Exploring co-learning behavior of conference participants with visual network analysis of Twitter data

Heli Aramo-Immonen [a,*], Jari Jussila [b,1], Jukka Huhtamäki [b,2]

[a] Tampere University of Technology, P.O. Box 300, FIN-28101 Pori, Finland
[b] Tampere University of Technology, P.O. Box 541, FIN-33101 Tampere, Finland

A B S T R A C T

Knowledge management has acknowledged organizational learning as a key factor for creating competitive advantage for companies already from early 1990. However, the studies of co-learning in this connection are in their infancy. This article contributes to an emerging field of 'smart data' research on Twitter by presenting a case study of how community managers in Finland used this social media platform to construct a co-learning environment around an annually organized conference. In this empirical study we explore the co-learning behavior in project contexts especially by analyzing and visualizing co-learning behavior from conference participants Twitter data.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Learning is the vehicle for individuals, companies, and communities to utilize past experiences, adapt to environmental changes and enable future options. Interest in learning has grown in companies, especially since managers were informed that our economy has turned into a knowledge economy (Drucker, 1994) and that knowledge and learning are of prime importance for creating and sustaining competitive advantage (Alavi & Leidner, 2001; Barney, 1991; Choo, 1996; Grant, 1996; Nonaka & Takeuchi, 1995). However, the studies of co-learning in knowledge management literature are in their infancy (Dasgupta & Gupta, 2009; Kakabadse, Kakabadse, & Kouzmin, 2003; Liao, 2003). Furthermore the utilization of 'smart data' (e.g., Patil, 2012) captured from social media using data science approach is explored in this connection. Our attempt is to use Twitter data to describe and further understanding of co-learning behavior of participants of professional conference. For this we focus on analysis of Twitter data collected during conference.

Our aim is to discover what the community of "community managers" is discussing during the annual face-to-face event. We visualize the most popular discussions of the community, identify the most active and prestigious community members and different subgroups and networks that emerge from the discussions. By applying the process of data-driven visual network analytics we seek to understand the co-learning behavior of the community and to make propositions on the role of social media as a co-learning environment.

In this article we introduce in the theoretical sections the concepts of co-learning, informal and formal learning, activity theory based informal expansive learning, internal and external memory aids, motivation to learn and context of communities of practice as co-learning environments. In the empirical part of this article we discuss Twitter as a co-learning environment and the visual network analytics of Twitter data. We introduce some visualization of hashtag metrics of people tweeting during the CMAD 2014 conference day. Finally we conclude our findings as practical propositions for utilizing social media as mediator in co-learning.

2. Theory and related research

2.1. Informal and formal co-learning

Collaborative learning also named co-learning is a method of learning and teaching in which learners team together to explore a significant question or create a meaningful project. A group of learners discussing face-to-face or working together over the Internet on a shared assignment are both examples of collaborative learning. Collaborative learning has been mostly studied in university and school context (e.g., Francescato et al., 2006) with little existing research in project work context. In this article the main focus is on informal collaborative learning in Twitter in project work context.

* Corresponding author. Tel.: +358 40 8262931.
  E-mail addresses: heli.aramo-immonen@tut.fi (H. Aramo-Immonen), jari.j.jussila@tut.fi (J. Jussila), jukka.huhtamaki@tut.fi (J. Huhtamäki).
[1] Tel.: +358 40 717 8345.
[2] Tel.: +358 40 585 4771.

Learning in firms can be divided into three parts: informal, formal, and non-formal learning. Informal learning consists of all that is related to the work process itself, including the doing of the work (Raivola & Ropo, 1991). At all levels and sectors of the work process, new things are learned that affect the work processes one way or another, either directly or indirectly. Informal learning is often not noticed or realized. Therefore, it can be called tacit knowledge and know-how accumulation (Aramo-Immonen, Koskinen, & Porkka, 2011). Tacit knowledge and know-how have a central significance for the professional identity and they form a part of qualifications that cannot be taught. Non-formal learning means learning that takes place outside the daily routines of the work place or school.

According to García-Peñalvo, Colomo-Palacios, and Lytras (2012) informal learners usually set their own learning objectives. They learn when they feel a need to know. The proof of their learning is their ability to do something they could not do before. Informal learning is often a pastiche of small chunks of observing how others do things, asking questions, trial and error, sharing stories with others and casual conversation. (García-Peñalvo et al., 2012)

Small team activity is a means towards company-based learning (Sarala, 1993). The efficiency of working life today is increasingly based on smooth and innovative co-operation of the parties (e.g., projects, events and conferences) working together. In case of volunteer work in events or non-profitable work in conferences money cannot be the motivator. The satisfaction has to be gained through being a part of a community for example. An operating system – conference committees in our case – can only be efficient if its parts are efficient. This calls for co-operation, planning, and realization of operation in virtual teams, and furthermore, development of creativity and increased utilization of social media like Twitter for example.

However, compared with the systematic learning that takes place in functional organizations, the one-off and non-recurring nature of project activities (such as focal conference preparations) provides little scope for routine learning (Hobday, 2000) or systematic repetition (Gann & Salter, 2000). The problem with this perspective on project-based learning is that it equates project-based activities with non-routine behavior. Davies and Brady (2000) argue that performance can be increased through exploitative learning because companies undertake 'similar' categories of projects in mature or new product markets, involving repeatable and predictable patterns of activities. Furthermore conferences and events even though they are unique they also have repeatable patterns of activities and similar repeatable structures and ways to organize.

The perception that conferences and events perform only unique and non-routine tasks often conceals many potentially transferable lessons. Learning can occur at several different levels, e.g., individual, project, and company levels (DeFilippi & Arthur, 2002). Many firms have tried to create learning mechanisms as deliberate attempts to capture the experience gained through projects (Aramo-Immonen, 2009; Prencipe & Tell, 2001). These mechanisms refer to the institutionalized, structural and procedural arrangements that allow companies to systematically collect, analyze, store, disseminate, and use knowledge (Aramo-Immonen, 2009; Popper & Lipshitz, 1998). Conferences and events, could develop their own momentum that leads to the pursuit of new objectives. There is a possibility to learn within the parameters set for the conference for example.

2.2. Co-learning environment seen through activity theory

The activity theory distinguishes between temporary, goal-directed actions and durable, object-oriented activity systems (Engestrom, 2000; Vygotsky, 2012). Here, within the conference context, the latter are discussed. The use and utilization of knowledge is not a spontaneous phenomenon in the development process of an organized community. According to the socio-cultural historical activity theory, there has to be a triggering action, such as a conflictual questioning of the existing standard practice in the organization in order to generate expansive learning (Engestrom, 2000). Expansive learning produces culturally new patterns of activity. In this context, the 'activity' has a broader meaning than 'action' or 'operation'. Here, the activity is the conference as a whole. As used in the activity theory, the concept of activity is linkinǵ eventś to the contexts within which they occur (Blackler, Crump, & McDonald, 1999).

The object of expansive learning activity is the entire organization (i.e., community of the focal conference here) in which learners (i.e., conference members and attendees) are performing (Engeström, 2001). In other words, the project work context in conference forms the learning environment. Fig. 1 illustrates the systemic structure of collective activity. Technologies used and language (instruments in Fig. 1) mediate the relationship between worker and working community. Division of labor mediates the relationship between community members and shared activity (Blackler et al., 1999; Engestrom, 2000). Together, these constitute the co-learning environment, i.e., infrastructure through which individuals' 'action learning' (Revans, 1982) takes place.

Triggering an action, which causes an expansive learning activity, can grow from tensions between the project team members. Therefore, findings of a tense working atmosphere are not inevitably negative features. This can occur in virtual teams as well. However, the feeling of ease can be problematic if nothing is seen to be worth developing in the community. Furthermore, people also fail to act intelligently. This is not because they as individuals lack intelligence, but because they are following this or that organizational order or practice (rules in Fig. 1). Organizational context determines, to a great extent, whether people are allowed or encouraged to use their intelligence, for instance, by pointing out inadequacies in existing practices. The advantage of informal Twitter communities is the freedom to be critical concerning contemporary ways of doing things. In other words individuals do tend to criticize and express their feelings more easily in social media than in face-to-face contact.

Thus, in order to meet conference attendees requirements, a conference committee community has to perform transformations which are not yet there. In other words, the organization has to learn in parallel of doing. In this Twitter (and other social media means, such as Facebook and Google Drive) offers novel ways to involve conference attendees into developing processes on real time. Traditional learning theories, such as single-loop and double-loop learning (Argyris & Schon, 1978), have little to offer in such a situation. Expansive learning at work produces new forms of work activity (Engeström, 2001). An essential component of expansive
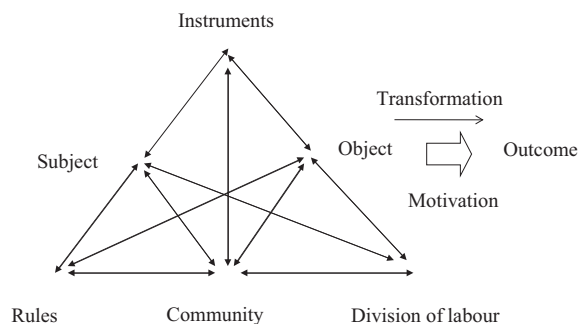

Fig. 1. System of collective activity applying (Engestrom, 2000).