring user influence in twitter: The million follower fallacy.* Paper presented at the 4th International Conference on Weblogs and Social Media (ICWSM), Washington, DC.

Chang, H. C. (2010). A new perspective on Twitter hashtag use: Diffusion of innovation theory. *The American Society for Information Science and Technology, 47*(1), 1-4.

Forkosh-Baruch, A., & Hershkovitz, A. (2012). A case study of Israeli higher-education institutes sharing scholarly information with the community via social networks. *The Internet and Higher Education, 15*(1), 58-68.

Leavitt, A., Burchard, E., Fisher, D., & Gilbert, S. (2009). *The influentials: New approaches for analyzing influence on Twitter. Web Ecology Project.* Retrieved October 17, 2011, from http://tinyurl.com/lzjlzq

Rogers, E. M. (2003). *Diffusion of innovations (5th ed.).* New York: Free Press.

Weng, J., Lim, E. P., Jiang, J., & He, Q. (2010). *TwitterRank: Finding topic-sensitive influential Twitterers.* Paper presented at the WSDM'10, NY, USA.

Zuckerman, O., Blau, I., & Monroy-Hernández, A. (2009). Children's participation patterns in online communities: An analysis of Israeli learners in the Scratch online community. *Interdisciplinary Journal of E-Learning and Learning Objects, 5,* 263-274.