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Analysis of Twitter usage in an exploratory seminar setting

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Summary

Despite the massive social and technological changes that have occurred due to the Web in the recent years, university courses often still emphasize time-honored teaching methods with classical learning tools and resources. During these courses students often acquire knowledge that is not up-to-date and detached from problem-based, realistic learning. The use of more recent tools and methods often remains out of student's grasp. In this article we briefly report on an exploratory seminar setting at two German universities where the use of Social Media for communication and collaboration was firmly embedded in the educational setup. Furthermore, we illustrate the usage of Twitter during the seminar using techniques from Social Network Analysis.

Keywords: social media, web collaboration, constructivist learning, twitter.

Introduction

During the last two decades new technological means and significant social changes that have emerged due to digital technology have altered the way we collaborate and learn. More than ever, learning takes place in an ever-changing universe of interconnected bits of information and in the exchange with peers as well as more knowledgeable others. The so-called Web 2.0 and its further stage of the Social Semantic Web (or Web squared) (O'Reilly and Batelle, 2009) fundamentally changed how individuals as well as organizations create, (re-)use and share information; it poses new potentials to integrate real-life working conditions into higher education which in turn fosters the development of necessary competencies of our students. Despite these changes the practical adoption of Social Media tools in higher education is still rather reluctant. In classical head-on courses students are taught about the massive effects of Social Media, most often without the opportunities to work with those tools themselves and without having the chance to experience their social impact. Our own experience in innovative research projects and industry projects shows that Social Media has already arrived in practical application. Thus we feel the strong need to integrate Social Media tools in higher education learning environments. Students should be able to experience the power of these tools in realistic, hands-on collaboration tasks that are embedded in the solution of real-life problems. Students must be equipped as early as possible with sufficient skills to master the new patterns of collaboration, emerging learning types and ever-changing working environments. When they enter the job market they need to be able to flexibly adapt to the IT infrastructure and social processes in place where prior knowledge about the utilization of Social Media is a must.

The educational setup

To include emerging online tools and practice-oriented learning in university settings we designed an exploratory seminar setting that required students from two German universities with differing research backgrounds (Computer Sciences and Mediapedagogics) to jointly solve IT design and implementation tasks by solely using social media services for collaboration, communication and production of artefacts. During the first implementation of our setting, Master students from the University of Paderborn collaborated with Bachelor students from the University of Augsburg on real research tasks stemming from our cooperation with two European research projects in Technology Enhanced Learning (TEL). The seminar setting is built around the use of existing web tools and practice-oriented learning in university settings. It has its theoretical groundings in John Dewey's philosophy of pragmatic education (Dewey, 1986) as well as Constructivism (Jonassen, 1999). Our aim was to alleviate the shortcomings of head-on education and provide students with the possibilities to actively engage in real-life learning activities, thus enabling practice-oriented knowledge creation within the realm of a formal seminar setting (cf. Heinze and Reinhardt, 2011).

Use of social media in the seminar

One key requirement for the students in the seminar was the communication and collaboration with nothing else than Social Media tools. In accordance to the rationales of constructivist learning theory, students should actively create their own knowledge about the practical use of Social Media tools in realistic scenarios. Several tools were used to allow students to engage in collaboration and communication processes. They were an online social networking site[1], Mendeley[2] for creating and sharing their bibliographies, Doodle[3] for voting procedures during the seminar, Delicious[4] for social bookmarking, Twitter[5] for informal message exchange and involvement of external experts and finally Wikis within the social networking site for an open and ongoing documentation of the students work. Further tools were at the disposal of the students if they wished to use them. We used FlashMeeting[6] for scheduled meetings with all students. The meetings were recorded and could be replayed by the students as often as the liked. In addition, the courses were held simultaneously at both universities with the broadcasting of one classroom to the other using Ustream[7] and Skype desktop sharing[8]. Video and audio are shared real-time, students held presentations together with students from the other university. They researched and prepared using social media only; they never met in real life before. Students gained hands-on experience with new modes of interaction that went beyond leisure, fostered their knowledge of working with social media in university settings, and guided them in their processes of informal learning embedded in a formal instruction setting.

Analysis of Twitter usage in the seminar

To analyze the use of Social Media during the seminar we used Artefact-Actor-Networks (Reinhardt, Moi and Varlemann, 2009) to obtain and analyze data that was published by the participants and staff of the seminar. To track communication we asked the participants to use the tag #fsln10 for all course-related issues on Social Media channels. In total we analyzed 431 tweets, 384 Delicious bookmarks, 14 SlideShare documents and 61 documents on Mendeley. In this paper we focus solely on the analysis of the social network that arose from the usage of Twitter during the seminar. From the 431 tweets we extracted over 80 keywords using semantic analysis services. Finally, we used the open source software Gephi[9] to visualize the networks and to calculate SNA metrics in the

[1] http://fsln.mixxt.com

[2] http://www.mendeley.com

[3] http://www.doodle.com

[4] http://delicious.com

[5] http://twitter.com

[6] http://flashmeeting.open.ac.uk

[7] http://www.ustream.tv

[8] http://www.skype.com

[9] http://gephi.org

artefact and actor networks. Figure 1 shows the artefact network that is comprised of all single tweets and their connections via common keywords. The color and size of the node reflects the degree of the respective tweet: the darker and larger the node, the more connections it has to other tweets. The light and small nodes at the bottom left corner thus have no keyword-connection to the other tweets. If we dig deeper in the artefact network, we can identify several clusters of tweets that deal with certain seminar topics. Using the semantic connections between the respective tweets it is easy to find out how those clusters are formed: clusters between tweets arise when they share common keywords (see Figure 2) or are replies to each other. In another analysis we compared the semantic similarity of tweets using the SemSim algorithm introduced in Reinhardt, Moi and Varlemann (2009) (not depicted).

Moreover, we applied common metrics from Social Network Analysis (SNA) to the artefact and actor networks from the usage of Twitter in the seminar. In particular, we analyzed the closeness centrality and betweenness centrality of artefacts and actors in the networks. Figure 3 shows the twitter actor network that arises when taking into account the semantic similarity of tweets, whereas Figure 4 shows the actor network based on betweenness centrality and Figure 5 uses closeness centrality. The user @wollepb is one of the seminar's tutors and a «local hero» in the Twitter actor network. His central role in the network reflects his intermediary role between the single groups in the seminar. He served as information pipe and connected the seminar to external experts. The analysis also shows that the Twitter actor network would soon fall apart if the tutors retracted their activities and the connection to the world 'outside the box' would not come into being.

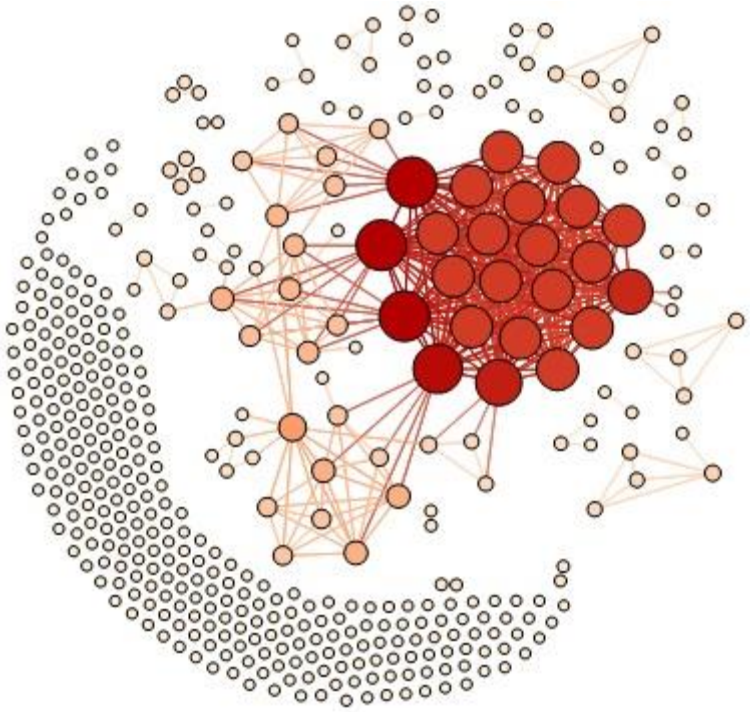

Figure 1 – Artefact network of Tweets, connected via keywords

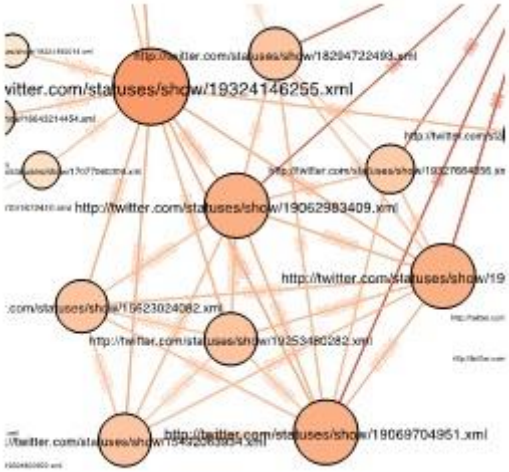

Figure 2 – Keyword connections between Tweets

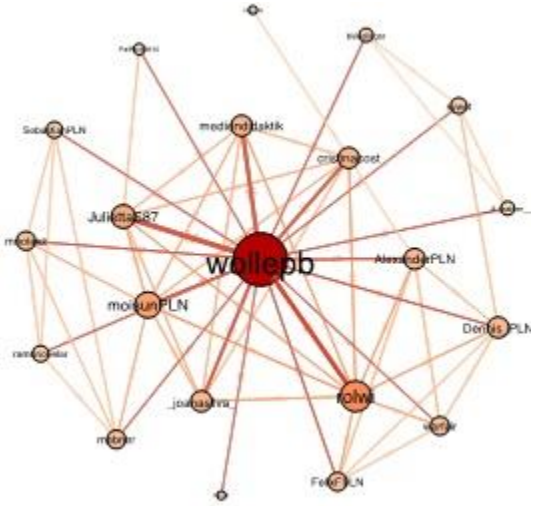

Figure 3 – Actor network from Tweets

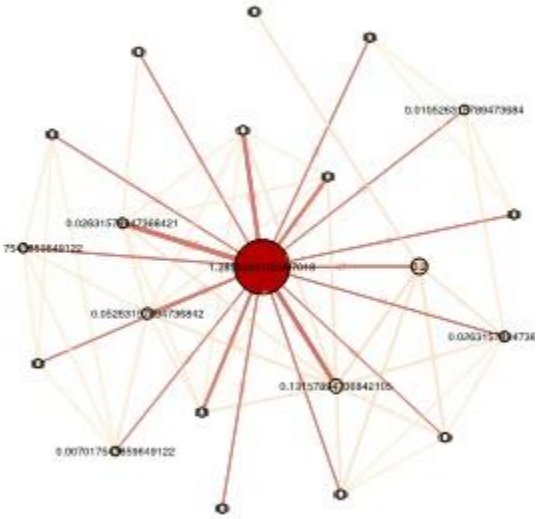

Figure 4 – Betweenness centrality in Twitter actor network

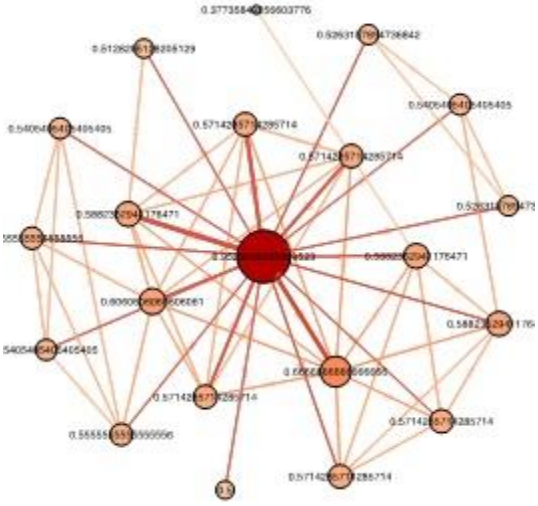

Figure 5 – Closeness centrality in Twitter actor network

Conclusion and outlook

Our evaluations lead to insightful results. Due to the strong inclusion of social media students were faced with the possibilities and shortcomings of these tools in regards to technology and communication. This led to an increase in information literacy and media literacy as well as problem-solving skills in scientific and workplace contexts. The learning and working conditions also lead to the development of higher communication skills and social competencies by nature of the dense collaboration efforts to jointly

produce artefacts during the course of the seminar in interdisciplinary teams. Overall, students displayed a high level of engagement, close-knit collaboration and knowledge management activities.

On the other hand we experienced that the usage of Social Media in university courses does not come naturally to the students. The use of the tools began rather reluctantly with the still inexperienced Bachelor students at the beginning of the course. Participants needed some guidance, especially with the tools commonly used for research or information management like Mendeley or Delicious. The strong personal involvement of the tutors in the Social Media activities aided the acceptance and utilization of the tools. As the above-noted figures show, students will need to get in touch with Social Media tools as early as possible in their university career in order to make use of the added value for their personal, university and workplace learning. We as educators need to foster the student's engagement with these tools by embedding them in the learning and working processes as publicly as we can to make their use commonplace. This will not only make the power of Social Media in education and the future of the Social Semantic Web visible to our students, but also encourage them to use new tools in their daily learning and working environment even if we do not prescribe their use in the context of a learning design.

The course design has caught much attention during it's first implementation due to our dissemination activities and is being carried out again in the fall semester of 2010, this time in cooperation with a third university in the United Kingdom. During this implementation we will incorporate the lessons learned from the first round of implementation, especially regarding the cold start problems and a more clearly defined and communicated usage strategy for the Social Media tools that we will use.

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