



Visualizing informal learning behavior from conference participants' Twitter data with the Ostinato Model



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ABSTRACT

Network analysis is a valuable method for investigating and mapping the phenomena driving the social structure and sharing the findings with others. 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 an informal learning environment around an annually organized conference. In this empirical study we explore informal learning behavior in the project context, especially by analyzing and visualizing informal learning behavior from Twitter data using the Ostinato Model introduced in this paper. Ostinato is an iterative, user-centric, process-automated model for data-driven visual network analytics.

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1. Introduction

Learning is a mechanism for people, groups, industries and society to benefit/gain knowledge from past experiences, adapt to the context of any given situation, and to facilitate change. Interest in learning has grown in companies, especially since managers have responded to the knowledge economy (Drucker, 1994) and its prime importance for creating and sustaining competitive advantage (Alavi & Leidner, 2001; Choo, 1996; Grant, 1996; Nonaka & Takeuchi, 1995). However, academic research into informal learning in this regard is in its infancy. Therefore, this paper seeks to understand the informal learning of communities of practice through the utilization of 'smart data' (e.g. Patil, 2012) captured via social media. The following paper uses Twitter data to analyze the behavior of participants prior to attending a professional conference. The paper does this in order to understand informal learning

before a conference event so as to be able to anticipate conference participant behavior.

Our aims are to find out what the community of "community managers" discussed before a yearly face-to-face event, in order to provide insights into what the most popular discussions of the community are in general and in relation to the conference event, and what kind of sub-groups and networks can be identified from the community in order to make propositions on the role of social media as an informal and non-formal learning environment.

In the theoretical section of this article, we introduce the concepts of informal and formal learning, internal and external memory aids and the context of communities of practice as informal learning environments. The Ostinato model data-driven approach allows investigations of patterns and structures within and between groups of actors. It can be extended beyond the boundaries of individual social media and cover long periods of time. Actors with different sets of skills, from the means to crawl online sources for data to domain knowledge allowing deep sense-making, can all fully engage in the different phases of the investigative process (Huhtamäki, Russell, Rubens, & Still, 2015).

These contributions allow the use of visual representations of

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the structures behind various social media phenomena to improve social interaction, in this article informal learning behavior in particular. In the empirical part of this article, we discuss Twitter as an informal learning environment and the social network analysis model, the Ostinato. We introduce a visualization of the hashtag metrics of people tweeting during the two weeks before the CMAD 2014 conference day. Finally, we conclude by demonstrating and discussing the use of social media as mediator in informal learning when building up to an organized event.

2. Theory and related research

2.1. Learning forms and mechanisms

The ability to learn faster than competitors is a sustainable form of competitive advantage for companies. In our dynamic contemporary world, there is a growing need to solve the problems at hand by continuously improving knowledge and skills in the face of changing conditions and situations. This means that learning has emerged as an important activity for individuals, communities, and companies. Learning can appear in various forms. We need to identify different types of learning in order to be able to create and nurture fertile learning environments.

There are three categories of learning in firms: informal, formal, and non-formal learning. Raivola and Ropo (1991) considered informal learning to constitute all that is related to the work process itself, including the carrying out of the work. During a work process, new things are learned that affect the work processes in 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 accumulation are crucially important for the professional identity and go beyond taught formal qualifications. Finally, non-formal learning is understood as taking place outside the daily routines of the workplace or school.

García-Peñalvo, Colomo-Palacios, and Lytras (2012) maintained that informal learners usually have their own learning goals and learn when they feel a need to know. Learning is demonstrated to the learner by their ability to carry out and achieve something that previously they had been unable to do. Informal learning can be seen as often being a combination of small chunks of observing how others do things, asking questions, trial and error, sharing stories with others, and casual conversations (García-Peñalvo et al., 2012).

According to Sarala (1993), small team activity is a means towards company-based learning. The efficiency of working life today is increasingly based on the smooth and innovative collaboration of parties (such as in projects, events and conferences) that work together. It can relate to both teams and individuals and does not only apply to whole organizations. Monetary incentives (e.g. bonuses) are often connected to results, calling for an increased need to develop one's own work. In the case of voluntary work in events or not-for-profit work in conferences, financial gain cannot be the motivator. A person must gain something non-financial from being part of the community, for example. This paper looks at the not-for-profit work associated with organizing, attending, and engaging with a conference. An operating system – conference committees in our case – can only be efficient if its parts are efficient. This calls for collaboration, planning, and realization of the operation in virtual teams. For this purpose various learning environments are crucial. The development of creativity and increased utilization of Twitter for example, is evidence of an emerging new learning environment, namely social media platforms. These act as a new form of knowledge sharing arena (Nonaka & Takeuchi, 1995).

In comparison to the learning that takes place in functional organizations and is systematic, singular events and non-repeating project activities (such as focal conference preparations) provide 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 suggests that project-based activities are non-routine. Davies and Brady (2000) argue that performance and learning can be increased in companies that undertake 'similar' categories of projects in nature or new product markets. These 'similarities' can be exploited for learning by understanding the repeatable and predictable patterns of activities. Furthermore, conferences and events, even though they are unique, also have repeatable patterns of activity and structure and organization (Aramo-Immonen, Jussila, & Huhtamäki, 2014).

The perception that conferences and events perform only unique and non-routine tasks often masks transferable lessons that can be learned. DeFilippi and Arthur (2002) argued that these can occur at several different levels, e.g., individual, project, and company. Many firms have tried to create learning mechanisms to purposefully try 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 can relate to an organization and utilize the corporate mechanism to learn from the event, but they also exist beyond the individual person or company, obtaining an agency in their own right. This can result in their own momentum leading to the pursuit of new objectives, enabling the possibility to learn within the parameters set for the conference itself (Aramo-Immonen et al., 2014).

2.2. External memory aids

Koskinen and Aramo-Immonen (2008) studied the utilization of an engineer's personal notes in problem-solving situations within the implementation of projects. They found that note-taking and the utilization of these notes are common practices in the context of a project. In particular, they found that people working in a project work context consider that their personal notes play a very important role on an individual level and a fairly important role on a project level. Moreover, knowledge hoarding is more uncommon a phenomenon in a project work context than is often reported in functional organizations. Furthermore, the understanding of colleagues' notes often requires help from the knowledge makers. It was concluded that the personal notes of project team members form a significant part of project-based companies' organizational memories (Koskinen & Aramo-Immonen, 2008).

External memory aids come in many forms, e.g., taking notes in a meeting, entering an appointment in a calendar, photographs, drawings, maps and the like (Intons-Peterson & Newsome III, 1992). Additionally, asking someone else is also used as an external memory aid. This means that external memory aids are used to retrieve memories from the past. The use of external memory aids to facilitate remembering in the future is a very common technique, for example, people writing notes in a diary. Some external memory aids are distinctly verbal in nature, encompassing either oral (e.g. conversations with others) or written functionality (e.g., reminder notes, calendar entries), while others are more spatial (e.g., pictures, maps, sketchnotes). (Koskinen & Aramo-Immonen, 2008). Rich pictures, as an example of spatial memory aid, were developed as part of Peter Checkland's Soft Systems Methodology for gathering information about a complex situation (Checkland, 1981; Checkland & Scholes, 1990). In the context of social media, photographs are an example of another spatial memory aid. These

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