A social network analysis of learning in corporate training context: Analysing Sosyal 2.0 as a space for networked learning

Didem Tufan

Department of Computer Education and Instructional Technology, Middle East Technical University, e123720@metu.edu.tr

Soner Yıldırım

Department of Computer Education and Instructional Technology, Middle East Technical University, soner@metu.edu.tr

Banu Günel

Graduate School of Informatics, Middle East Technical University, bgunel@metu.edu.tr

Abstract

It is obvious that, human life is being affected by the facilities of new technologies with all of its aspects including learning and development. On the other hand, besides the increasing use of the facilities, we have limited knowledge about the question of how social interaction and Web 2.0 technologies affect the training environments in workplace context. This study, which is a part of an on-going doctoral research, aims at investigating the interactions among participants within the networks constructed in an online learning environment in corporate training context (Sosyal 2.0) while verifying network coding procedures and providing evidence for the methodological issues regarding the use of SNA in combination with other methods in researching Networked Learning.

Training and adult learning literature is limited when compared to the areas of formal education, teacher training or higher education. The current study, examining corporate training, aims at contributing to the literature, as the field of NL research is untouched, especially in Turkey.

The study is conducted in cooperation with Enocta, an e-learning company in Turkey. The logs of Enocta's LMS with social interaction capabilities, called "Sosyal 2.0", are used as the data source. The members of Enocta who participate by using facilities of Sosyal 2.0 formed the actors of the network. Networks are constructed according to different web 2.0 facilities in Sosyal 2.0: "wallpost-comment" (WPC), "wallpost-like" (WPL), "question-answer" (QA), "question-comment" (QC), "question-like" (QL) and "blog post-like" (BPL) networks are constructed. To be able to examine the interactions among participants Average Degree, Degree Centralization, Closeness Centralization, Betweenness Centralization and Cohesion analysis are carried out using PAJEK Software.

The results revealed that the tightest interaction was constructed via wall platform in Sosyal 2.0 in comparison to BPC, BPL, QL and QA platforms. The results of cohesive sub-groups reveal that, the users of Sosyal 2.0 form a comparatively big community by using wall platform. On the other hand; QAC, BPC and BPL networks had revealed weak components and small mutual relationships. These findings indicate that the information sharing among participants are not dispersed into several, middle sized sub groups in Sosyal 2.0. Rather it is more centralized in wall platform and mostly in mutual level for the QAC, BPC and BPL networks. These findings deserve further investigation including users' preferences and gratification and individual level network analysis methods.

Keywords

Networked Learning, LMS, Computer Supported Collaborative Learning, Social Network Analysis

Introduction

In the last decade, we witnessed the rise of the web 2.0 technologies which have effects on both individuals and organizations. In this rapidly changing context, organisations are struggling with the problem of managing and

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creating knowledge. According to Buono and Poulfelt (2005) when moving from first to second generation knowledge management; the understanding of knowledge has changed from being perceived as asset to be captured and disseminated; towards an understanding of knowing-in-action in which knowledge is perceived as a socially embedded phenomenon. Perceiving knowledge as a socially embedded phenomenon, and as a part of an on-going doctoral study examining learning taking place in online networked learning (NL) communities in a corporate training environment, the current study mainly aims at investigating the use of learning management system (LMS) with social interaction abilities allowing knowledge sharing and collaboration.

One important reason for this study is, compared to widespread use of Web 2.0 technologies, their effect on learning and knowledge sharing is studied comparatively less. This study, will contribute to the related literature by providing evidence regarding use of these technologies in corporate training settings. Additionally, training settings and adult learning literature is limited when compared to the areas of formal education, teacher training or higher education. The current study, examining corporate training, will contribute to the literature, as the field of NL research is untouched, especially in Turkey. It will enlarge perspectives of the researchers who are willing to study in the NL field.

Aim of the Study

The aim of this study is twofold: firstly, as a part of the doctoral research guided by the main research question "How does learning take place in online NL communities in corporate context?" this study aims at investigating the types and intensity of social relationships constructed in Sosyal 2.0 according to different social interaction abilities (wall, blog and question- answer). In other words, the study tries to find the answer for the research question "How do interactions occur among participants within the networks constructed according to different facilities in Sosyal 2.0?" Secondly, the current study aims at verifying network coding procedures and providing evidence for the methodological issues regarding the use of SNA in combination with other methods in researching NL.

Context and Participants

The study is conducted in cooperation with Enocta, an e-learning company in Turkey. The logs of Enocta's LMS with social interaction capabilities, called "Sosyal 2.0", are used as the data source. Sosyal 2.0 provides users a shared, web-based platform, enabling collaborative learning in addition to known LMS facilities. In this platform, users can share documents, blogs, links, and ideas around the Social Groups. A Social Group can be defined as a workspace, gathering people around a specific area of interest. Each social group contains social interaction and collaboration tools which are "wall", "question-answer", "resources", suggestions" and "blog". For the current study, because of time and space constraints, the scope is limited to the data from the wall, question-answer, wiki and blog facilities. Participants of the current study are the members of Enocta, including managers, coders, designers who are located in Enocta's two branch offices located in İstanbul and Ankara.

Definition of networks, ties and actors

For the current research, the logs of Sosyal 2.0 are used to establish the ties and the network data. The users who participate by using facilities of Sosyal 2.0 are the actors of the network. A separate network is constructed for wall, question-answer, wiki and blog facilities which are "wallpost-comment" (WPC), "wallpost-like" (WPL), "question-answer" (QA), "question-comment" (QC), "question-like" (QL) and "blog post-like" (BPL) networks: In total, among the 112 registered users.

To be able to examine the interactions among participants within the networks constructed according to different facilities in Sosyal 2.0; Average Degree, Degree Centralization, Closeness Centralization, Betweenness Centralization and Cohesion analysis are carried out using PAJEK Software.

Results

Centralization

The centralization values calculated for 7 networks (See Table 1). When the all degree centralization values are examined, WPC and WPL networks centralization values are found to be the highest, 27.238 and 23.000 respectively; which indicates a large difference in WPC and WPL activities of participants in comparison to other platforms. (*Closeness centralization can only be calculated in strongly connected networks, therefore, isolated dyads are removed for calculation.) For the 7 networks, closeness centralization values vary between

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0.306 (BPC network) and 0.714 (QC network) and betweenness centralization values vary between 0.044 (QL network) and 0.223(BPC network).

Table 1: The Degree Centralization of Networks

	Network Size	Degree Centralization	Closeness Centralization	Betweenness Centralization
1-Wallpost-comment	65	27.238	0.552	0.191
2-Wallpost-like	70	23.000	0.427	0.105
3-Question-answer	23	4.548	0.424	0.054
4-Question-comment	9(7-2)*	2.071	0.714	0.100
5-Question-like	13	3.045	0.460	0.044
6-Blog post-comment	33(31-2)*	6.581	0.306	0.223
7-Blog post-like	29(27-2)*	9.741	0.614	0.188

When the centralization results and sociograms (see Figure 1) are examined; it is observed that the networks represent different traits.

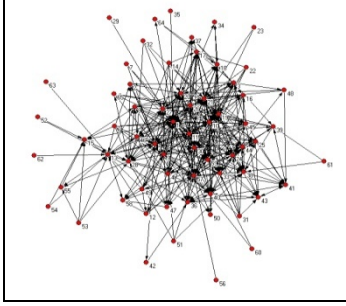
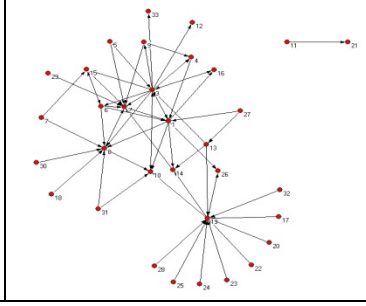
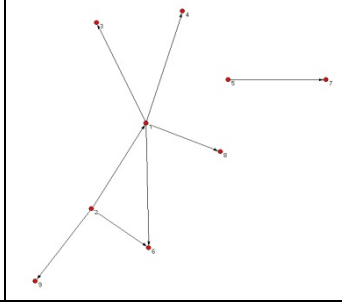
WPC Network (65)	BPC Network (33)	QC Network (9)
		

Figure 1: Selected network sociograms

Average Degree

The networks constructed had sizes ranging between 9 and 70. As density cannot be used for comparing networks of varying sizes, average degree measures are examined for each network. The average degree values indicate that an average of 15 interactions occur for each person in terms of WPL interaction and an average of 13 interactions occur for each person WPC interaction. Additionally, an average of 1.58 BPC and 2.24 BPL interactions occur for each person. On the other hand, an average of 0.81, 0.21 and 0.31 interactions occur for QA, QC and QL type interactions respectively. These values indicate that only a limited number of users took part in QA type of interactions; whereas a tighter interaction took place in wall platform in Sosyal 2.0.

Cohesion

In order to find out cohesive sub-groups, weak and strong components are examined (see Table 3). As the strong components are more strict than weak components, Nooy et al. (2011) recommends detecting weak components first. Therefore, weak components are examined first and if no weak components are found strong components are examined.

Table 3: Cohesive Sub-groups

	Size of the network (isolates removed)	Weak comp.	Strong comp.	Size of the largest comp.	Size of the second largest comp.
1-Wallpost-comment	65		X	47	1
2-Wallpost-like	70		X	48	1
3-Question-answer	23		X	3	1
4-Question-comment	9	X		7	2
5-Question-like	13		X	1	
6-Blog post-comment	33	X		31	2
7-Blog post-like	29	X		27	2

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The examination of cohesive sub-groups showed that, WPC and WPL networks had strong components which are dominated by one large component (n=47 and n=48). Similarly, QA network is also dominated by a strong component (n=3). On the other hand, QC network, BPC and BPL networks had resulted in weak components, in which the second components show an isolated mutual network relationship (n=2). For the QL network we cannot talk about any weak or strong component as the calculation of strong component gives 1 as the largest number of strong component.

Conclusion and Further Study

Conducted analysis reveals that, the tightest interaction was constructed via wall platform in Sosyal 2.0 in comparison to BPC, BPL, QL and QA platforms. But the analysis conducted in this study does not reveal the details and the reasons for this situation. The current study is intentionally limited to network level SNA because of time and space constraints. However, individual level centrality analyses are planned to be conducted to gain more detailed profound results about the information flow and roles (brokerage, bridges) of individuals in the system.

The results of cohesive sub-groups reveal that, WPC and WPL networks had included more than half of the actors in the cohesive sub-group. This finding indicates that, the users of Sosyal 2.0 interact as a big community by using WPC and WPL. On the other hand, QA network revealed a very small triad. QAC network, BPC and BPL networks had revealed weak components in addition to small mutual relations. These findings indicate that the information sharing among participants are not dispersed into several, middle sized sub groups in Sosyal 2.0. Rather it is more centralized in wall platform and mostly in mutual level for the QAC, BPC and BPL networks. These findings deserve further investigation including users' preferences and gratification.

While conducting this study, the whole process pointed out that, the notion of a tie is very significant in order to capture the relationships in online NL environment. This situation makes us think about the question that Haythornthwaite and De Laat (2010) asks in their paper: "what constitutes a “learning tie”- i.e., what is it that people do with each other that promotes their learning process?" (p.188). This study was limited to thread-response relationship data; however, examining interactions including resources and/or suggestions in addition to two people's direct interaction might shed light on the mentioned question.

Lastly, as an initial part of the on-going doctoral study, pure social network analysis methods were implemented to gain insight about the NL in corporate training environment. On the other hand as Sing and Khine (2006) notes online interaction is "a complex and discursive phenomenon" (p.251). Therefore, in order to provide in-depth evidence about learning in online NL communities, applying a multi-method research and making use of other analysis techniques, such content analysis (Aviv et al., 2003; Tirado et al., 2012), statistical analysis (Wang, 2010) or critical event recall (De Laat, et al, 2007) is verified to be essential.

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Didem TUFAN

Didem Tufan, received her B.S. degree in Computer Education and Instructional Technology from the Middle East Technical University, Ankara, Turkey, in 2005, the M.Sc. degree in Educational Sciences, Curriculum and Instruction Department, from the same University in 2008 and she is continuing her Ph.D in Computer Education and Instructional Technology at METU since 2009 and working on her thesis titled "Investigating Online Knowledge Sharing And Collaboration: A Mixed Method Study Utilizing Social Network Analysis in Corporate Learning Context." Simultaneously with her academic studies, she has worked in corporate e-learning projects as an instructional designer and project manager. And currently, she is working as a project manager for an e-government project.
Her research interests are critical thinking, e-learning, CSCL, training, networked learning and mobile learning.

http://www.linkedin.com/pub/didem-tufan/9/604/708
tufan.didem@gmail.com

Banu GÜNEL

Banu Günel received the B.Sc. degree in Electrical And Electronic Engineering from the Middle East Technical University, Ankara, Turkey, in 2000, the M.Sc. degree in communication systems and signal processing from the University of Bristol, Bristol, U.K., in 2001, and the Ph.D degree in computer science from the Queen's University of Belfast, Belfast, U.K., in 2004 for her work in audio and acoustical signal processing. Between 2004-2010 she has worked as a Research Fellow in Center for Communication Systems Research (CCSR), University of Surrey, Guildford, U.K. Since 2010. Dr. Günel is working as an Assistant Professor at METU Informatics Institute. Her main research interests are natural human computer interfaces, sensor networks, audio forensics and surveillance systems, 3D multimedia systems, room acoustics (analysis and modeling), statistical modeling for audio and acoustics, microphone array based source detection and separation, assistive technologies for disabled, psychoacoustics (perception based data reduction), augmented and virtual reality applications (hands free communication, remote presence), subjective testing and analysis techniques.

http://ii.metu.edu.tr/tr/staff/bgunel
bgunel@metu.edu.tr

Soner YILDIRIM

Soner Yıldırım, received his B.A. degree from Hacettepe University, Curriculum and Instruction department, Ankara, Turkey, in 1990. The M.A. degree in Instructional Technology, from Michigan State University, East Lansing, USA ,in 1993 and the Ph.D degree in Instructional Technology from University of Southern California, Los Angeles, USA, in 1997 for his work on Effects of an Educational Computing Course on Preservice and Inservice Teachers' Attitudes and Computer Use. Since then he has completed many projects, working as a consultant, project manager and he has given many courses as an Instructor. Currently, he is working as a Professor at Computer Education & Instructional Technology Department, Middle East Technical University, Ankara, Turkey. His research interests are: Preservice Teacher Technology Training, Instructional Software Evaluation, E-Learning, Technology Planning in Schools, Technology Policies in Education.

http://www.metu.edu.tr/~soner/
soner@metu.edu.tr