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Analyzing collaborative networks emerging in Enterprise 2.0: the Taolin Platform

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Abstract

It's not easy to get people working in the same company to coordinate and network with one another and share information and resources. Competencies, positions, and the structural characteristics of the company, along with communication preferences and group assets, can all work against a productive exchange of ideas and information. Technology, and the Internet in particular, has the ability to alleviate these problems while also fostering the proliferation of creativity and efficiency in the workplace. The term "Enterprise2.0" has emerged to describe the incorporation of essential Web2.0 features, such as user engagement, into corporate settings; before, these platforms were known as "Intranets." In this white paper, we discuss the development and implementation of the open source Enterprise2.0 platform at the research institution Fondazione Bruno Kessler (FBK), which is home to over 400 academics and professionals engaged in a wide range of academic disciplines. We also examine the actions of various user types and their group dynamics, as well as conduct research into the platform's use and communication trends. Our preliminary study shows that users are more likely to engage in the most common social activities -- including conversing and browsing profiles -- with members of their own research group than with other colleagues. When we look at how central people are in conversation and profile view networks based on how long they've been part of the FBK community, we discover that newer members have a greater betweenness centrality. 2011 Elsevier Ltd. Published.

Key words

Enterprise 2.0, social networks, interactions, and cooperation at work are some of the keywords that come to mind.

Introduction:

Business 2.0 and Corporations The dissemination of information, the knowledge sharing among employees, the improvement of communication and collaboration, and the assurance of up-to-date information and advertisement of new projects or products are just some of the many communication-related challenges that businesses and organizations face on a regular basis. Similar needs arise inside businesses, where employees need to be aware of current initiatives and discover teammates who possess the expertise, they need to address an issue. It may be challenging for businesses and organizations to persuade workers to update their profiles with relevant, valuable, and dynamic

information, even though a number of services can be supplied to support this information and knowledge sharing requirement, such as intranet services and institutional websites. Social networking services (SNS) like Facebook, Myspace, and Orkut are widely used by individuals all over the world to make new friends, exchange updates, and discuss a wide range of topics. (Boyd & Ellison, 2007). The proliferation of niche social networking sites that cater to certain user demographics

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demonstrates the use and benefit of social media in specific settings, such as among employees in a company. (Demico et al., 2008). However, there have been little empirical studies devoted to examining this possibility and the social considerations involved in the integration of Enterprise 2.0 technologies into internal company communications. In this working paper, we report on the development of an open source Enterprise2.0 platform and its implementation inside a research organization, the Fondazione Bruno Kessler (FBK), and we explain preliminary results about the platform's use and communication patterns. Our research aims to better understand the potential benefits of using social networking sites at work, as well as the specific effects these sites have on their users and their online interactions. Our article takes a modern approach to research by using social network analysis to gather and examine actual platform use data and to compare user groups and their habits using social network metrics.

Taolin, an Enterprise 2.0 context platform

Social networking sites and other IT based resources, in particular, have proven to be quite effective in increasing the flow of information and the number of opportunities for employees to work together in the workplace. (Kostakos & Little, 2005). Web2.0 technologies, especially user engagement, are helping pave the way for the creation of new kinds of social interaction in the workplace by making it more common for people to utilize tools that are both user-friendly and adaptable. Enterprise2.0, or the phenomenon of "the use of emergent social software platforms within companies, or between companies and their partners or customers," (McAfee, 2006) is predicted to bring about beneficial change for professionals, collaborators, and employees within an organization. McAfee (2007) uses Granovetter's theory of the "strength of weak ties" (Granovetter, 1973) to illustrate how the usage of Social Networking Sites would change the way individuals interact with one another in the workplace by considering a typical knowledge worker in a big business. The author illustrates the many connections she may make: a core group of trusted partners (her "strong ties"), and a wider network of acquaintances and co-workers (her "weak ties") with whom she has casual contact or who she has been exposed to via her employment. However, there is a far bigger group of individuals who this average knowledge worker does not know but who may be useful to her if she did (her "potential ties"). These individuals may be able to answer some pressing research concerns, may have previously studied related issues, may know of a good resource, or may be willing to work with her on her study. Similarly, if her work, expertise, and talents were publicized, this knowledge worker may be useful to others. Inducing and favouring collaborative attitudes and supporting existing practices of work coordination, social networking sites may be beneficial for both the company and its staff. In this article, we explain early results concerning the platform's use and communication patterns and report on the current development of an open source Enterprise2.0 platform at Fondazione Bruno Kessler (FBK) in accordance with this interpretation. The Fondazione Bruno Kessler (FBK) is an Italian research center that employs over 400 people across a wide range of disciplines and levels of experience, including professors, graduate students, undergraduates, and technicians. Information technology, materials and microsystems, Italo-German studies, and the religious sciences are only a few of the many topics of study. FBK also investigates theoretical nuclear physics, communications and networking, and the efficacy of public policy. The Foundation hopes to make use of the wide range of skills and areas of expertise present among its members. However, the staff is divided up into around 35 separate study groups, and information seldom flows freely between them. One of the goals of the administration is to foster greater interactions and information exchanges among researchers from other departments and institutes, reflecting the increasingly multidisciplinary nature of modern science. Consequently, FBK is an ideal test bed in which to implement and evaluate Enterprise2.0 software.

Examining Taolin's Interpersonal Connections

Different opportunities exist for analysing data pertaining to the relationships between users on the Taolin collaborative platform, as suggested by the preceding description; furthermore, these opportunities are structured in part by the organizational environment (hierarchy and group organization of FBK Foundation) and in part by the Taolin platform itself, as derived from the mashup and collaborative perspective of Web.2 technologies. In this part, we detail the chat and profile views networks and how we retrieved and coded the original data from user activity logs, two of the interaction networks we investigated in this preliminary study. It also details the method of continuous recruitment of new champions, which is important to our analysis of the data we have.

The hiring procedure

Analysing the changes in champions' actions as the platform progresses and linking such shifts to the champions' traits that are more significant for collaborative expectations is one approach to gauging Taolin's instruments' efficacy. In reality, the Taolin collaboration space is intended to encourage researchers to adopt a cooperative

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mindset and facilitate communication amongst researchers from diverse fields of study. Given that Taolin is an ongoing process, it is vital that we take into account that every communication opportunity is modified whenever a new champion accesses Taolin (new nodes and new virtual connections); in other words, the recruitment process carried out for testing the Taolin platform may interfere with the interpretation of the data concerning activities on the platform. In a nutshell, this implies that as more and more "champions" join the platform, we will be able to collect information on a larger and larger percentage of the network nodes. Participants may choose and choose which other nodes to connect with for purposes such as communication, guidance, or a simple review of their activity profile, and links can be weak or strong based on the degree of interactions built among them.

A few months after Taolin's initial launch in April 2008, the platform began actively recruiting new users; during the first three months, most of the participants were Taolin developers themselves, and only after an initial experimental phase was the platform made available to users without extensive IT experience. (for a visual display of the champions acquisition process, see Figure 2). A total of 43 champions were counted after the first three months, and by the end of July 2009, the number had risen to 116. (Out of about 400 employees of the research institute).

Table 1 - Champion acquisition phases.

Phase description	Time period	# Champions
Phase 1 - experimental	June 2008 - Sep 2008	43
Phase 2 – platform open to champions	Oct 2008 - Jan 2009	74
Phase 3- development of platform	Feb 2009 – May 2009	106
Phase 4 – update situation	Jun 2009 – Jul 2009	116

Figure 2: Champion's acquisition (June 2008 - July 2009).

Thus, Taolin's rate of activity is linked to the development of the platform as a whole as a collaborative environment. To add to this, we can't rule out the possibility of homophily effects in the nascent stages, given that the users were first recruited from the friends and colleagues of the programmers' group (a common method of selection within this professional community). It's possible that once the acquisition process has been opened to users from other disciplines (phases 2 and 3), social activity will concentrate more among users from the same group (selection effect) than between groups with users who may have less immediate reasons to collaborate on the platform. This demonstrates that a) the recruitment criteria defined by the developers' team (friends of friends as in the small world case) and b) the social evolution of the platform itself, as a result of intended and non-intended connections associated to each new champion, are both necessary for a successful recruitment process. In the early stages of the platform, recruiting is more influential than social 'reproduction,' which grows in importance as the number of champions grows and as their tendency to engage does as well. In this paper, we report the activity of two months (April and May 2009), which proved to be more stable in terms of champions' composition, in order to define our methodology and limit the bias introduced by the recruitment criteria. To ensure that all network nodes remained operational during the entire two-month period, we only take into account the users who were champions at the start of the period and exclude any new champions that emerged during that time. As of 1 April 2009, there were 88 champions actively using Tallin, and this research will focus only on them. In the future, we want to investigate the impact of varying time intervals on network dynamics.

Connecting with your own private study group and using chat and profile viewing functions

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Here, we dive into the connections between the champions' Taolin platform activities and the communities to which they belong. We start by describing the two networks we've derived from the platform's activity logs and assessing how well they perform inside the platform: the conversation network and the profile views network. All champions have the ability to initiate a discussion with any other champion, as detailed in Section 2. Taolin software records these exchanges, allowing us to construct a correspondence web. In this network, the nodes are the champions, and along the edge from point A to point B is the total quantity of messages delivered from point A to point B. When a champion clicks on another user's username, she is sent to that person's personal page, where she may learn more about her background, skills, and hobbies, among other things. Taolin software records these exchanges as well; the resulting network includes metadata on who saw whose profile and why, supposing that this indicates a desire to make contact. The profile views network is weighted and directed much like the conversation network. We limited our analysis to the two months of April and May 2009 and took precautions to protect users' privacy during data collection and retrieval by, among other things, 'obscuring' the contents of messages and giving each champion a unique two-digit ID. We adopt a descriptive measure that allows us to investigate the extent to which relations are concentrated within a group, rather than toward the external network (as suggested by (Bock & Husain (1950)), and we compute it in accordance with the recommendations of Wasserman and Faust (1994, p. 271).

Table 2 – Profile view and chat messages activity

	Profile view			Chat messages		
Group	Internal messages (average)	External messages (average)	More external than internal?	Internal messages (average)	External messages (average)	More external than internal?
37	0.1667	0.0844	False	0.0238	0.1660	True
44	0.7500	0.0991	False	0.5500	0.5047	False
46	0.1250	0.0345	False	0.0972	0.0065	False
80	3.5000	0.4692	False	38.2500	1.9121	False
49	0.3500	0.0710	False	0.0000	0.0019	True
18	0.0333	0.0467	True	0.1619	0.0674	False
19	0.1500	0.0953	False	0.0000	0.0748	True
25	0.2500	0.0505	False	0.2000	0.2187	True

For each group A, we take into account as internal messages the total weights on the edges that flow from a user in group A to another user in group A, since our analysis of valued relations centers on the correlation between group membership and platform activity. The total edge weights connecting a user in group A to a user who is not belong to group A are what we call "outgoing messages." There may be n-1 internal target nodes and N-n external target nodes if there are N champions in the whole network and n champions in group A, respectively. We standardised these metrics by dividing the total number of messages by the number of potential edges, arriving at n*(n-1) for internal messages and n*(n-2) for external ones.(N-n). We can calculate the average strength of relationships between members of group A and those outside the group this way. To get an idea of how much more attention is paid to connections inside a group as opposed to those between members of other groups, we estimated ratios for two types of networks (weighted directed chat networks and weighted directed profile views network). For this reason, we did not include groups with 4 members or less in our final analysis. Even though the Taolin developers (#80 in Table 2) made significantly more use of the platform than the other groups, we chose to include them in our tests anyhow.

Authority and seniority in the workplace

This part considers the seniority levels of champions, as specified in part 3, and their connections to platform activities; the preceding section focused on champions' association with research groups. Remembering that our study is preliminary and based on data from a short window in the platform's history is vital when trying to make sense of these findings; so, too, is keeping in mind that the platform's development is linked to a gradually increasing variety of users and groups. In Section 3, we explained how we categorized winners into three distinct age brackets. (Length of stay in FBK). Using a weighting process, we calculated an average betweenness centrality index of the members in each group, based on data from conversation and profile view networks. Since these networks are weighted, we computed betweenness centrality by viewing distances as the inverse of weights (Boccaletti et al., 2006, p. 199). We assume that the average betweenness centrality index of users in each age group accurately reflects their importance to the system. Even though every user is accessible from inside the company, it is more probable that a new tie will be formed via the introduction of someone who is already in touch with the target user, thus we opted to calculate betweenness to account for this. (For example, this is represented by the fact they chat already a lot for keeping up with their daily job needs). Even though there is no

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proof of transitivity of profile views, we opted to calculate betweenness centrality across the network of profile views anyhow.

Table 3 – Chat and profile view networks betweenness indexes by seniority class.

Organizational position	Chat messages	Profile view
seniority class 0 (new arrived)	68.0344	131.217
seniority class 1(middle)	51.0459	93.405
seniority class 2 (senior)	34.6833	66.080

Specifically, those who have just recently joined the FBK organization are more central in both conversation and profile view networks, and this index rises as the amount of time spent in the organization decreases (Table 3). Such findings can only be understood by considering the historical context and social development of users' engagement with the platform.

To begin, there is a greater impetus for newcomers to try out Taolin's social aspects in order to establish internet access and gain a feel for the workplace. (making sense of their presence and experiencing their role). Second, senior staff members are less likely to feel the need to "find new people" or engage with the just arrived, since they already have their own established interaction and have created personal networks outside of Taolin space. These findings are generally accepted with respect to chat engagement, but need some clarification with regard to the profile views network. It seems to reason that higher-ups in the organization would have been the primary focus of profile views. Instead, it's the newest members of staff who are getting the most attention. The entrance of a new user is broadcast to all Taolin users through the timeline, prompting many champions to click on the new name out of sheer curiosity and the desire to learn more about the research interests and group to which the new user has been added. Checking out a new member's profile is a great way to ease into the more involved activities of the FBK Foundation, such as the chat, the discovery of common interests and experiences, and the foundation's organizational side, as we mentioned earlier. Our evidence is preliminary, therefore more study of Taolin's FBK social network development may be necessary to confirm this interpretation. The interface (Taolin platform) and technological system (Web2.0) play a significant role in shaping our understanding of them as a social network; however, the process of evolution and the merging of social and organizational features may also provide the condition for a more complex structuring of social relations.

Future research and implications

When a company adopts a social software platform, workers have a fresh chance to learn about the tools' communication and use dynamics, as well as the platform's potential for fostering internal knowledge sharing and collaboration. Our analysis of Taolin's platform deployment reveals that the most common means of interaction between users might change over time and in response to factors like membership in a certain group. However, social interactions often develop in predictable ways; the data presented here suggests that champions, in general, are more likely to visit the profiles of their own group members, a trend that may be linked to imitation dynamics. The results also imply that champions use the chat widget more for internal communication within the research group than for external outreach, suggesting that the collaborative aspects induced by the platform are still passive at this stage, and that learning more about Taolin's evolutionary process will shed light on the emergence of integrative or innovative dynamics among the champions. The fact that the Taolin platform is open source means that it may be used by other companies and academics who can then install it, examine it, and expand upon our work, increasing the likelihood that comparable instances will be available in the future.

References

[1] Boccaletti,S, Latora, V and Y. Moreno, M. Chavez, & D. U. Hwang (2006). Complex networks: Structure and dynamics , Physics Reports, 424.

[2] Bock, R. D., & Husain, S. Z. (1950). An adaptation of Holzinger's B-coefficients for the Analysis of sociometric data. Sociometry, 13, 146-53.

[3] Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. Management Science, 49(4), 432–45.

[4] Borgatti S. P. & Molina J. Louis, (2005). Towards ethical guidelines for network research in organizations, Social Networks, 27, 2.

[5] Boyd, D., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. Journal of ComputerMediated Communication, 13(1).

[6] Brzozowski, M. J. (2009). WaterCooler: exploring an organization through enterprise social media. In Proceedings of the ACM 2009 international Conference on Supporting Group Work (Sanibel Island, Florida, USA, May 10 - 13, 2009).

ISSN:0976-0172

Journal of Bioscience And Technology
www.jbstonline.com

[7]GROUP '09. ACM, New York, NY, 219-28. DiMicco, J., & Millen, D. R. (2008). People sensemaking with social networking sites. CHI 2008, April 5-10, 2008, Florence, Italy.

[8] DiMicco, J., Millen, D. R., Geyer, W., Dugan, C., Brownholtz, B., & Muller, M. (2008). Motivations for social networking at work. Proceedings of CSCW'08, November 8-12, San Diego, California, USA. Granovetter, M. (1973). The strength of weak ties. The American Journal of Sociology,78(6), 1360-80.

[9] Kostakos V., L. Little, (2005). The social implications of emerging technologies, Interacting with computers, 17, 475-83.

[10] McAfee, A. P. (2006). Enterprise 2.0, version 2.0. Message posted to http://andrewmcafee.org. McAfee, A. P. (2007). How to hit the enterprise 2.0 Bullseye. Message posted to http://andrewmcafee.org/

[11] Steinfield, C., DiMicco, J. M., Ellison, N. B., & Lampe, C. (2009). Bowling online: Social networking and social capital within the organization. In Proceedings of the Fourth international Conference on Communities and Technologies. C&T '09. ACM, New York, NY, 245-54.

[12] Totterdell, P., Holman, D. & A. Hukins (2008). Social networkers: Measuring and examining individual differences in propensity to connect with others. Social Networks, 30, 283-96.

[13]Wasserman, S., & Faust, K. (1994). Social network analysis. Methods and applications. Cambridge, MA: Cambridge University Press.