

Expert microblogging, communal knowledge building and cultures of networked expertise on Twitter. Case #okfest.

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Tiivistelmä – Abstrakt – Abstract <p><i>Aims.</i> This qualitative study explored a phenomenon of epistemic communality around a Twitter hashtag. The primary aim of the study was to explore communal epistemic production on the Twitter platform, especially in the context of a mutually shared hashtag. The study explored the peer-production of knowledge and epistemic structures in the context of a specialist domain collaborating in the open Web. The secondary aim was to explore how Twitter functions as a platform for networked expertise and as a public agora for practitioners' expert discourse. This nascent mode of cultural production leads to the development of expert cultures on Twitter and in the open Web. This creates new contexts for informal collaborative learning and cultural production potentially answering some of the competence challenges presented by the 21st century.</p> <p><i>Methods.</i> The hashtag #okfest was launched for the 'Open Knowledge Festival' conference held in Helsinki, Finland (17–22.9.2012). The participants of the study were open knowledge practitioners who participated in the hashtag discourse of #okfest on Twitter. All public tweets containing the string '#okfest' were collected as data. Tweets were analyzed with qualitative thematic analysis exploring the epistemic contributions either included in the tweets or as hyperlinked attachments.</p> <p><i>Results and conclusions.</i> The analysis indicated how the hashtag was appropriated to serve as a node of communal knowledge sharing beyond mere reporting from the conference. The analysis observed six themes of communal knowledge building in the hashtag space. The communal epistemic activities in #okfest were likened to the properties of a community of practice (Wenger, 1998). A network of practitioners engaging in a mutual domain creates a dynamic 'social learning system' combining social interaction with the production and dissemination of knowledge. The study yielded a novel theoretical concept of 'expert microblogging', recognized as a significant genre of cultural production in a specialist domain on Twitter and in the open Web. Finally the Twitter platform was ascertained as a site for the manifestation of cultures of networked expertise.</p>	
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Työn ohjaaja(t) – Arbetets handledare – Supervisor Fritjof Sahlström	Vuosi – År – Year 2015
Tiivistelmä – Abstrakt – Abstract <i>Tavoitteet.</i> Tämä laadullinen tutkielma tutki episteemistä yhteisöllisyyttä Twitter-palvelussa hashtag-aihetunnisteen ympärillä. Hashtag #okfest lanseerattiin Helsingissä pidetyn 'Open Knowledge Festival'-konferenssin taustakanavaksi 17–22.9.2012. Tutkielman pääasiallinen tavoite oli tutkia yhteisöllistä tiedonrakentelua Twitter-palvelussa erityisesti hashtagien ympärillä. Tutkimus kohdistui tietyn toimialan tiedolliseen vertaistuotantoon Twitterissä ja avoimessa Internetissä. Laajempi tavoite oli tutkia miten Twitter toimii alustana verkottuneelle asiantuntijuudelle ja julkisten asiantuntijayhteisöjen vuorovaikutukselle. Tämä uusi kulttuurisen tuotannon konteksti mahdollistaa verkottuneiden asiantuntijakulttuurien kehittymisen Twitterissä ja avoimessa Internetissä. Tämä luo uusia tilaisuuksia informaaliselle yhteisölliselle oppimiselle ja kulttuuriselle tuotannolle mahdollisesti vastaten nykyajan vaativiin osaamishaasteisiin. <i>Menetelmät.</i> Tutkimuksen osallistajat olivat avoimen datan ammattilaisia, jotka osallistuivat Twitterissä #okfest keskusteluun konferenssin aikana. Kaikki julkiset Twitter-viestit #okfest aihetunnisteella kerättiin aineistoksi. Viestejä analysoitiin laadullisella temaattisella analyysillä koskien niiden tiedollisia kontribuutioita joko viestiin sisältyen tai linkitettyinä. <i>Tulokset ja johtopäätökset.</i> Tutkimustulokset osoittavat että hashtag-aihetunnisteen ympärille syntyi yhteisöllisen tiedonrakentelun ilmiö, joka oli enemmän kuin pelkkää raportointia tapahtumapaikalta. Analyysissä löytyi kuusi yhteisöllisen tiedonrakentelun teemaa jotka ilmenivät hashtag-tilassa. Yhteisöllinen tiedonrakentelu muistutti käytäntöyhteisöjen teoriaperinteen (Wenger, 1998) vuorovaikutuksen piirteitä. Asiantuntijoiden yhteisöllinen vuorovaikutus synnytti ”sosiaalisen oppimisen systeemin” jossa tiedonrakentelu yhdistyi vuorovaikutukseen. Tutkimustuloksista nousi uusi käsitteellistys, asiantuntijoiden alakohtainen tiedollinen tuotanto (eng. <i>expert microblogging</i>). Twitter-alustalle paikantui verkottuneiden asiantuntijakulttuurien kehittyminen avoimessa verkossa.	
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1 INTRODUCTION

”New forms of community are emerging. And also new cultures of knowing, sensing, analyzing are being built. They are fluid with temporary roles and shifting affiliations based on common/changing intellectual enterprises. These communities, however, are held together through the mutual production and reciprocal exchange of knowledge.”
(Jenkins, 2002, 2)

The Internet has created new and exciting opportunities for formal and informal learning in the 21st century. In its wake a networked society has emerged imposing new challenges for work, learning and development of competence. Information and communication technologies (ICTs) have changed how we communicate, work and learn together. A development called the epistemification of work is an essential aspect of the networked knowledge society. This means work becoming more knowledge-intensive, to the point that it is presenting new challenges for human competence.

Knowledge work today revolves around the deliberate advancement of knowledge rather than just the production of material things (Bereiter 2002). Traditionally organizations’ and their employees’ knowledge was often regarded their best asset to triumph in the information society (e.g. Beinhauer, 2000). However today, success in knowledge-intensive work requires individuals’ and organizations’ continual development beyond their current state. Tackling the perpetual learning challenge requires a mindset for epistemic exploration and the development of new epistemic competencies. A key reality of knowledge work today is taking responsibility for continual professional development. A prevalent professional requirement is becoming an active practitioner seeking opportunities for learning and improvement in one’s domain. This may require cultivating and maintaining personal connections to networks and peers providing relevant learning opportunities.

Concepts of knowledge and expertise are being radically redefined, developing from individualistic to more collective and networked qualities. Knowledge today is regarded as

an emergent property of dynamic communities and networks rather than brilliant isolated minds. In this new reality, the development of expertise is grounded on hybrid systems of networked individuals, tools and practices. Thus knowledge creation does not take place within the human mind but rather between participants through participation to innovative knowledge communities. (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004).

These developments signal a renaissance of information, knowledge and creative collaboration with far reaching consequences for our collective cultural development. Contemporary information and communications technologies (ICT) enable people to gather around a shared purpose unrestrained by physical location. Individuals participate into these communities for support, challenge and to develop their understanding in a field. These communities and networks are responsible for transforming prevailing knowledge and practices in specialist domains.

These social learning systems provide a substantive context for learning in the 21st century. Social media services, like Twitter, offer opportunities to craft professional identities and to engage in collective meaning making and reinventing professional practices. It is thus important to study how such innovative online cultures and networks are organized. To understand cultures of networked expertise we need to better understand how new knowledge, mediating artifacts, and practices are created, sustained and shared in such communities.

As the attainment of pertinent knowledge and understanding has become more critical for individuals and organizations, it has become crucial to understand how knowledge emerges in these new online contexts. This study explores the social media as an enabler of knowledge workers' collective epistemic inquiry. Firstly this thesis examines how knowledge is created, disseminated and validated collectively on the Twitter platform.

Secondly the manifestation of networked expertise on the Twitter platform is explored. Cultures of networked expertise situated in Twitter and the open web offer an authentic context of collaboration among practitioners in a domain. Participation and engagement may lead to socialization into these expert cultures promoting professional development and mutual networking with peer practitioners. Connecting with relevant peers and communities may open up rewarding opportunities for joint collaboration and learning.

2 THEORETICAL FRAMEWORK

2.1 THE PARTICIPATIVE WEB AND NETWORKED INFORMATION AGE

The participative Web has well and truly arrived (OECD, 2007). With the help of social media and online services, the Internet has seen an explosion of user-generated content and the emergence of the voice of the common Internet user. Content wise this has meant an explosion in online content such as web pages, blogs, video, audio podcasts and images. The participative web means that users are empowered to produce and distribute online content and collaborate directly with one another. It also means the Web developing truly into a platform for peer-to-peer interactions, a goal that was already an original goal of the Internet (Andersen, 2007).

The term Web 2.0 was introduced by Tim O'Reilly to describe a developmental trend of the Internet emphasizing communities and collaborative content production supported by *social software*. Web 2.0 was also a business revolution recognizing that communities and user-led content production added significant value to online services. In this new paradigm software and service development have evolved towards architectures enabling interaction, communality and participation. (Andersen, 2007). The disruptive developments that followed from Web 2.0, empowered users to create and disseminate online content with minimal transaction costs. This has led to the development of a new global public sphere situated in the open Web.

Social media was born in the wake of the Internet's participative turn and in accord with the developments referred to as Web 2.0. Boyd and Ellison (2007, 2) define social network sites (SNSs) as online services where users 1) construct public or semi-public personal profiles, 2) create lists of contacts to interact with and 3) can browse their lists and connections and those made by others within the system. Successful social media services have included services like MySpace, Instagram, Pinterest, Facebook and Twitter.

The emergence of social media also meant a shift in the organization of online communities. In the wake of SNSs gaining traction, other forms of online communality that existed before social media like niche websites, web forums and Usenet discussions were challenged by the new media. The previous online communities that were structured topically met with social media that was primarily egocentric or organized based on

personal networks where the individual is at the center. The SNSs thus created a new framework and context for online communities and networks to develop. (boyd & Ellison, 2007, 219).

Social software is a broad concept that has been used to express how the Internet has extended human capacity for interaction. It has enabled collaboration across time and space, such as decision-making and planning. It has created entirely new patterns of interaction and association on the Web. It has also facilitated the functioning of groups by providing an organizational memory, helping decision-making, documenting interactions and processes. Social software has also been said to help individuals deal with the complexities of the Internet through processes of social filtering, recommendation and authentication systems. (Dron & Anderson, 2014a, 8).

Mejias (2005) has described social software as “software that allows people to interact and collaborate online or that aggregates the actions of networked users”. A key aspect of social technologies is the potential of aggregating content into collections of ideas, artifacts and discussions. Dron and Anderson (2014a, 15) posit that social software bears potential to expand the possibilities of learning in many ways such as helping build communities, helping create knowledge and encouraging active learning. (Dron & Anderson, 2014a, 9). Social software enables different kinds of interaction: 1) one-to-one, 2) one to many and 3) many-to-many. Social software supports synchronous (real-time) and asynchronous interaction (communication that may be viewed, listened to, or read by the recipient at a different time than when it was posted), or both. The interactions supported by social software may be direct (dialogical) or indirect (expressing no direct interaction). (Dron & Anderson, 2014a, 10-11).

The Internet serves as an enabler of users’ participation and production. Social media has dissolved the difference between producer and consumer and created new contexts of participation. A key point in this development is regular users’ participation through generating and circulating content. (Malinen, 2015, 1).

Castells (2010) suggests that the development of information and communication technologies (ICTs) have formed the basis for a new information age, marking a change, which is comparable in significance to the eighteenth-century industrial revolution. According to Castells, the information age represents a discontinuity in the material basis of economy, society and culture. It thus brings forth a time of new realities termed the

Networked Information Society. In contrast to previous technological revolutions, the Internet has, in less than two decades, connected individuals, groups and territories into a unified global communications infrastructure. (ibid.) However the Internet is not only a new venue of communication but also tool and platform for various kinds of societal developments.

Castells argues that a central trend is the Internet's functioning as a global "cumulative feedback loop" that forwards the development of human knowledge and culture (Castells, 2004, 29–33). In this light the Internet may be regarded as an engine of collective cultural production to which anyone enabled by computers or mobile devices can take part in. The participative web should thus be regarded as a new public sphere where different kinds of networks and interests become enmeshed, where individual actions converge and collective intelligence manifests itself (Dron & Anderson, 2012, 66).

The landscape of modern society augmented by online networks and connections has been called egocentric, meaning that the individual is at the center. Rainie and Wellman (2012) have introduced the concept of *networked individualism* to describe this new global reality. Networked individualism stands in contrast to other longstanding social forms such as households, communities or workgroups and their breakdown. In the contemporary configuration of networked individualism, individuals stand primarily as loosely oriented players, operating in fragmentary contexts of association with one another. (Rainie & Wellman, 2012, 6-7).

Rainie and Wellman call networked individualism "a new operating system" because it determines how we connect, communicate and exchange information with others. The operating system mediates our relation to the world and our peers. It has been described with three qualities: 1) *personal* – the operating system is based on the individual and her personal communications technology 2) *for multiple users* – people are interacting with others 3) *for multithreaded multitasking* – people are doing many things at once, often simultaneously. (Rainie & Wellman, 2012, 6-7).

The networked operating system creates new capacities and affordances for human activity empowered by networks and ICTs. It also presents challenges such as the requirement to develop network age competencies and corresponding social skills. People need to master the art of networking to be able to function in the new reality. They cannot remain passive and expect to be taken care for any longer. Finally they must assume an active role in

managing their presence and self-presentation in these networks. (Rainie & Wellman, 2012, 6-9)

These developments may predict that in the future people will have more remote relationships that aren't based on face-to-face encounters. Contemporary communications technologies make it easier to manage larger and more diverse populations of relationships. The Internet facilitates the maintenance of weak ties, letting us keep in touch with people who aren't that close. This development means that social cohesion is reduced and individuals are afforded more freedom and greater capacity to act on one's own. (Rainie & Wellman, 2012, 13)

2.2 PEER-PRODUCTION IN THE NETWORKED INFORMATION AGE

The production of knowledge has always belonged to networks and communities. Traditionally these communities were closed, homogenous and either small and privileged or large and institutionalized. However abreast of the old, new communities and networks of knowledge are emerging that are more heterogeneous and less institutionalized. As access to knowledge and actionable insight is so critical for individuals, business and society at large, it becomes necessary to better understand the mechanics of how knowledge is created, transmitted and validated in these new contexts. (Schuller & Theisens, 2010).

Yochai Benkler (2006, 138–139) has described the emergence of a culture of commons-based peer production. In this setting the common user assumes an active role in information production and exchange. Users are sometimes consumers and sometimes producers. In contrast to the previous setting, they are remarkably more engaged in productive activities and more in control of what they consume and how they consume it.

Similar to Benkler's thesis, Axel Bruns (2008) has coined the term of produsage (portmanteau of production + usage) and discussed it widely. Produsage explores the concept of producer-consumers as active agents and content creators. It also emphasizes the blurring of lines between passive consumers and active producers; the reality veers towards a hybrid of both. An example of these developments is the rise of professional

amateurs (Pro-Ams) who work in open environments, striving for professional-level results. (Bruns, 2008).

The networked information age has empowered the user to create and connect with others. Users are simultaneously consumers and producers of knowledge and content. Two examples of practical phenomena related to peer production are crowdsourcing and folksonomy. *Crowdsourcing* is a concept in which a large group of people, most often an online community, collaborates on a greater task by dividing it into subtasks that individuals can do independently (Doan, Ramakrishnan, & Halevy, 2011). A common example of this would be collaborating on a Wikipedia article that is gradually refined through participants' iterations and contributions.

Folksonomies are collectively produced knowledge taxonomies built through tagging content. A folksonomy makes a body of knowledge (or any other content) easier to search, discover and navigate. It is open collaboration on a grand scale in which users participate by doing a small part. The results are clearly different from a systematic taxonomy, such as one in a library. But nevertheless folksonomy is a significant process that builds value to content or knowledge through sorting or organizing it collaboratively. (Albors, Ramos, & Hervas, 2008, 197). An example of folksonomies could be individuals tagging Flickr images online creating a better collection.

As individuals have begun to coalesce and associate with one another in online contexts they, have begun to engage in sharing ideas and practices and developing knowledge. New forms of epistemic communality and collaboration have begun to emerge. Von Hippel (in Bruns, 2008, 15) has described such instances as information communities that are "communities or networks of individuals or organizations that rendezvous around an information commons, a collection of information that is open to all on equal terms." These developments have taken us to the brink of an epistemic revolution that may well be as disruptive as the invention of the printing press.

Peer production communities have from the beginning been governed by a different kind of logic reflecting their values and practices. Collectively produced knowledge is regarded as common good (or an information commons). Ownership or compensation was not an issue as other motivations to participate were discovered. The possibility to participate and to contribute publicly to a common purpose arose as a significant motivator. Developing a

shared information commons and the content that amassed there were enough to motivate many. (Bruns, 2008, 28-29).

In peer production, the information commons is shared, but individuals may also capitalize on it while following certain rules and practices. Also users may gain personal merit from their knowledge contributions even when the content is maintained collectively. Merits earned in the community's collaborations often materialize into social capital that may sometimes even traverse the limits of the community. Sometimes the earned kudos can even be converted to professional accreditation or recognition and consequent employment opportunities. (Bruns, 2008, 29)

Online peer production communities have been recognized to resemble Leadbetter and Miller's description of Pro-Ams whom are "innovative, committed and networked amateurs working to professional standards" (Bruns, 2008, 29). They are recognized as committed long-term participants of peer production communities participating in common efforts, identifying themselves among their community and representing the community to itself and to the wider society around it. (Bruns, 2008, 28-29). These could be taken as examples of online epistemic cultures that exist on the Internet. They are collaborating in a specific domain, where the participants have a shared professional interest. These communities may be very important to practitioners for whom they may represent significant arenas of interaction and collaboration with one's co-practitioners.

The information commons of a peer production process bears the character of being permanently unfinished. Communal activity is introducing iterations and increments in the form of new artifacts that represent temporary snapshots of an ongoing collaborative process. Knowledge products are thus just extractions from the living process. (Bruns, 2008, 27-28). Knowledge is expressed as a process of continuing interactions and flowing knowledge artifacts. As there is no end point for this process and the information is never packaged into a physical product (like a book) it could be argued that networked peer production of knowledge represents a different mode of knowing. A kind on networked expertise manifested as cycles of iterations, shifting artifacts and on-going discussions.

2.3 THE KNOWLEDGE CREATION METAPHOR OF LEARNING

In the turn of the 21st century understanding of learning has begun to develop to reflect recent societal developments and new realities. The unit of analysis for learning has expanded from isolated individual minds towards contextually sensitive, sociocultural and technologically mediated understandings. Learning in this new setting is a collaborative activity, taking place in different intersecting sites, settings and contexts. (Ludvigsen, Lund, Rasmussen, & Säljö, 2010, 1–2).

A central question is what the approach and agenda of education should be in the wake of the 21st century. Previous models of schooling have regarded knowledge as a given that needs to be acquired by the learners. The shortcoming of this educational paradigm is that students are not socialized into a culture of epistemic inquiry. They don't learn to ask questions, nor do they question existing knowledge, or engage in the production of new knowledge themselves. (Ludvigsen, Lund, Rasmussen, & Säljö, 2010, 1–2). This means that new conceptions of knowledge and expertise are required, ones that correspond to the networked information age. Only then can we refurbish our paradigms for learning, collaboration and expertise. We need a paradigm that focuses on the advancement of knowledge rather than its reproduction.

In the networked age, it has become natural to lump learning, collaboration and knowledge production together. From the development of ICTs and globalized society new paradigms of learning and collaborating have begun to emerge. Dron and Anderson (2014c) have discussed how some emergent pedagogical models have recognized the benefits of creating and sharing of cultural products as part of the learning process. These theories model the functioning of authentic expert communities. These approaches also consider the combination of sharing cultural products with open dialogue as an optimal blueprint for learning. (Dron & Anderson, 2014c, 1-2).

In the view of modern educational research, neither students, teachers nor professionals should any longer be regarded as mere consumers or empty vessels of knowledge. Everyone should be prepared to engage in deliberate knowledge advancement in his or her domain and relevant epistemic communities. People should be empowered to assume responsibility for fashioning their own cultural practices. They should engage collectively in activities of producing and sharing actionable knowledge, which others can use and build upon. Finally, to make learning authentic, it is necessary to connect educational and professional cultures, cross-fertilize and interleave their knowledge practices, and

introduce authentic complexity to the quotidian of educational institutions. (Hakkarainen & Paavola, 2009).

Paavola and Hakkarainen (2005) have introduced the knowledge-creation metaphor of learning to answer the challenges of the nascent innovation-driven knowledge society. The triological approach is an extension to two major learning paradigms, first the constructivism on the individual level ("monological") and second, the participative paradigm of learning ("dialogical"). The third ("triological") paradigm focuses on processes of collaborative knowledge advancement in the knowledge society. Learning is seen as analogous to epistemic inquiry connected to cultures of expertise, where networked knowledge resides. (Paavola and Hakkarainen, 2005).

The knowledge creation metaphor of learning has brought about a new conception of knowledge. Collectively shared knowledge has been described as open-ended 'epistemic objects' constant in process of being defined by participants. The triological approach means that learning is understood as a multi-dimensional process of collective interaction in connection to networked cultures of expertise. The activity centers around the "triological" development of shared objects of activity (e.g. conceptual artifacts, practices or products), referring to dialogue that are mediated by epistemic artifacts. Thus new ideas, tools and practices are developed and existing ones improved. (Hakkarainen, Palonen, Paavola & Lehtinen, 2004)

Participation to knowledge building communities and activities requires an altogether new set of skills. Progressive inquiry requires a concept called *epistemic agency* that entails the pursuit of personal and collective epistemic goals. It is not solely an individual quality, but one, which arises from the socio-cultural context of a particular community or other social form. Epistemic agency means that the learner assumes partial responsibility in the collective task of knowledge advancement in a field. This means carrying out collective epistemic responsibilities in addition to concentrating on one's individual learning process. (Paavola and Hakkarainen, 2005, 554).

Paavola, Lipponen & Hakkarainen (2004) have discussed how to develop advanced skills needed to participate in the imminent knowledge society. Today more people need advanced competencies to work productively with knowledge and its advancement. (Paavola, Lipponen, & Hakkarainen, 2004). It is therefore important to study how experts in such networks in the open Web are organized to develop practices and forward

knowledge creation. We need to better understand how new knowledge, mediating artifacts, and practices are created, sustained and shared in such communities.

2.4 NETWORKED EXPERTISE AND INNOVATIVE KNOWLEDGE COMMUNITIES

The networking of expertise and explosion of user-generated content in online environments are developments requiring a new conception of expertise and expert practices. Changes in technology, economy and society have a profound effect on work life in contemporary society. The networked society brings about entirely new competence and skill requirements for knowledge workers. Rather than relying on existing connections and static organizations, the future will be that of shifting communities and transient associations. Also the melding of continuous learning with work life is a key characteristic of the future of knowledge-intensive work. People will be required to develop their competencies and to maintain their skills to successfully perform in the new reality. Work is also becoming increasingly a team effort, supported by collaborative technologies. (Hakkarainen, Palonen, Paavola & Lehtinen, 2004, 3).

The very concepts of knowledge and competence are shifting towards distributed expertise beyond individual skill and effort. Collective expertise is based on networks and cultures of knowledge and expertise. (Hakkarainen, Palonen, Paavola & Lehtinen, 2004, 3). As a result new forms of knowledge production are emerging. Knowledge-workers are creating and transmitting knowledge outside formal learning institutions such as universities, which were traditionally the home of such epistemic ventures. As Harold Jarche (2012) has put it, "work is learning and learning is the work", learning has become an integral part of the work.

Along the development that has been referred to the 'epistemification of work', expert work has become more knowledge-intensive (Hakkarainen et al., 2004, 139). A company's economic success and competitive edge are based not merely on possession of existing knowledge, but being able to organize towards the advancement of knowledge. It has been suggested that all expert workers are due to become knowledge workers who engage in value adding epistemic activities beside their primary job. Knowledge work is done with knowledge artifacts such as theories, concepts, designs or plans. Knowledge workers need

to be much more autonomous and to take more responsibility for their work in a very different sense to only following orders. Knowledge workers must participate in communities that emulate the functioning of expert cultures such as academic communities. They must become socialized into the cultures and practices of expertise and develop an identity of a knowledge worker. Professional excellence in this new reality - requires access to knowledge resources and expert communities - sites of situated epistemic activity. (Hakkarainen et al., 2004).

Expert work operates on a complex body of historically evolved knowledge, instruments, and practices (Hakkarainen, Lallimo, Toikka & White, 2010). Innovation in these settings comes from coupling with networks of knowledge practices. For many knowledge workers, information seeking has become a daily routine. Mining for information may involve searching the Internet as well as maintenance and cultivation of personal networks and contacts beyond one's own organization. These connections enable information flows from peers, stakeholders, thinkers, informal contacts and relevant professional communities. (Hakkarainen, Palonen, Paavola & Lehtinen, 2004, 91).

Communities of enthusiasts working in in technology-enhanced learning contexts that focus on constant innovation and pursuit of novelty in a domain have been categorized as Innovative knowledge communities (IKCs) (Hakkarainen, 2009, 215). IKCs exhibit knowledge practices or productive ways of working with information that can be characterized as purposeful furtherance of knowledge and innovation. Such communities have been described to engage in the deliberate reinvention of prevailing practices, systematic pursuit of knowledge and constant working on the edge of competence. These online communities could be said to have their own epistemic culture or a shared cultural practice concerning the production of new ideas and forwarding knowledge. (Hakkarainen, 2009, 214–215).

The knowledge practices employed by IKCs are in part supported by collaborative ICT technologies that enable the creation and circulation of epistemic artifacts that mediate the community's collaborative activities. Mediation is based on the sharing of digital entities that contain knowledge and ideas embedded in them (e.g. a linked blog post). These digital knowledge artifacts are subject to the community's collaborative efforts and activities and can be shared, interlinked, and explored in a longitudinal process. The knowledge artifacts circulated in the community make prevailing practices visible and allow them to be

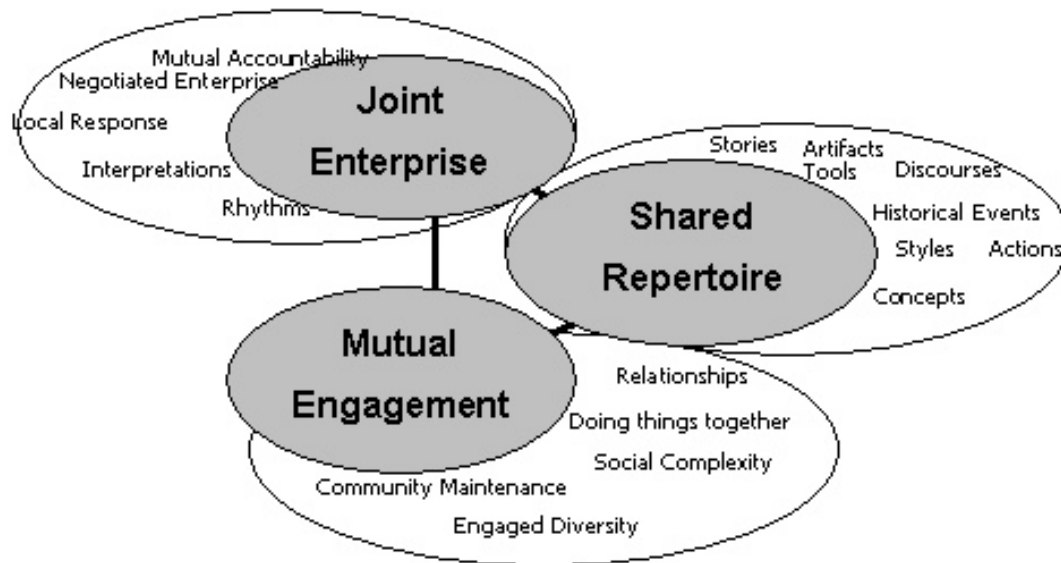
subjected to reflection and potentially transformation. These knowledge-laden epistemic objects are shareable social objects that are the subject of the collaborative practices. The IKCs' collaborative processes revolve around developing and sharing epistemic objects that are open-ended and contain possibilities for novel lines of inquiry (Knorr-Cetina 2001 in Hakkarainen, 2009, 215).

2.5 COMMUNITIES OF PRACTICE AND NETWORKED LEARNING

This thesis explores a paradigm of learning and expertise based on participation to networks and communities of expertise. A seminal theorization of learning in the context of participative communities is Etienne Wenger's (1998) *Communities of Practice (CoP)*. Communities of practice are an organizational form, which has challenged and augmented earlier notions of knowledge sharing, learning and organizational change (Wenger & Snyder, 2000). Communities of practice foster learning and knowledge sharing in a specific domain. They have been identified as a mechanism through which specialist knowledge is held, transferred and created. The participation metaphor or learning regards knowing as an act of participation in complex 'social learning systems' (Wenger, 2000, 226). Participating to communities of practice is essential to our learning and staying up to date with latest developments in a domain.

Communities of practice (CoP) are units of social interaction and learning. CoPs disseminate expertise and knowledge through informal interaction. High quality learning takes place and new ideas are spread within these communities. Learning within CoPs is based on negotiation of meaning and shared histories. These communities uphold a recurring process of collective meaning making and production of knowledge in their specific domain. These communities have local cultures and processes of social learning from which their participants and followers benefit. (Wenger, 1998)

Image 1. Three key dimensions of Communities of Practice (Wenger, 1998, 73).



According to Wenger (1998, 73) a community of practice is defined on three dimensions: 1) a *joint enterprise* that is understood and continually renegotiated by its members, 2) *mutual engagement* that binds members together into a social entity and 3) a *shared repertoire* of communal resources (routines, sensibilities, tools, artifacts, vocabulary, styles, etc.) that members have developed over time. Competence is having access to these resources and being able to use them competently. (Wenger, 1998, 73).

These three key factors define the nature of a community of practice. The first dimension means that the community shares an interest that gives coherence to its communal activities. The joint repertoire is collectively negotiated and gives meaning to members' actions. It is not just a stated goal but directly connected to practice creating mutual accountability. The second dimension means that practice does not reside solely in artifacts or tools but in the concrete interactions whose meanings they negotiate with one another. The key point of mutual engagement is the maintenance of interactions and relations in a shared domain. The third and last dimension is the shared repertoire that emerges from the joint pursuit in an enterprise. The repertoire is a reified reflection of a community's past interactions, in other words that the artifacts embody the negotiated meanings of a community. The repertoire is a history of past engagement and also a resource for the production of new meanings and interpretations. The three dimensions create a context for the negotiation of meaning and the production of practice. These characteristics make

communities of practice a locus of creative achievements such as the production of new knowledge and expertise. (Wenger, 1998, 72-85).

”Any community of practice produces abstractions, tools, symbols, stories, terms, and concepts that reify something of that practice in a congealed form” (Wenger, 1998, 59.) The participation of members to a community of practice is described as dialectic of participation and reification. This means that the community’s activity and engagement embodies a continual process of informal knowledge production.

The community of practice framework has been applied far and wide to explore many kinds of phenomena, from loose emergent associations to teams of professional and systematic initiatives of organizational development. The CoP terminology has been applied so widely to diverse contexts, that it has resulted in blurring of its meaning (Dron, 2014a, 57).

Although the CoP conceptualization was originally developed to describe physically co-located communities, Wenger (1998, 6–7) foresaw how they might also exist via online mediation. As the concept of communities of practice was introduced to the Internet, its manifestations have become more diverse as new kinds of contexts and spaces for interaction and collaboration have been identified and created (Wenger, Trayner & de Laat, 2011, 9). The Internet and web technologies have created conditions for new kinds of collaborative practices and knowledge work to take place and develop. In this sense the Internet has led to even more diverse permutations of the concept. By participating in the Web’s online contexts groups of hobbyists, aficionados and professionals may come together to share expertise and experiences, work with knowledge and to foster new ideas and developmental trajectories in their domain.

The community of practice conceptualization bears the characteristic of cohesion that comes from the joint mission, mutual engagement and collective production. A central question in the context of the Internet is whether certain instances of online interaction can be merited as CoPs. There exist many forms of interaction online. The CoP theorization can be used to calibrate our exploration of online cultures and help us identify their activities. But often it is the case that many cases of interaction don’t achieve such levels of cohesion and sustained interaction that they could be regarded as a CoP.

Wenger, Trayner and de Laat (2011) have revisited the community of practice concept to accommodate it to the networked age, while taking into consideration developments in modern learning paradigms (e.g., Downes, 2007; Rainie & Wellman, 2012; Siemens, 2005). In their revision, they distinguish between cohesive groups and loose networks. Networks are regarded not to have specific domains or shared enterprises:

”The learning value of a network derives from access to a rich web of information sources offering multiple perspectives and dialogues, responses to queries, and help from others—whether this access is initiated by the learner or by others. On the one hand, because of personal connections, networking enables access to learning resources to be very targeted—whether one sends an email query to a friend or decides to follow someone’s Twitter feed. On the other hand, because information flows can be picked up, interpreted, and propagated in unexpected ways, they traverse networks with a high level of spontaneity and unpredictability. This potential for spontaneous connections and serendipity – and the resulting potential for collective exploration without collective intention or design – is a key aspect of the value of networks for learning.” (Wenger et al., 2011, 12)

In their view communities and networks are two different types of social structures where learning takes place. Communities of practice refer to the development of shared identities around a topic. They are representative of collective intention to forward a domain of knowledge collaboratively and to learn from it. The network is regarded as a set of relationships and connections among practitioners. The network creates affordances for learning such as information flows, helpful linkages, joint problem solving and knowledge creation. It is however unclear where the two terms meet and at what degree one becomes the other. (Wenger et al., 2011, 10)

The learning value of a community comes from shared purpose to advance learning in a domain. A key characteristic is blending individual and collective learning processes together in the development of a shared practice. Such shared commitment is a resource for learning on the individual and collective scale. This creates meaningful information flows between participants. Collaboration and engagement create a shared history of learning

that subsequently becomes embodied in a shared repertoire of knowledge artifacts. (Wenger et al., 2011, 11).

Wenger et al. (2011) discusses special qualities of learning in online networks. Networks weave together a rich web of information sources and potential partners for learning dialogues. The interactions may be initiated by the learner or following interactions of others and discovering content made by others. Networks consist of information flows that easily traverse different contexts and communities with great spontaneity. This creates opportunities for serendipity and spontaneous discovery of the unexpected. A key aspect is how networked learning presents a potential for collective exploration without collective intention or design. (Wenger et al., 2011, 12).

The challenge of networked learning is that it requires a very active and intentional role from the individual. Rich resources and active collaboration translate to increased noise and information overload. The fragmentation makes it harder for any one to supervise or steward the collaborative epistemic initiatives. Leveraging networks for learning requires that individuals become active agents capable of evaluating content and taking initiative. The learner must participate in meaningful enterprises and perhaps collaborate with others and share information. (Wenger et al., 2011, 12-13).

Brown and Duguid (2002, 141–142) have referred to *networks of practice* as social forms that are significantly looser than communities of practice, but share some core attributes in common. Members are usually unknown to one another and links between them are more indirect e.g. mediated by ICTs. These systems where "reach dominates reciprocity" are also referred to as loosely coupled systems. These social systems tend not to initiate action and produce little knowledge. Communities of practice have sometimes been regarded as subsections of larger networks of practice. (Brown and Duguid, 2002, 141–143).

2.6 NETWORKS AND LEARNING

The participative web and the networked information ecosystem have created new contexts for learning and cultural production in the network age. Social media services like Facebook, Twitter along with blogs and other social software enable people to congregate and collaborate online and engage in learning activities. This new domain is poorly charted

territory. We know a great deal about learning in purpose-built contexts and communities, but we know far less about how it happens among loose collections of people linked together through social media, web services and mobile applications.

The proliferation of mobile devices has enabled on-the-go participation to different instances of network participation. Network technologies enable very different patterns of participation than were previously possible. (Dron & Anderson, 2014, 132). In the case of Twitter, this means practitioners having the capacity to connect to the network dynamically either to share content or to follow the feed of a certain hashtag.

Networks have been applied less to formal learning. Because of their unstructured form, they don't fit well with institutional structures. By definition networks are devoid of structure and cannot be designed. They may be initiated in formal contexts, but they cannot be engineered, overseen or managed. (Dron & Anderson, 2014, 131). Networks have their own ebb and flow of participation and activity based on their participants' activities and interactions.

Networks are very different from groups and communities as they are characteristically uncertain and unforeseeable. The audiences for networks are often very heterogeneous and share some values, interests and qualities in common. Traditional groups may share goals and norms while the variety found in networks is fertile ground for new contacts, serendipity but also conflict and misunderstanding. The strength and weakness of networks lie in their openness and unconstrained nature breeding diversity and complexity. Trust may be difficult to achieve along with homogeneity afforded by shared norms and mutual memberships. The lack of homogeneity however, enables the introduction of multiple perspectives leading to a cornucopia of creative solutions and ideas. (Dron & Anderson, 2014, 134-135).

Learning outside purposely-designed environments is indeed very different than in structured environments. For example an individual may be well accustomed to the practices of social construction of knowledge. However they are quite seldom in charge of designing their own learning process or structures supporting their learning. Adapting to the networked learning paradigm requires individuals to assume responsibility for self-directed learning. In the spirit of *connectivism*, an emergent learning paradigm, networked learning is equally much about developing meta-skills to support one's own learning as about learning itself. (Dron & Anderson, 2014, 136).

Networks facilitate the formation of 'weak ties' serving as links to other individuals and other communities. Networks commonly have a greater number of weak ties than strong ones, albeit both have their distinct facets. Strong ties are associated with short transactional distance, fellowship, frequency and diversity of interactions. The shortcomings of strong ties lie in their imposing of restrictions and norms upon their members and also their inertia and disinterest in life outside the core group. Weak-tie entities and networks offer diversity of opinion and a multiplicity of information flows. They are characteristic of what Putnam referred to a 'bridging social capital' that supports the dissemination of useful information but does not provide emotional rapport alike in more tightly knit groups. Weak-ties organizations are merited with flexibility to adapt to changing situations and coordination requirements. (Dron & Anderson, 2014, 137).

Learning in networks depends on the initiative or learners themselves assuming a productive role. Commonly learning in networks begins from creating something or introducing someone else's creations that may be a blog post, video, comment or question. Freedom to choose the learning content is characteristic of learning in networks. Learning also involves the creation and sharing of paths that lead to learning materials via hyperlinks. However content is not equally distributed as the emergent organization of a network will cause content, which is in higher demand to be amplified, and less engaging to wane. Still, networks are considered far more diverse than community or group oriented environments and formal learning environments. A central concern about popular content is that it may not correspond to being the most useful. Content distributed in networks is often subject to permutations, iterations and appropriation. This is how processes of co-construction of knowledge may emerge that are fully organic and without any editorial control. Networks are optimal for browsing topics, ideas and exploring divergent lines of thought. Learner activity is required to actively explore links and materials and to bridge disparate knowledge and skills together. (Dron & Anderson, 2014, 139-140).

Lines between communication, content sharing and content production tools are blurred in networked environments. These different functions are becoming hybridized into a complex system of practitioners interacting with each other and knowledge artifacts. The activity in a network can be described as a process of networked information management on a collective level. Networks may thus serve as information routing systems where participants serve as filters for one another in a system of collective meaning making. (Dron & Anderson, 2014, 145-147).

Networks may also be used to expand the audience of a certain event such as lessons, presentations or conferences. This means initiating a network beyond the formal group or event to allow for ideas to flow and individuals to make new connections and engage in discourse. Opening up an event for remote participation may add authenticity and diversity of ideas that may be motivating for participants. Even if the primary context of interaction is a local physical event, enabling network coupling in the open Internet may introduce elements that enhance learning and interaction. (Dron & Anderson, 2014, 149).

Networks boost learning by enabling learners or practitioners to connect directly without mediating institutions. Networked informal learning represents a profoundly disruptive technology to formal institutions. This kind of learning is unconstrained and obviously cheaper to produce than the institutional kind. Its strength is in learner-centeredness so that it can be chunked, sequenced and managed by the learner. (Dron & Anderson, 2014, 150).

Many researchers regard emergence as a key identifier in network learning models. This implies that the members of the network have both the tools and authority to recreate the form and function of the network in response to changing requirements. (Dron & Anderson, 2014, 153). The case of emergence versus design has been discussed in regard to communities of practice as well. The regard towards facilitation, promotion, and leadership in networks is a contentious issue among network theorists. Community of practice theorists have argued that one cannot intentionally or artificially create communities of practice, but that they are by definition self-organizing (e.g. Wenger, 1998). However at the same time, Wenger and others talk about certain individuals who play key roles in 'community development' and provide leadership in emerging networks. (Dron & Anderson, 2014, 153–154).

Somewhere between traditional groups and informal networks, exist the transient learning networks that this study aims to explore. In these loosely joined networks people with shared interests come together based on their personal interests and assertiveness.

3 WHAT IS TWITTER?

Twitter is a social network site whose focus lies on the efficient delivery of timely relevant information to its users. According to Twitter's help documentation the most important function is reading tweets and discovering new valuable information (Twitter 101, 2013). Sharing your own tweets is deemed useful but it is stated that "the real magic of Twitter lies in absorbing real-time information that matters to you" (ibid.).

Founded in October 2006, roughly 2½ years after Facebook, Twitter has become one of the major players in the social media industry. In early 2014 Twitter had more than 645 million active users, who sent 58 million tweets per day (Statisticsbrain, 2014).

The core function of Twitter lies on the circulation of short messages, in a public discursive space on the Twitter platform. Twitter is often described as a microblogging service, meaning that users publicly broadcast a stream of tweets limited to 140 characters. Microblogging is the real-time dissemination of short messages sent via the web or from mobile devices. Tweets can contain text, images, videos and links to other media. (Java, Song, Finin, & Tseng, 2007).

Twitter is a social network service where people build their personal profiles and establish connections. However the principals by which social ties in the network are established differ. Twitter does not have a feature for reciprocated relationships like the 'friendship' status on Facebook. Instead there is the practice of 'following', which means subscribing to receive tweets from a certain Twitter account, without needing to seek the approval of the owner. As Twitter users' profiles and postings of tweets are public, anyone is free to subscribe to anyone else's tweets. If a user does not wish to receive anymore updates from a certain account it is common practice to unsubscribe from their updates by stopping to follow them. In this follower mentality, users seek, discover and follow interesting Twitter accounts, whose updates they would want to receive, thus building a personalized selection of handpicked Twitterers.

As Stevens (2008) states "the value of Twitter is the network" and consequently, in the connections one can make while subscribing to meaningful streams of updates. One of the core functions of Twitter is connecting with pundits, enthusiasts, thought leaders, professionals and generally any kinds of active practitioners in a domain. The practice of tweeting has been adapted by critical mass making it a prevailing service in the domain of microblogging. These developments enable using the platform as a utility to tap into cultures of expertise and to connect with networks of practitioners.

Twitter differs from other social media services like Facebook because of its core idea of establishing feeds of meaningful information from a variety of sources. This brings about a practice of intentional networking. Boyd and Ellis (2007) describe how on a majority of the large social network services, participants are not necessarily discovering new people; instead, they are primarily communicating with people who are already part of their extended social network (boyd & Ellison, 2007, 211). Twitter on the other hand functions on a different logic of users actively seeking to establish follower/followee relationships with other Twitter accounts, which they regard as interesting information outlets. Another aspect that reflects the centrality of networking to Twitter is the communal practice of recommending users to follow by attaching the hashtag #followfriday or #ff and to certain promoted usernames in a tweet. The Twitter service also has a function of suggesting people to follow based on (unpublished) factors of similarity. (Lewis & Rush, 2013, 6).

As all communication is public on Twitter, one does not even have to be a registered member to explore it's interactions and messages. Twitter is a real-time media where one can subscribe to receive feeds of tweets from other accounts. This means that one receives all the tweets sent by accounts one is following at the time when they are sent. To compare, Facebook uses algorithmic filtering to decide what content the user sees. This means that the system will never show all the content produced by one's Facebook friends. Also Facebook does not present the content chronologically in it's feed, but creates a timeline of content, that is an algorithmic composition. The Twitter timeline however, lists all available tweets from the accounts one is following in reverse chronological order with the most recent on top. On Twitter presenting the sum of all tweets is referred to as "the full fire hose" that results in a much more chaotic real-time experience. On Twitter's platform there are no gatekeepers or any processes of moderation to limit the flow of tweets.

This study examines Twitter as an online platform that exhibits niche cultures and practices of topical discourse, special interest information diffusion and collaborative production of content in various domains.

3.1 A SOCIAL NETWORK OR A NEWS MEDIA?

Originally Twitter executive Jack Dorsey said he wanted "Twitter to be like electricity, e-mail, SMS, or phone" indicating a strong intention for a multipurpose tool and service (Dijk, 2012, 4). It has however been somewhat of an issue, what kind of media and communications platform Twitter actually is. During its early years, Twitter was often called a service in search of a user application. The exact purpose of the technology was discussed among journalists and business analysts, who openly wondered about its strong points and most evident usage. (Dijk, 2012, 4) Given Twitter's simple and flexible nature, the service can be adapted to many kinds of uses.

Twitter is a hybridized form of social networking and diffusion of information. Twitter is a platform designed for the authoring and distribution of tweets and large-scale propagation of information, based on Twitter users' social networks. News and information spread according to the communicative structure of the social network. Twitter's communicative structure is based on two dimensions, first the long-term and relatively stable follower-followee relationships and secondly the relatively short-term and emergent relations based on shared topics coordinated by common hashtags. (Bruns & Burgess, 2011, 2).

Having analyzed Twitter users' networks Kwak, Lee, Park, and Moon (2010) came to describe Twitter rather as a source of information than social network because of the imbalance between a great number of followers who were not reciprocated. They describe the practice of retweeting in the context of spreading information. Through retweeting individuals have the power to decide which tweets contain information deserving to be retweeted. The authors also note the emergence of a kind of collective intelligence related to how retweeting amplifies the visibility of content collectively interpreted as valuable or interesting (Kwak et al. 2010, 8). Twitter is increasingly becoming a medium for sharing and receiving information, as opposed to a social network service such as Facebook, where interactions are related to real-world social ties. Twitter is however, a hybrid media, both a social networking site and a news media.

In the same vein Brooks & Churchill (2010, 4) reported Twitter usage as a utilitarian information resource and an epistemic awareness platform for time sensitive content. Twitter usage in this sense has been referred to as '*information snacking*'. The service is useful for polling an opinion from the 'hive mind' and as a social search engine that reaches into people's tweets. Brooks and Churchill (2010) used the analogy of Twitter as a radio-like information source serving for pragmatic information needs enabling on the fly

tuning into specific information outlets or channels represented by specific Twitter accounts or hashtags. (Brooks & Churchill, 2010).

There are different motivations and uses for microblogging platforms like Twitter. Single users may of course have multiple intentions and even changing roles in different communities within a service. Java, Song, Finin & Tseng (2007, 62–63) identified some of the main user intentions of using Twitter by categorizing tweets by content. '*Daily chatter*' was the most common use of people reporting their daily routines and what they are currently doing. '*Conversations*' was a second category meaning users commenting and replying to their contacts' tweets. The third use was using the service to '*share information or URLs*'. The fourth function was '*reporting news*'. This thesis is particularly interested in users' information sharing behavior in on Twitter. (Java et al., 2007, 62–63).

Java et al. (2007, 61) also observed Twitter users' tendencies to form communities of common interest in which participants share selected domain knowledge aside with more personal sentiments and daily experiences. This finding means that information exchange in Twitter communities is not merely about the cold exchange of information as there is room for individuality and personal expression.

Twitter has evolved beyond personal life sharing, daily chatter and interpersonal communication and gained significance as a journalistic tool because of its power in the diffusion of information. Usage of the platform has developed towards journalistic, quasi-journalistic and para-journalistic activities. (Bruns & Burgess, 2011a).

Subašić and Berendt (2011) took a look at citizen journalism on Twitter with the presupposition of the platform's powerful potential for introducing and spreading new information. They set out to analyze whether users produced news themselves or peddled existing content. In contrast to their premises the study found that the biggest role of citizen journalists was commentary, expressing opinions and taking positions on the news. This also expresses that Twitter functions as a platform were the expression of sentiment and taking points of vantage to a story can happen. (Subašić and Berendt, 2011).

3.2 MICROBLOGGING, A NEW GENRE OF ONLINE DISCOURSE

Twitter was among the first microblogging platforms and with it emerged a new format of online expression and cultural production. It has been established that Twitter affords many different modalities of social participation and expression.

From its specific communicative format arises a new genre of online participation called microblogging. Microblogging has been referred to as an entire new genre of conversation (Yardi & Boyd, 2010, 325). Microblogs should be regarded as a hybrid of traditional blogs and social networking sites, belonging to the general classification of social media (Kaplan & Haenlein, 2011). Microblogging has been recognized for its great potential in epistemic production as it pairs social networking with epistemic production.

Microblogging is a hybridization of a blogging, instant messaging, social networking and status notifications. It shares a lot of characteristics with blogging's three key concepts, according to Karger and Quan (2005): namely that the posts are short, the postings emerge from one author and lastly that the entries can be collated together. Microblogging practices and systems have lowered user investment in the production and consumption of content. This has created a lightweight and dynamic mode of communication which has carved out its own communicative niche. (Ross, Terras, Warwick, & Welsh, 2011, 217).

Microblogging is a condensed version of blogging of sending brief text updates. Studies on microblogging have described it as mundane chatter, where the ordinary is made visible to others (Oulasvirta, Lehtonen, Kurvinen, & Raento, 2010). However when topical specialization is combined with microblogging, a more relevant practice of expert microblogging emerges.

Microblogging has been studied in the context of learning in higher education (Menkhoff, Chay, Bengtsson, Woodard, & Gan, 2014), inside organizations and enterprises. This has suggested that microblogging could be useful in knowledge management, personal branding and mass communication (Schöndienst, Krasnova, Günther, & Riehle, 2011).

Microblogging has led to a new way of managing information flows. Networked individuals can choose whom they receive information from. This happens by people following people they respect and trust to function as their guides. (Rainie & Wellman, 2012, 233)

While some academics and journalists have emphasized the conversational nature of tweeting, a fair number of researchers have focused on its epistemic content, by looking at

Twitter's function either as a headline-news distribution system (Kwak, Lee, Park et al. 2010) or as a quasi-journalistic tool facilitating dissemination of short fragments of information from a variety of official and unofficial sources (Hermida 2010).

There is little social expectation for users to reply to any given tweet, and even where a direct address is made to a particular user the obligation is relatively weak. Such development has been referred to as the 'dilution of conversational obligations' (Oulasvirta, Lehtonen, Kurvinen, & Raento, 2010, 244). This reflects the genre of microblogging where output may be regarded primarily as production of content rather than a discursive act.

Horan (2012) has studied Twitter messages and made three observations based on features that Twitter has for produsage (portmanteau of "production" and "usage"). 1) Twitter has a tremendous potential in delivering pertinent information to individuals 2) Because users' choices create information flows, Twitter seems more like a news network than an social network 3) users similar to each other tend to have similar patterns of information diffusion. (Horan, 2012, 8)

3.3 HASHTAGS AND COLLECTIVE SENSE-MAKING

The findability of a user's or groups content can be increased by introducing a hashtag keyword (#). Hashtags are brief identifiers, which mark a tweet as taking part to an established discussion or communicative context. In this section we explore how hashtags tie in with the collective production of meaning on Twitter.

The Twitter hashtag has proven a remarkable engine of "cultural generativity" (Burgess, 2011). It has seen a profusion of applications and adaptations to millions of individual applications. It has been deployed in emergency relief situations, Twitter jokes and memes, as commentary to popular television programs and especially in the coordination of ad hoc publics. (Bruns & Burgess, 2011).

Twitter being a robust, but lightweight platform that can be dynamically accessed with mobile devices makes it well suited for quickly set up online collectivities. For this reason Twitter is commonly employed in different instances for setting up ad-hoc communicative networks that engage in discourse and knowledge sharing in a topic. General applications

have been discussing natural disasters, global sporting events, uprisings and military conflicts to political campaigns. There is something about Twitter that makes it suitable for mediating the collaborative activities of loosely affiliated individuals who are animated by an emergent topic, designated by a shared hashtag.

Twitter has been studied to understand the process of collective sense making during violent crises (Heverin & Zach, 2012). It has been found a suitable media when people are trying to understand what is happening before any news coverage or official information are available. In such instances Twitter may serve as a node for sharing and seeking information and creating mutual understanding. The collective operates by filling the gaps in information and offering micro-incremental bits of information reported by individuals acting as citizen journalists. (Heverin & Zach, 2012). This is an example of Twitter enabling a collective epistemic process, which emerges with minimal coordination than agreement upon a mutual hashtag upon which individual tweeted contributions will begin to amass/converge.

Twitter is a communications platform that produces an instant and on-going social evaluation of significant or newsworthy content (Bruns & Burgess, 2011, 2). Bruns & Burgess (2011) have discussed how Twitter hashtags enable the formation of ad-hoc issue publics. A key feature is that hashtags are deployed, bottom-up, by users themselves, without approval from any administration. As Bruns and Burgess (2011, 13) have noted, Twitter communities denoted by hashtags produce original commentary on news stories that is based on the community's interests and frames of reference. This means that such hashtag collectivities exist, which can deliver analytical insights into various phenomena through collective negotiation of meaning.

The selection, evaluation and publishing of information on Twitter employs a process called *gatewatching*: highlighting, sharing and evaluating relevant material released by other sources in order to develop a more comprehensive understanding (Bruns & Burgess, 2011, 2). In the practice of gatewatching, users select and put forward content that they perceive to be significant to their followers or to Twitter communities formed around topical hashtags. Certain users may begin to act as social filters, with the intent of mediating valuable content pulled from information streams and outlets they are themselves actively following. Thus what is shared and how it is framed in discussion results in the expression of 'What Twitter thinks' about an issue.

Hashtags on Twitter enable the emergence of ambient communities where participants construct interpersonal meanings in dynamic discourse. Electronic discourse in social media becomes searchable talk, and a new genre of dynamic collective knowledge proposed by Zappagavina (2011). Searching for online discourse on social network sites is an emergent cultural practice adjacent to the use of any other search engine. Upon the unfolding of some event, Twitter can be used as a social search engine for tuning into highly specific and real time streams of information. This means being able to search and discover what people are discussing online in real time and also being able to survey past events' unfolding. Thus hashtags function both as topical identifiers and as potential discourse communities. Hashtag usage on Twitter means leveraging the affordances of new media by making social information searchable and making relationships visible that might not otherwise be seen. (Zappagavina, 2011).

Hashtags render discourse in social media findable and they serve to group tweets together and to announce an ad-hoc discourse community. Zappagavina refers to this as creating *ambient affiliation*. Ambient affiliation means creating context and loudness to one's words and adding probability that the topic will be found and 'followed'. Ambient affiliation means individuals bonding around evolving topics of interest and forming transient discourse communities. Twitter emerges as a place where to go if you want to know what people are saying about something right now. This renders Twitter as an interpersonal search engine functioning at real-time. This means enabling people to connect to communities of potential value that are interesting at any given moment. (Zappagavina, 2011).

Hashtags that represent topics causing much discussion at the moment are referred to as 'trending'. The function of 'Trending topics' on Twitter.com, expresses popular keywords or hashtags, which are being included in sent tweets. At any given moment Twitter will thus be able to show you what the world is tweeting about as trending topics. As hashtags shift, also communities shift and altogether different associations of ideas and interpersonal meaning are established depending on what people are tweeting about at a given time. This reflects how the construction of ambient communities is a dynamic phenomenon. (Zappagavina, 2011).

Twitter has become the default platform for immediate widespread dissemination of pertinent news and information. Twitter can be used as an awareness system that users can

navigate according to their interests and information needs. Twitter can be used to tap into meaningful discussions in real-time regardless of physical location. In this way any given user can maintain a high level of awareness of a domain or topic that is relevant to them.

3.4 HASHTAGS AS BACKCHANNELS

It has become common practice for conferences and seminars to publish a Twitter hashtag in their official program to create a digital backchannel for the event. The hashtag allows participants and other interested parties follow tweets emanating from the event. It has been recognized that much meaningful information about an event is captured in its Twitter stream. The recent surge in interest has lead to a number of studies that attempt to study the implications of conference backchannels.

Conference hashtags have been recognized as a gold mine of rich contextual knowledge. Using Twitter as a conference backchannel "constitutes a complex space, with users combating its disorienting context by providing step-by-step accounts of events, making notes, sharing resources, holding discussions and asking questions as well as establishing a clear individual online presence" (Ross, Terras, Warwick, & Welsh, 2011, 20). Thus the backchannel emerges as a collaborative space that is populated with individual participants' experiences. Individuals and expert practitioners can use the backchannel to participate through with their Twitter persona. Through individual reports a collective narrative emerges without any coordination required. Twitter functions as a catcher pooling together individual practitioners' tweets.

Atkinson (2009, 58–59) has suggested a number of functions for the backchannel: reporting information by posting highlights, enhancing information by adding additional materials and commenting on information by offering an opinion. Conference hashtags are creating new ways for conference participants to engage with each other; to monitor what others are saying, amplifying others' ideas by retweeting, helping others and coordination.

Reinhardt, Ebner, Beham, and Costa (2009) found that conference backchannels provide a supplementary space to discuss presented topics and to share additional information. Also the interactions are not limited to co-located individuals, but enable participation for

virtually anyone to actively participate in the thematic discourse (ibid.). A backchannel's central function is to extend any event and its topics into the open Web.

Deploying a digital backchannel is regarded as a tool to support interaction among a community of practice. It is a unique communication medium that enables new forms of learning. A backchannel may encourage community building and other higher-level processes such as deep content knowledge, reflection, metacognition, distributed expertise. (Yardi, 2006).

4 RESEARCH AIMS

This research is centered on #okfest, a hashtag put forward by the organizers of the Open Knowledge Festival in Helsinki, Finland 17–22.9.2012. The designated hashtag was intended to function as a backchannel for discussion concerning the event and its themes. The hashtag was adopted by an active population of open knowledge practitioners for the duration of the conference. The analysis centers on the knowledge sharing activities within the hashtag space.

The hashtag backchannel could be seen as a parallel event, taking place in the online realm, and in some respects existing independently of the physically located conference. As interactions around the hashtag took place publicly on the Twitter platform, a transient forum emerged gathering participants from around the world to discuss open knowledge and engage in collective epistemic production.

4.1 RESEARCH QUESTIONS

This study endeavors to answer the following questions:

1) How does Twitter function as a platform for networked expertise?

- What does epistemic production on Twitter look like?

- What kind of knowledge and epistemic structures are being built?

2) How do practitioners engage in communal knowledge building in #okfest?

- What kinds of communal epistemic practices can be detected?

5 DATA AND METHODS

Following presenting key concepts, theoretical framework and research aims of the present study, this section presents the methodological choices taken in the course of this research.

In the present study tweets that included the hashtag #okfest between 17–22.9.2012 were studied to describe an instance of emergent online collaboration when Twitter users were sharing knowledge in the domain of open knowledge. Through the analysis of tweets sent to #okfest, the study examines communal knowledge building in the hashtag space.

By studying the activities in #okfest, we may gain understanding what role hashtags and topical hashtag communities on Twitter may play in enhancing collaborative knowledge building in a specialist domain. This research has bearing on description of online cultures of networked expertise entailing professional development and situated (at least in part) in the public Internet. The first goal of this thesis is to describe the process of communal knowledge building that took place in the exchange of tweets in #okfest. The second goal is to explore Twitter as an environment supporting the emergence of networked knowledge and expertise.

To address these research objectives, this study employs a qualitative approach and methods of thematic analysis. Thematic analysis is used in the analysis of tweets that were part of the process of collective knowledge building.

5.1 DATA COLLECTION

All of the public tweets containing the text string “#okfest” were collected during 17–22.9.2012 from Twitter. No tweets were removed from the data pool. The raw corpus of tweets was collected through the Twitter Search API programming interface (<https://dev.twitter.com/rest/reference/get/search/tweets>) using a PHP script. The Twitter API output (in JSON format) was transferred to a MySQL database for storage and finally moved to an Excel sheet upon delivery to the researcher¹.

The Twitter API is available to software developers who have registered with Twitter with an intention to develop Twitter applications and services. Similar search functionality is available to the public at Twitter.com without requirement to register to the service. The collected tweets could have thus been correspondingly explored using Twitter’s public search or through any other Twitter application.

The period for the data collection was June 14, 2012 to October 30, 2012. The corpus of collected tweets encompassed every tweet sent containing the conference hashtag, #okfest during the data collection period. The actual Open Knowledge Festival conference in Helsinki took place during September 17, 2012 to September 22, 2012. The analysis focused on the tweets sent during the conference when participation was most active. Even though tweets sent outside of the conference were not included in the analysis, they served as background information for the researcher, complementing his understanding of the online phenomenon.

5.2 PARTICIPANTS

As data collection in this study was limited to public tweets containing the hashtag #okfest, no predefined group of participants was set. Thus there weren’t any preconditions for the selection of participants, nor were their expertise or persona in any way identified or explored for such a reason. All public discourse pertaining to the #okfest hashtag discourse was collected through the Twitter API. All Twitter users who tweeted using the #okfest hashtag were included in the data.

¹ I would like to thank Tapio Nurminen, who had already collected the data corpus and

Contrary to common research practice, I decided to keep the Twitter users in the study identifiable, and retain their authentic names and Twitter personas. The primary reason for this decision was that Twitter use is commonly acknowledged as participation in the public sphere of the Internet. This intentional publicity can be further approximated from most participants' Twitter presence consisting of active tweeting, fully rounded Twitter profiles often containing full name and details about their public persona and affiliations. Moreover since participants were practitioners in the domain of open knowledge, they can be expected to have understood the publicity of their activities. Regarding the open knowledge community's values and mission, the choice to preserve the real identities of participants might even be regarded as an appealing proposition.

The Twitter users included in the study were not contacted by the researcher nor notified about the study. The researcher did not collect any additional data on the users whose tweets were included in the corpus. However the analysis of tweets was supplemented by exploring users' Twitter profiles to better illustrate the phenomenon of networked expertise.

The data corpus for #okfest was made up of 18.319 individual tweets. The data was also used by the organizers of the conference to visualize the Twitter activity and tweeters in relation to one another.

THE OPEN KNOWLEDGE COMMUNITY

Open Knowledge is a worldwide network of professionals and passionate amateurs intrigued by 'open culture'. They are proponents of software, knowledge and cultural heritage that are free to use and reuse without restrictions. Knowledge is understood broadly as data, online content and governmental information. Open knowledge is a set of values and practices related to the production and distribution of knowledge works in an open manner.

The field of open knowledge has a direct inheritance to the Free and Open-Source Software movement (FOSS). According to Benkler (2003) the free software movement is part of a new economy of commons-based peer production of information, knowledge, and culture. Quite often FOSS software projects are cited as examples of open source culture.

For this reason this population presented an interesting context for study because their community is so forward thinking in terms of open collaboration and knowledge sharing over the Web.

The Open Knowledge community is a worldwide network of practitioners who advocate the application of 'open practices' to a wider base of societal functions. Their focus is on the production and sharing of knowledge especially in areas such as, journalism, education, public governance, cultural heritage and civic action. Their grand goal is to "open up" data, knowledge and information to benefit everyone and to build an enlightened and empowered society of active citizens.

THE OPEN KNOWLEDGE FESTIVAL

The Open Knowledge Festival was a conference organized in Helsinki, Finland in September 2012. The event was organized by the Open Knowledge Foundation in collaboration with Aalto University. The festival brought together over one thousand experts and aficionados from over 50 nations. The festival program consisted of lectures, workshops and programming sessions (hackathons). The festival featured prominent speakers in the domain such as Hans Rosling, Rufus Pollock, Farida Viz and Simon Rogers.

5.3 RATIONALE FOR QUALITATIVE RESEARCH DESIGN

A qualitative research design was selected for the study. The aim of the research was to describe participants' interactions on Twitter and to craft a holistic understanding of the socio-technical phenomenon of epistemic production on Twitter.

Qualitative research focuses on phenomena in their natural setting, in effort to interpret meanings that people assign to them. Reality is regarded as equivocal and consisting of peoples' subjective meanings. The socially constructed nature of reality, the involvement of the researcher with the subject of study and the situatedness of the research are specific characteristics of the qualitative research paradigm. (Denzin & Lincoln, 2000, 10).

The qualitative approach emphasizes processes and qualities that cannot be empirically measured in terms of quantity, amount, intensity or frequency. Quantitative research on the other hand focuses on causality and the measurement of isolated variables. (Denzin & Lincoln, 2000, 10). Hence the goal of this research is to qualitatively understand the process of collaborative knowledge building in situ, where it takes place. The objective is not to test hypotheses or to represent phenomena numerically.

The objective of the qualitative approach is to craft a composition of a local phenomenon that is rich with detail (Denzin & Lincoln, 2000, 10). In this vein the intention of this study is to immerse in the full cacophony of Twitter, as it is often perceived. The primary data is the corpus of #okfest tweets that have been logged. However, to paint a fuller picture, the analysis must include a wider scope of significant contextual details that make up the phenomenon of collaboration around the hashtag in Twitter. This means analyzing the hyperlinked materials in relation to the domain of open knowledge practitioners. Also as a detail the online personas of the practitioners were explored to see how they portrayed them selves as public expert practitioners in their domain.

Qualitative research is not a sterile process, but subjective and value-laden, where the researcher gets involved and gets his hands dirty (Denzin & Lincoln, 2000, 10). This study stems from my personal involvement and experiences with Twitter. My experiences of Twitter have been the main motivation to undertake this research project. My intention has been to capture the significance of Twitter that I have experienced and appreciated myself. There have been profound experiences that have driven me towards trying to capture in this study. I must obviously recognize my positive bias in the work. Thus it is my task to make these motives and values salient to the reader. On the other hand, my motivation and drive will have hopefully made me strive towards a composition of the phenomenon that is expressive, alive and grounded in data.

5.4 QUALITATIVE INTERNET RESEARCH

According to Flick (2006, 256) most Internet research has been quantitative, however the use of qualitative methods is on the rise. Most of the research on Twitter and hashtags are also based on quantitative methods. These studies often come forth as rather shallow in

their analytic rigueur, only seeming to graze the top of the whole sociocultural phenomenon of Twitter and other social media. Today Twitter and social media exhibit exquisite and socially significant phenomena that would benefit from more in-depth exploration and qualitative approaches. Through the qualitative approach we can better focus on the (socio)cultural aspects of Twitter.

The Internet today is definitely a remarkable object of study. First it must be defined what qualitative research of the Internet actually entails. Markham has defined the Internet somewhat ambiguously as a "multiplicity of cultural phenomena" (2004, 330). He has thus left it to users, researchers and consumers to interpret and assign meaning to. Clearly the Internet is a complex social phenomenon of contemporary society, whose wide reaching cultural implications and complexity may yet be impossible to fully comprehend.

Markham has argued that the Internet (and all computer-mediated communication) is generally experienced in a threefold manner: alternatively or simultaneously as 1) tool, 2) place, or 3) way of being. Thus "the Internet is not only a conduit that facilitates the swift and planet-wide flow of information, it comprises the cultural spaces in which meaningful human interactions occur" (Markham, 2004, 332). The Internet should not be regarded as merely a tool, medium or communications platform, but a location for situated interaction that mediates human experience. Although online spaces of interaction have no physical existence, they can be perceived as meaningful and structured sites of situated interaction, which carry genuine consequences in the world. The third quality of Internet as a way of being describes rather enigmatically how individuals and society experience themselves and others through Internet-mediated communication. (Markham, 2004, 332). The fact that the Internet mediates our experiences, means that it melds with our collective thinking and with the production of shared realities.

In this study Markham's threefold definition of Internet is adopted. For the aim of this study the Internet is not regarded only a communications media but a place where new culture emerges and new way of being. The Internet supercharges our collective meaning making by creating new venues, fashions and instances of interaction. It is likely that entirely new forms of social association emerge through the web's interfaces and services. This results in online cultures that operate in a specific domain or profession and maintain mutual relations to learn, build knowledge and evolve their practices. The global Internet infrastructure is a hotbed for different kinds of social systems that affect how people learn.

Markham (2005) states that the Internet has the capacity to shape user's perceptions and interactions. The Internet is thus not only affecting how we work, but also how we communicate and ultimately how we think. Human thought is tightly bound to language and communication. Communication includes the externalization of thought and experiences so that others may be exposed to and to engage with. One might suggest that the global networking of minds with minimal transaction costs and powerful means for information production would have very interesting consequences. This study addresses Twitter as a socio-technical vehicle of thought that is a worldwide agora, whose activity is constantly percolating our collective experiences. If billions of people are indeed already active on the Internet, the question is how is this latent potential being realized in the domain of learning. Can it be described? Can its base of participation be widened? How do cultures of expertise and networks of practitioners exist and interact in the open Internet is the object of study.

From new technology, new faculties, behaviors and mindsets emerge. If the Internet is indeed functioning as a "global cumulative feedback loop", how is it forwarding the development of human knowledge and culture as Castells has suggested (2004, 29–33). This study is set to explore how Twitter mediates human activity enabling new forms of engagement and collaboration. Twitter was chosen for this study because it has a unique position in our globalized culture. In the case of Twitter, most interesting is that it is a public arena. The interactions and discussions of Twitter are already making headlines and directing discussions. What is its bearing in the domain of learning and collective cultural development?

Orgad (2009) has presented this definition of qualitative Internet research:

"[T]he study of the multiple meanings that emerge around the Internet in a particular context. These meanings and experiences can relate to contexts of use (by individuals, organizations, networks, etc.) and / or to contexts of design and production processes. The task of a researcher involved in a qualitative internet research project is to inquire into those meanings and experiences and explore their significance." (Orgad, 2009:34)

The qualitative approach was regarded as the most suitable for the present study. A central objective of the research is to understand microblogging as a situated activity of loosely connected expert practitioners operating in a specific domain. Secondly the study aims to

describe the knowledge building activities and practices in the context of a conference hashtag (#okfest) that developed into a learning initiative.

All pre-internet media—the press, film, radio, and television—have been interpreted and researched as cultural artifacts and as culture, to reiterate Hine’s (2000) distinction of approaches to studying the Internet. (Bakardjieva, 2009, 57)

Bakardjieva has described qualitative Internet research much alike any other area of mediated social life involving ”looking at people, their hustle and bustle, their conversations, and their artifacts and texts produced in and through different media”. (Bakardjieva, 2009, 59).

5.5 THEMATIC ANALYSIS

This study explores the phenomenon of collaborative knowledge building on Twitter upon the hashtag #okfest. The goal is to describe the practices of knowledge building through posting tweets. The data was subjected to qualitative thematic analysis in search of commonly recurring themes and patterns in light of the research aims.

Thematic analysis is similar to content analysis, but with a stronger footing in the qualitative tradition. It is useful in systematic analyses of qualitative phenomena that are firmly rooted in context. (Joffe & Yardley, 2004, 67). Thematic analysis is a very widely applied method of qualitative analysis, which often goes unacknowledged by its actual name (Braun & Clarke, 2006, 79). The method suffers from unfamiliarity rooted in its universal character.

Thematic analysis offers an applicable and theoretically meaningful method of qualitative analysis in search of themes and patterns from the data. Thematic analysis is regarded as a core practice in the qualitative research tradition. It is commonly merited for its flexibility because it is not connected to any specific epistemic or theoretical traditions. This is one of its key advantages. Thematic analysis provides minimal organization of a data set while offering rich amount of detail to come forth often resulting in an interpretation of various aspects of the study. (Braun & Clarke, 2006, 78-79).

Thematic analysis is always driven by the particular research question. The themes that emerge from the analysis aim at capturing something essential about the data in relation to the research question. Thus researcher judgment is required in determining themes and their relations. (Braun & Clarke, 2006, 82). Thematic analysis is a generic method fitting the qualitative ideation of the researcher as bricoleur, a craftsman who concocts a study to create a composition representing the studied phenomenon (Denzin & Lincoln, 2000, 4).

Thematic analysis can be applied both inductively and deductively (Braun & Clarke, 2006, 83). Inductive analysis is a process of coding the data without a pre-existing coding scheme or by avoiding the researcher's analytic preconceptions. A theoretical analysis is driven by the researcher's theoretical and analytical interests. My initial interest stems from personal experiences of using Twitter complemented with readings of theoretical traditions of expert communities. I have had a positive disposition towards theories of networked expertise and expert practitioners' epistemic collaboration. In the present study I have set to explore the manifestations of networked expertise and epistemic collaboration in Twitter. My analytical interest and theoretical dispositions have guided the analytical process, from the collection of data until writing up the analysis. My objective however has not been to test pre-existing theories, but to attempt to explore their existence in a new playing field, in which they have not been much yet applied. Thus the theory has helped me take informed decisions and cast interpretations of the data.

An early decision to take is what the unit of coding will be (Joffe & Yardley, 2004, 59). In this study it is clearly a single tweet that is regarded as self-contained knowledge contribution. The 18,319 tweets from #okfest were logged into a single excel sheet. The analysis also covered hyperlinked content besides the text body of a tweet. The hyperlinked materials were not recorded locally into a file for analysis, but were browsed online. As the analysis began to process also some relevant hyperlinked content was downloaded and also included in the final report. This included knowledge artifacts in multi-media format such as texts, images, slide presentations, links to web applications, graphs, data sheets and entire websites. Not everything seemed sensible to download and record as it could be found online and could be examined or retrieved when needed. Regrettably there were instances where a hyperlink became irretrievable during the research process, and had to be excluded from the study.

The analytical process begins when looking at the data the analyst begins to recognize themes and patterns of interest. The process ends in reporting of findings and recounting the meanings of themes. The analytical process is cyclical and holistic, so that the analyst may move back and forth between the data set, the coded data extracts, the analytical constructs and the analytical text that is being produced. Writing is a key aspect of the analytical process and should be initiated early on in the analytical process. (Braun & Clarke, 2006, 86).

Braun and Clarke (2006, 87) have presented a six-phase guide for thematic analysis. As is common for qualitative research, the analytical process is not linear, but recursive, characterized by repeated revisiting of different analytical phases. The phases of the analytical process are 1) Familiarizing yourself with your data, 2) Generating initial codes, 3) Searching for themes, 4) Reviewing themes, 5) Defining and naming themes and 6) Producing the report.

The first analytical phase includes immersion in the data and repeated reading in an active way looking for patterns, themes and meanings (Braun and Clarke, 2006, 87). The analytical process began with profound reading and intuitive exploration of the data corpus. Surveying the data in view of my research question made it evident that instances of knowledge sharing were abundant throughout the data. I began scouring the corpus for expressive examples of knowledge sharing. In this phase my research question had not yet been refined to its final form. Thus several strands of analytical inquiry were explored that did not find their way in the final work. I initiated the analysis with a research aim with a rather general goal of exploring online communality of professional practitioners in the #okfest data.

There are different positions about when and how theoretical literature should be associated with the analytical process. Depending on the view, it is thought that reading may narrow one's analytical scope and direct the analysis too much. On the other hand reading may serve to sensitize the analytical approach towards a more refined analysis. (Braun & Clarke, 2006, 86). In my case reading was strongly present during the entire analytical process because of my initial orientation towards networked expertise and communal knowledge sharing (as key frames of reference). Social media and especially Twitter create social spaces and contexts, where also cultures of expertise may reside and

develop. My intention was to locate similar epistemic cultures in areas where they have not before been studied.

Having familiarized myself with the data and having drafted some preliminary categorizations, I returned to some central theories to attune the analytical process towards the characteristics of networked expertise (e.g. Communities of practice and Innovative Knowledge Communities). Having vacillated between different theoretical frameworks of expert communities, I began to home in on to the epistemic dimension of interaction, which seemed an essential feature of hashtag-based communality. Hashtags are most commonly transitory and not communities per se and they could said to be "more about knowledge than communality". After settling on the research question of communal knowledge building in #okfest, the analysis began to develop into it's final form.

As the research objective was settled to the epistemic engagement of the practitioners, the analysis reached a rigorous quality. The focusing brought more precise questions to observation. I became more interested in what kind of information was being shared. Also the question of what constitutes knowledge or knowledge artifacts in the context of #okfest arose and what kind of information was considered valid. In this phase I began to identify and sort together tweets, which represented categories of knowledge sharing activity that I was interested in.

Coding is essentially the part of the analysis where the content begins to organize into meaningful groups (Braun & Clarke, 2006, 88). Coding is extracting content from the data representing meaningful ways of seeing the phenomenon. Coding the data began with the research question of collaborative knowledge building in mind. Coding was done on a computer with a word processor. Also images were copied to the text processor from the data when for example a hyperlinked artifact contained something visual. Tweets were copied in their entire form into a document and organized into groups or classes intuitively. Simultaneously, as tweets were divided into preliminary analytical categories the process of coding began. Below is an example of assigning a code representing the content of a tweet.

Figure X. Data extract with codes applied.

Data extract	Coded for
We have a page started to draft a doc on	Co-authoring a document

why contemporary artists should release their work CC: http://t.co/2Rs6GdDN #openglam #okfest	
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Reading theoretical literature while doing the analysis evoked adopting the analytical approach of practitioners building a shared repertoire of conceptual artifacts. An essential aspect of the #okfest discourse seemed to be the sharing of hyperlinked knowledge content rather than for instance engaging in conversation. For this reason the mentioned theoretical constructs struck a chord with the analyst and inspired making certain analytical decisions. Eventually one theme remained in the final analysis borrowed its name 'negotiating a joint venture' directly from Wenger's Community of Practice theory. In this sense may be said that the analytical process was indeed a dialogue between theory and the empirical work.

The third phase of analysis is sorting codes into potential themes (Braun & Clarke, 2006, 89). This included looking how well the codes could be organized to represent the phenomenon. The coded content and themes were put together into tables to represent the phenomenon of knowledge building in #okfest. At a preliminary phase a theme called 'miscellaneous' was created for codes, which did not fit the main themes. However this theme was dissolved as the analysis progressed. Below is demonstrated how the theme 'inviting participation' began to take form.

Figure XI. Constructing a theme.

Theme	Codes
Inviting participation	Commenting on a draft Advertising job opportunities Competitions for solutions Co-drafting an open letter Thematic blogging effort Co-authoring a document

In the end the focus was to establish a satisfactory thematic map to convey an over all story about the data. The final themes were reviewed and settled upon six main themes representing aspects of knowledge sharing in #okfest. In this phase the relations between

themes were analyzed in regard of balance and overlap. One sub-theme was eliminated entirely by dissolving its contents to create a more balanced analytical model. The names of themes were revised so that they were descriptive, punchy and expressive of the phenomenon.

5.6 ETHICAL CONSIDERATIONS

Data used in this research is regarded as publicly available. In general, Twitter has been characterized as a public environment (Sveningsson Elm, 2009, 75). Participation in Twitter requires that users accept to operate in plain view. This means that all actions besides private messaging are public. Everything from tweets and interactions to user profiles and follower/followee relations are publicly available for unregistered visitors. In this sense Twitter makes individuals and their activities and relations visible to others, thus enabling the development of open cultures of networked expertise.

Also the data employed here was not of a sensitive nature. On the contrary microblogging is regarded as conscious building of an expert identity through sharing relevant materials. The discussions were addressed to #okfest representing a global audience of interested parties who might be following the interactions and shared content. The discourse was in no way personal but rather explicitly professional.

6 COMMUNAL KNOWLEDGE BUILDING IN #OKFEST

The #okfest hashtag began as a conference backchannel of the Open Knowledge Festival. Therefore #okfest was a parallel instance of online interaction to the physical conference event. Conference attendees used the #okfest hashtag to report their observations and experiences from the event. The hashtag featured topical highlights from the conference program, as reported by participants. In essence the conference was reported by tweeting attendees acting as curators crafting a collective representation of the event.

The hashtag space came to represent a joint linkage between conference attendees and distance participants on Twitter. Information flowed from the conference to the open web in tweet-by-tweet increments. The collective activity resulted in an aggregation of networked knowledge consisting of shared tweets, hyperlinked content, Twitter identities and contextual information such as other hashtags and keywords. The analysis in this section takes a look at the different dimensions of knowledge sharing activity that took place in the hashtag space.

6.1 NEGOTIATING A JOINT ENTERPRISE

The hashtags activity shows evidence of negotiating and developing common values, culture and goals through the shared contents. This category of interaction in #okfest represents the sharing of content which deals with the expression and negotiation of shared values in the domain of open knowledge. All the shared materials reflect the principles that lay the foundation for the profession and practice of the open data practitioners. A persistent theme is the negotiation between the community's high ideals and the gritty practice.

@parfenov_:	RT @petermurrayrust: #okfest. Yes, we ARE changing the world and its exciting, fun and really hard work.
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Many circulated quotes, like the one above by @petermurrayrust (retweeted by @parfenov_), eulogize the community's social agenda and its potential to change the world. The field is based on progressive social values wishing to do good and inducing change in the world. Therefore the practitioners seem often to identify themselves as change makers and emissaries who are introducing the values and practices of open culture to new contexts in society. A commonly held vision is how their activities and initiatives might have potential to incite great changes in society. Sharing quotes and materials like the one above strengthen a collectively shared vision for the domain that practitioners can aspire to. The digital artifacts shared in #okfest give meaning to the young field of open

knowledge and celebrate it's potential and promise. Quotes like the one above declaring to change the world are rallying opinions and strengthening the moral position of the field.

Image 2. Anneli Jäätteenmäki highlighting citizens' rejection of #ACTA by @tkb



@tkb:	It's ANNELI JÄÄTTEENMÄKI, Finnish MEP highlighting citizens impacting EU, highlighting their rejection of #ACTA #okfest http://t.co/MVzwM3xg
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The above tweet from user @tkb (Tarik Khokhar) reflects the community's agenda of active citizenship. The tweet includes a link to a photo snapped from the conference of Anneli Jäätteenmäki a Finnish MEP reporting how EU citizens have expressed their discontent towards the ACTA agreement (Anti-Counterfeiting Trade Agreement) and have had an impact on EU policy. ACTA was a legislative agreement from which many negotiations were ran under a veil of secrecy out of the public eye. It was feared that ACTA would restrict EU citizens' fundamental rights and civil liberties, most notably the freedom of expression and communication privacy. However a group of active citizens became animated around an online campaign against ACTA. The user @tkb sharing this item reflects core values of the community wanting to promote governmental transparency and active citizens watchdogging for wrongdoings and organizing themselves to applying political pressure. In the tweets, Anneli Jäätteenmäki acknowledges the people's initiative to organize against ACTA. This public recognition from a well-known politician signals official support for the values of active citizenship, which the open knowledge practitioners support.

Another subtheme in the social agenda is how open data and open knowledge initiatives have an agenda of empowerment built into them. The solutions and products developed in the field are intended to promote the developing understanding and the democratization of knowledge. When data is put to work by open data activists, new interpretations and meanings emerge which help understanding phenomena. The practitioners envision that once data and knowledge are no longer locked into proprietary institutions, professions and behind gatekeepers they may be explored by active citizens, to learn from and create new insights.

One subtheme in the material concerns the principle of 'openness', an essential concept in the practice of the field. Openness is a defining concept in the practice of the open knowledge community under constant reinterpretation and negotiation as it is being applied to new contexts and use scenarios.

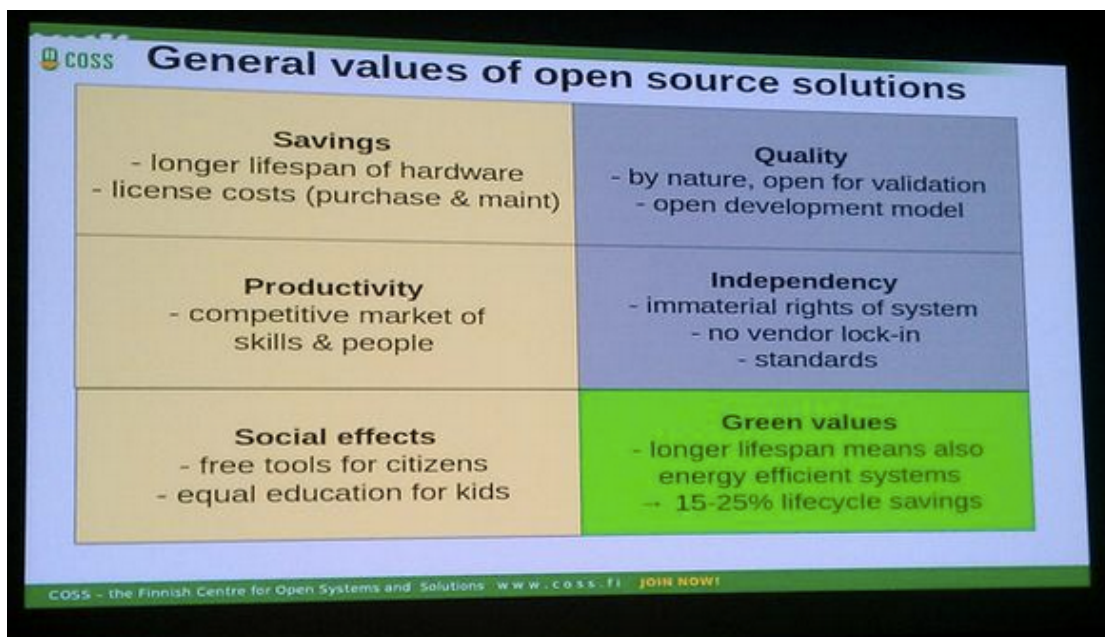
@JournalErrology:	RT @tkb :“Open is an attitude” - @meowtree says it's a deep idea that development institutions and individuals need to internalize. #okfest
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In the above quote, openness is defined as a mindset not always easily grasped by 'outsiders' or something, which can be readily introduced to new contexts. This kind of discourse reflects the intention of the community to preserve the integrity of the concept and to make sure that it is not applied half-heartedly in practice. Quotes like this are very commonly circulated in #okfest through retweeting as they deal with one of the basic tenets of the field and come to define it's practice. They definitely also try to depart from 'closed' cultures and underline what their mission is.

Another ongoing reflection concerns the value of open source culture and what kind of impact they might have on society. The tweet below by user @reinikainen (Esko Reinikainen) is a snapshot of a presentation slide. The tweet presents foreseeable results than might come from adapting open source solutions. These benefits are financial savings, social and societal effects, better quality, independence and productivity in the open development model and also green values and environmental benefits. By sharing these ideas to the community, the user promotes their importance and invites other practitioners to acquaint themselves with them.

@reinikainen:	General values of opensource solutions #okfest http://t.co/S1bXGqHn
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Image 3. General values of open source solutions by @reinikainen.



The topic of openness is addressed again below by user @mpedson (Michael Peter Edson) sharing a link to 'opendefinition.org', a site listing a precise definition of "open" in respect to knowledge and data.

@mpedson: "A piece of content or data is open if..." A definition of "open" content: http://opendefinition.org/ via @jpekel #OKFest

The definitions on the site are translated into several languages for universal accessibility. The linked website is a useful resource in communicating specifically what open culture is about to parties not already familiar with it or its technical jargon. The Open Definition website (opendefinition.org) has been created to standardize the core concepts and ideology in the field to be used as a resource for practitioners in their work and as a point of reference to educate stakeholders and the public. The linked materials contribute to the discussion of defining openness. As a tool it aids in the building of common ground for the community's practices. In this sense the website is a cultural artifact that has exceptional constitutive significance in defining one of the cultures' core concepts. By sharing the Open Definition website, user @mpedson is promoting its significance as a definitive definition.

The discussion concerning the core concepts is revisited below by user @Leksis (Aleksi Neuvonen) who is posing a question to #okfest in trying to discern the difference between two concepts which are very similar and ambiguous. This kind action invites collective attention to differentiating two core concepts and their correct use in the common domain. The tweeter is addressing and underlining the ambiguity of the terminology of the domain. User @kliehm (Martin Kliehm) replies by offering an explanation on differentiating the two concepts. This discussion might lead to something else because the problem is so central. Perhaps someone will address the issue in a blog post. Even if no further discussion follows right away, having posed the question and received an answer have propositional value as they have addressed an evident discrepancy in the community's terminology. This is an example of thinking out loud, and directing one's observation to the attention of other members of the community of practice.

@Leksis: Stupid question to be presented in #okfest: is there a clear difference in use of concepts 'open data' and 'open knowledge'?

@kliehm: @Leksis IMHO open knowledge is general, #OpenData is public sector information (PSI, generated data) & content (eg cultural goods). #okfest

The core concept of openness often needs to be renegotiated to fit new contexts where it is applied. It is a discussion that continually re-emerges. In the tweet below user @mhawksey (Martin Hawksey) contributes to this discussion by sharing a blog post written by Audrey Watters addressing the significance of "open" especially in the context of education.

@mhawksey: "What Do We Mean By "Open"?" Pause for thought if you are using the new CC license generator. <http://t.co/gtR54H3x> #okfest via @rscwales

The blog post discusses OERs (open educational resources) and content licensing schemes such as Creative Commons (CC). This post discusses how 'openness' often means different things in different contexts. When introducing open culture into new domains there appears to be a need to assess and evaluate what openness means in the new context. The tweet contains a reminder to the community how Open Knowledge is a phenomenon and set of practices that cannot be reduced to mere content licensing schemes.

It should be noted that in the above case @mhawksey had not written the blog post himself, but he however uses it to pose a question and to make a point to the #okfest community. The tweet also includes "via @rscwales" indicating that the link to the blog article has been discovered through another user whom he is mentioning to give credit. This kind of practice reflects the idea of Twitterers as regarding their peers as active practitioners in the shared cultural domain whose 'knowledge contributions' are appreciated. By including a 'via username' a practitioner can express where the idea originated from. This practice is very similar to the retweet where a user resends a tweet authored by another Twitter user. In this practice the retweet may be taken to express agreement and a will to engage with the user and to resend a Tweet to one's followers.

Introducing open culture to new domains is a central mission of the community. Above openness was declared as special attitude or deep mindset of the open knowledge practitioner. The concept needs to be grasped by open knowledge practitioners and stakeholders in the organizations that they collaborate with. This discussion reminds that the concept of openness cannot be plastered on top. Introducing open values and practices has a profound effect on how many things are done.

The discussions above are an example of how the community is negotiating the meaning of one of its core concepts with the intention of preserving its integrity. The concept of openness is found to be ambiguous as it means different things depending on contextual factors. To promote the concept of openness in different domains and applications it needs to be localized. For example openness in the case of science and scientific publication may be something very different from what openness means in the context of governments. This exchange also reminds practitioners of cultural clashes when collaborating with different stakeholders. Differences in organizational cultures may hinder or complicate the introduction of open practices and principles. This discussion reflects the situation where open source idealism collides with stark realities or conservative cultural friction in institutions. This also includes the mission of lobbying the open culture and practices to different domains in society. The shared items acknowledge the cultural heritage of the field from open source software.

Another subtheme of #okfest exchanges represents the guarding of common values. There are critical voices that are guarding the moral and are keen to expose any evident transgressions in the field. This kind of internal watchdogging and policing keeps track of when shared values and practices of openness are not heeded. The exchanges also reflect developments that are deviating from the collectively held premises and practices. Critical voices make sure that individuals and institutions in breach of shared values will be brought to the attention of the whole community. Through critique and commentary the community negotiates what kinds of actions and practices are unacceptable or that go against the shared agenda. This example below alerts the community with a special dispatch how 'Makerbot replicator 2', a 3-D printer projects is going 'closed source'.

@sc_r:	Stop!! Makerbot replicator 2 to go CLOSED SOURCE http://t.co/jXSgVRqa /cc @openp2pdesign #okfest via @3D_Printing_Now
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Makerbot is an interesting case which is discussed in a blog post written by Josef Prusa, a self proclaimed "open hardware activist". The blogger describes a company that originated in the open hardware community, that built 3D-printers based on openly licensed schematics. Makerbot used open source designs to build a their new product upon. But then the company refused to continue to release their designs as open source to the public domain. The blog post thus critiques Makerbot of "going closed source" meaning that the company would no longer release their products' design iterations to the rest of the open hardware developer community. Essentially this means breaking off from the tradition and practices of 3D-printer and open hardware practitioners and disregarding their community values. This is an interesting case as it covers the clash of values between the open source community and business realities. Traditional business is often based on "induced scarcity"; protected intellectual property rights and closed off, in-house R&D, rather than open sharing.

Secondly the Makerbot case is significant as it discusses the viability of open source business models. After securing significant funding and breaking away from the open source values the Makerbot case represents a failure for open source based business models. The blogger argues that building a company based on the open hardware model should be possible and is irate that Makerbot has chosen another route. This passionate exchange in #okfest is interesting as it investigates the failing of an open source business model as the company in question has reverted to a traditional market logic. The open source practitioners are understandably angry because much of the groundwork for the Makerbot company was based upon the open sharing of ideas, inventions and design iterations.

Open knowledge is quite a young and burgeoning field, which is still in the process of defining itself. Therefore a common topic of reflection is the relevance and meaning of the field in relation to other fields in society. Judging by the content shared in #okfest, the community is rife with idealism and enthusiasm. There is a high-spirited glee that conveyed by the slogans and mission statements shared in #okfest. The community envisions having a significant impact on society. Their social agenda is to empower,

educate and enable active citizenship. A central mission shared by the practitioners is to introduce and advertise open knowledge practices to different stakeholders in society. The shared content in the hashtag space gives direction and meaning to activities in the field of Open Knowledge. The digital content circulated in #okfest is building and negotiating a shared agenda for the field's practitioners.

A common theme is discussing the field's quite abstract core values and trying to implement them in practice. This also involves the need to negotiate the concept of 'openness' to match various different contexts of application. The standardization of terms and concepts was clearly a central challenge for the entire domain. The community was also producing elaborate conceptual artifacts such as opendefinition.org hoping to lobby their cause and communicate their ideas efficiently. Another manifestation is guarding shared values so that their meaning is not corrupted or misapplied. An especially interesting example was the case where a practitioner alerted the rest of the community about the Makerbot company deviating from open source values of values. This led to a discussion about the viability of open source as a functional business model.

6.2 DEVELOPMENTS AND NEWS

The second category of activity in the hashtag space is the intentional sharing of new knowledge and news to the hashtag space. The hashtag operates as a shared resource of timely, vetted domain knowledge. The sharing practice includes many kinds of knowledge artifacts that carry cultural significance in the field. Practitioners who engage in knowledge sharing are instigating new ideas or topics to the hashtag space and the audience of practitioners who are following it. Especially notable is the diversity of media and format of the shared knowledge artifacts.

@kyyberi:	My presentation slides on Peer Production generation are available at https://t.co/y77e5rvd #OKFest
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Above user @kyyberi (Jarkko Moilanen) is sharing his presentation slides for a presentation held at Open Knowledge Festival. It is a common practice of experts to share their presentation slides to their online communities and professional networks. By making the slides available in such manner enables others to follow up on a presentation that they might not have attended. When hosted in an online service (in this case Slide Share) and shared to the hashtag space, the slide deck may become a valuable knowledge artifact discussing preliminary ideas or achievements that may not be available anywhere else. In a sense such content may be a source of timely high quality knowledge coming straight from the horse's mouth. Other practitioners in the expert community can study and learn from the materials. They can also engage with the material, by quoting its ideas or by referring to the original author. Sharing conference slides helps spread ideas beyond the situation where they were presented to reach a wider audience of practitioners in a field. By sharing their slides practitioners are also advertising their own expertise and professional interests to the rest of the community of practitioners.

@revenuewatch:	@serena_danna: steps today in EU #transparency push for oil, mining cos. #euopendatastrategy #okfest #doddfrank http://t.co/toNjK1k7
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The account @revenuewatch shared an official communiqué issued by the natural resource governance institute (NRGI). This news item reports that the U.S. Securities and Exchange Commission has ruled that oil, gas and mining companies must now disclose payments made to governments in accordance to the Dodd-Frank act (signified by the hashtag #doddfrank). The law forces companies to disclose how much they are paying governments for natural resources. The newly available information can reduce corruption and unlock opportunities for new economic development. The report concludes that several foreign countries have expressed interest of implementing similar legislation. The bulletin suggests that full transparency of oil, gas and mining sector payments might eventually be a global standard.

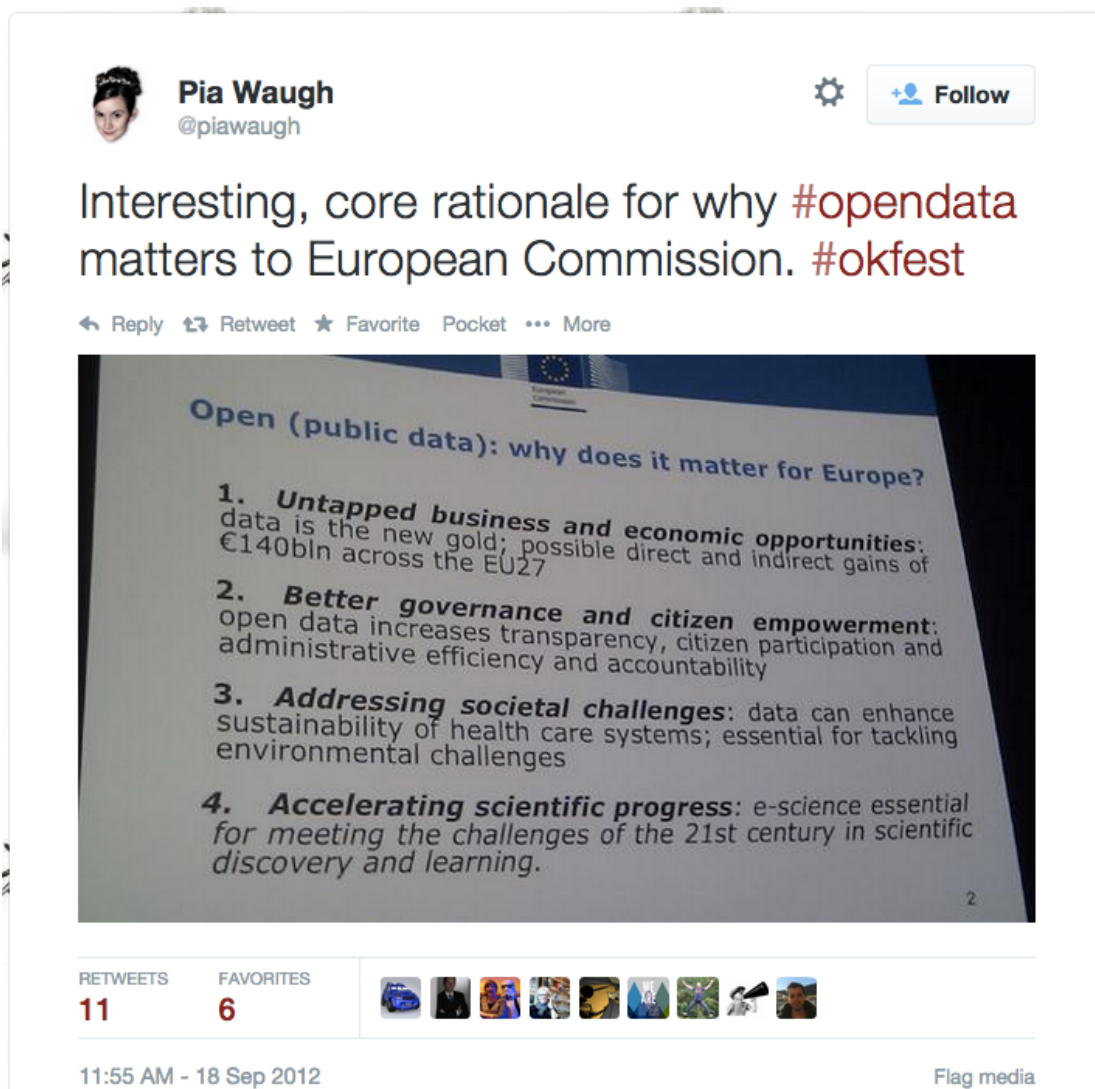
One central objective of the Open Knowledge Community is to work with governments and companies to advocate transparency of business and governance. Use of the hashtag #euopeandatastrategy in the tweet implies that similar legislation should be considered in

the EU as well. The news item describes how legislation is developing in the US. Reporting this development to #okfest suggests that similar steps should be taken in the EU as well.

Promoting this in #okfest is an example of advocating for more transparent policies to governments and businesses. This is an example of social advocacy among the globally dispersed Open Knowledge community. The practice of global information sharing among the network of practitioners may be of interest to practitioners in some other locality.

@piawaugh: Interesting, core rationale for why #opendata matters to European Commission. #okfest
<http://t.co/cTqaht6p>

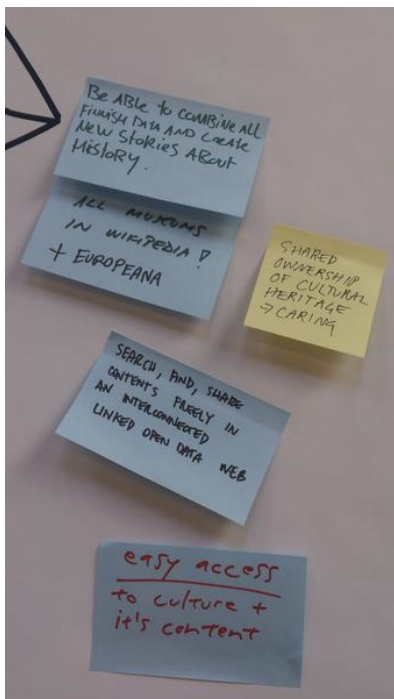
Image 4. Core rationale for #opendata in the European Commission by @piawaugh



The above user @piawaugh (Pia Waugh) shares a screenshot of a presentation slide presenting core arguments for the relevance of open data to the EU. This argumentation provides validation to the open knowledge domain and expresses that there exists a political agenda and will to forward it in Europe. The user @piawaugh has found it interesting and decided to tweet it to the #okfest hashtag. By sharing it to #okfest and it's network of practitioners @piawaugh is informing her peers about arguments she has found interesting or valuable. Open data is expected to yield new business opportunities and lead to better governance and citizen empowerment. Open data can help in advocating societal change. It can be seen as a vehicle of accelerating scientific discovery and learning. It can lead to a greener society. These are high ideals and compelling goals. By sharing a snapshot of a slide to the open knowledge community, one can instantly communicate a perspective or set of ideas that might be interesting or useful to the rest of the community.

@johannaberg: RT @MSanderhoff: This is where cultural heritage is heading #OKFest #openglam #sharecare12 <http://t.co/ZrZRC5Vm>

Image 5. This is where cultural heritage is heading by @johannaberg.



Above @johannaberg (Johanna Berg) has retweeted a message by @MSanderhoff (Merete Sanderhoff) that contains a photograph of five Post-it notes. The tweet reads: 'This is where cultural heritage is heading'. The hashtag #openglam indicates that the tweet is related to the Open Galleries Libraries, Archives and Museums (GLAM) initiative, a topical stream at the Open Knowledge Festival. The photographed notes probably resulted from a brainstorming session at the Open Knowledge Festival. The notes present some ideas about how our common cultural heritage should be digitally preserved and made available. The notes present ideas to enable shared ownership of cultural heritage and making it accessible and reusable.

By sending this snapshot to the hashtag space, the freshly discussed ideas are instantly shared with others. Sharing the results of a brainstorming process also makes visible what is happening at the conference locally. This kind of sharing practice adds a dimension of interactivity to the conference by enabling distance participation and commentary. Also by this sharing practice knowledge shared at a conference may seep to the online community of practitioners, where the products may be witnessed by a larger audience and added to the collective memory of knowledge.

@intertwilight: RT @a_b_powell: Interested in my open hardware article? Prepress version @ http://t.co/YrTqM0Bv MT: great #OKfest talk too - #opendevHW (!?)
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The user @a_b_powell (Allison B. Powell) is sharing a pre-press version of her scientific article that is going to be published in a scientific journal, Media, Culture and Society. This is an interesting of scientific collegiality manifesting in the open Internet. Now anyone, even a novice or an uninitiated follower of #okfest can have access to scientific research in the specific domain. In addition to this anyone following the discourse has a possibility to engage directly with the author. The article is titled 'Democratizing production through open source knowledge: open software to open hardware'. The article touches the theme of open hardware. The article deals with open-sourcing the designs of material objects. The tweet includes a hashtag #opendevHW in order to establish a topical context for the article.

Sharing pertinent knowledge and timely developments denotes the activity of practitioners actively sorting through and materials to share to their networks and followers. The

activity creates a steady flow of new vetted domain knowledge as practitioners function as social filters curating essential content and ideas pertaining to the Open Knowledge domain. This activity can also be regarded as a practice of brokering knowledge, meaning that practitioners introduce items of knowledge from other communities and contexts and position them towards the followers of #okfest.

The practice of knowledge sharing has a quality of multimodality to it. Shared content is not just blog posts or journalistic news items, but often a product of creatively combining mixed media and contextual factors. Much of the knowledge artifacts are user generated content created by practitioners themselves. The activity of sharing tweets to a niche community is inherently productive of knowledge. For example the tweet above containing a photograph of Post-it notes is a clever way of communicating the products of a brain storming session. It also represents a practice of rapid sharing, afforded by tweeting a snapped photo and instantly sharing it to a network of practitioners. Even though sharing a single image is a seemingly lightweight form of production, it derives potency from the high degree of contextual factors. As a media Twitter usage and microblogging in general is geared towards knowledge in micro-format that is easily consumable.

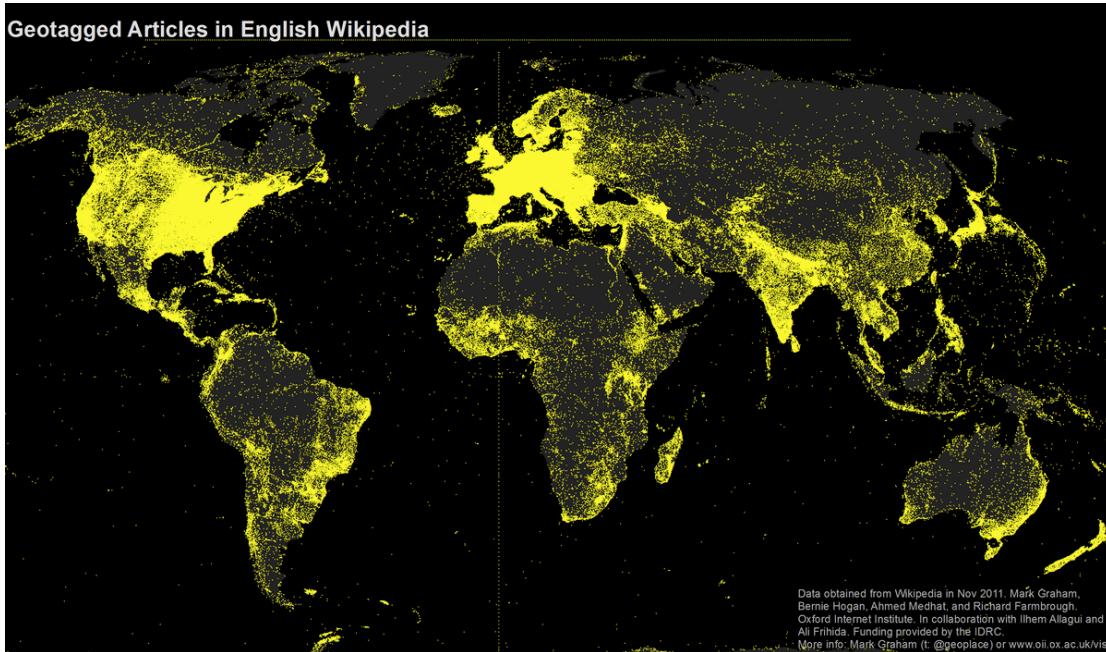
A great degree of the content shared is constructed or produced by practitioners themselves. This leads to the effect of the horse's mouth, meaning that it becomes evident where the knowledge is emerging and originating from. Thus a great deal of the shared knowledge is emerging directly from practitioner and experts in the field. This brings about an authenticity to the interactions of the expert culture and also of making community interactions visible

6.3 BENCHMARKING CULTURAL PRODUCTS

Shared practices are negotiated and disseminated in the hashtag space through benchmarking shared cultural artifacts arising directly from the practice. Clever solutions are subject to collective adulation, analysis and eventual appropriation. A set of collective standards and best practices is maintained through the practice of benchmarking of cultural oeuvres.

@mseiplax: visualization of geotagged english wikipedia articles <http://t.co/niWU1Yje> #okfestyle #okfest #ylejustnu

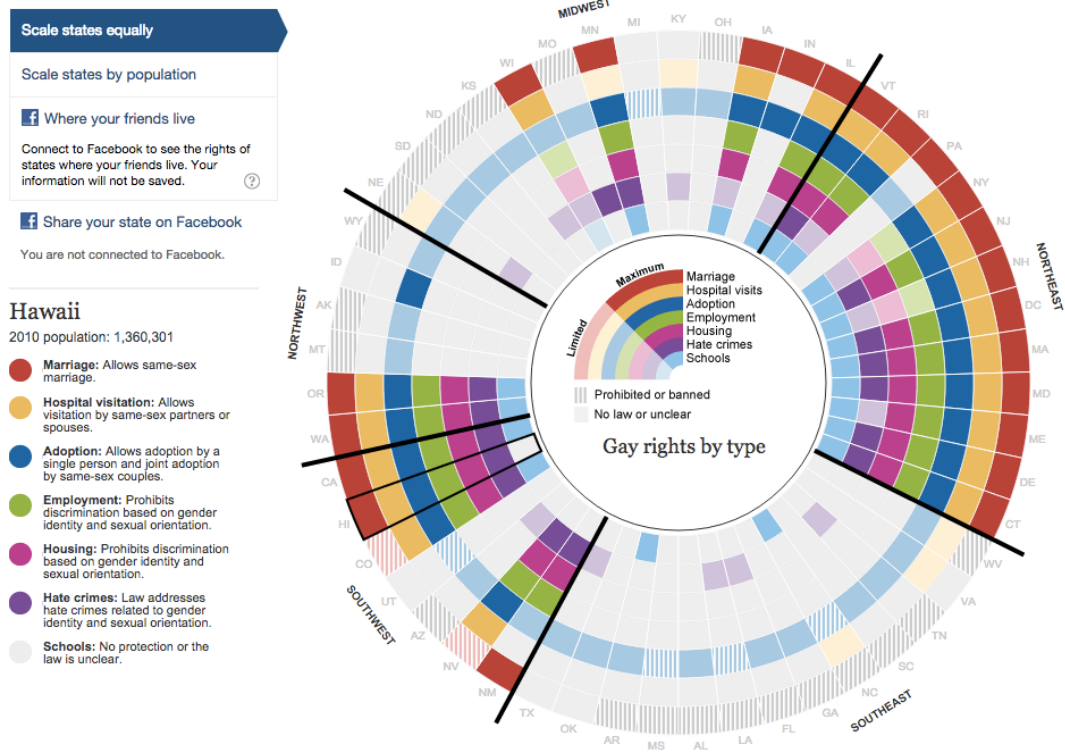
Image 6. Visualization of geotagged English Wikipedia articles by @mseiplax.



User @mseiplax (Mårten Seiplax) shares an example of a map visualization that has been built upon geotagged (GPS/GIS) data of English Wikipedia articles. The map shows in yellow all geotagged articles in the English Wikipedia. This visualization is an example of how information shared with an open license and made publicly available can be utilized in creating new applications like this world map. These projects are examples of creatively combining available data and other resources to create new solutions, services or visual expressions.

@flyingzumwalt: Gay Rights by State - how does your state measure up? #visualization #guardian #OKFest <http://t.co/UCgY61J8>

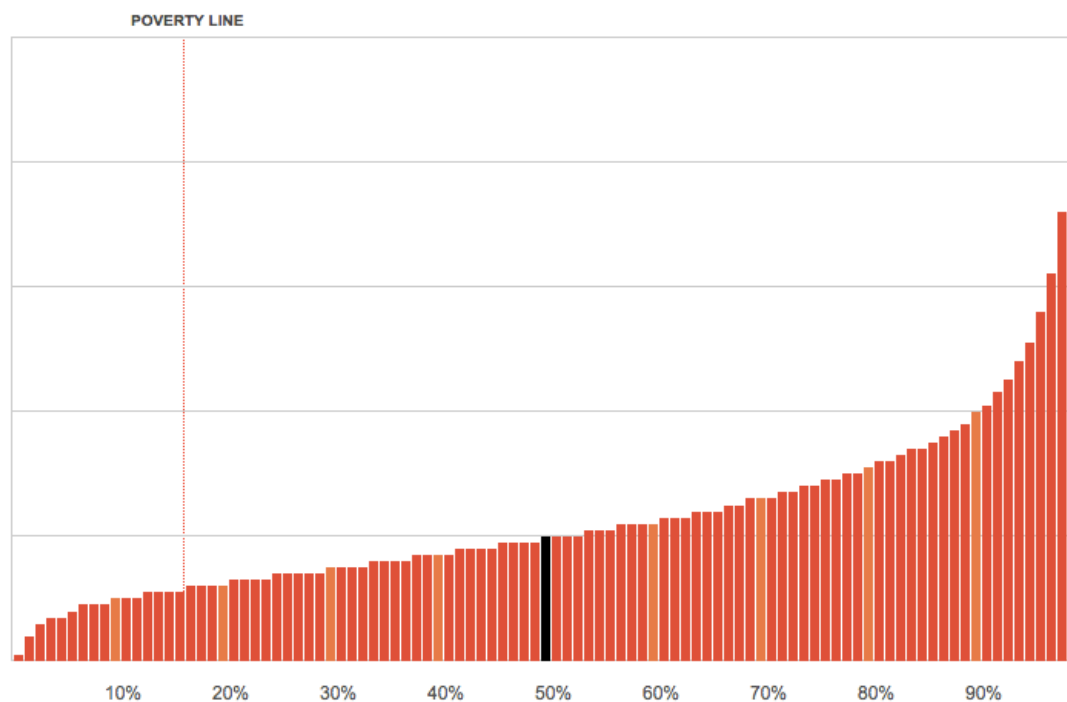
Image 7. Gay rights by state #visualization by @flyingzumwalt.



This tweet links to a visualization on The Guardian’s web site in examining gay rights laws in the US states. It is an example of how to display data effectively in an interactive graph. This product represents a new genre of journalism called ‘data journalism’ that is based on interpreting and displaying data in an interactive graph for maximum impact. This application is also an expression of the values and agendas of the Open Knowledge community’s, which are to promote democracy and understanding, transparency in government and progressive values like universal human rights. Effective visual expression and compelling narratives are core principles in the professional practice of the data journalist. The goal of data visualizations is to illustrate important information in order to communicate and educate most efficiently.

@gquaggiotto: @smfrogers showcases how to redefine perceptions of poverty through #data and social media <http://t.co/9kLx6pSI> Genius #okfest

Image 8. How to redefine preconceptions of poverty through by @gquaggiotto



Here user @gquaggiotto (Giulio Quaggiotto) tweets user @smfrogers' (Simon Rogers) work published in The Guardian newspaper. This tweets is a prime example of data journalism, which is making scientific data interactive and intelligible. Another goal is telling a story or developing a compelling narrative of a topic using the data. The link points to an article in Guardian newspaper's data science blog with an interactive wealth calculator. The original poster of the tweet has added the word "Genius" to praise the quality and inspirational value of the work. The poster is thus enticing #okfest's followers to open the link and to discover a paragon of the professional craft. The Guardian has been a forerunner in the data journalism genre so many in the #okfest community might be predisposed to be interested in their work. This work is also expressive of the core values of the Open Knowledge community as it promises to redefine conceptions of poverty and enlighten the recipient. The high aspiration of open data practitioners is to make a difference through data by exposing inequality, corruption or wrongdoing in society.

@johannaberg: RT @smfrogers: Love this site: I paid a bribe, India: <http://t.co/rqykBbAI> #okfest

User @johannaberg (Johanna Berg) retweets an interesting website that is systematically exposing corruption in India with an original solution. Individuals can report and expose instances of bribery they have experienced themselves. This is an example of the activist side of the Open Knowledge community that aims to tackle societal wrongdoings by harnessing the collective input of citizens. This solution reflects the values of the open knowledge community by empowering individuals to affect their immediate environment. The website uses citizen reports to improve governance and to fight rampant corruption in India. This case is another example of the practice of using data science to incite social change. The case is also a practical demonstration of how data gathered by crowdsourcing can be used to build a meaningful online service. It is also an example of the empowering aspect of open data by giving individuals the power to affect change in their societies be it their immediate living grounds or the society at large.

@TapSq: I didn't know about this project! GLAM Ateneum. Has produced 120 new articles so far. http://t.co/TNYqgVay #openGLAM #okfest
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User @TapSq (Tapani Sainio) shares a case he just discovered. GLAM is an initiative run by the Open Knowledge Foundation that promotes free and open access to digital cultural heritage held by Galleries, Libraries, Archives and Museums. This project was done in coordination with Ateneum, a museum of high arts in Helsinki. Its objective was to produce Wikipedia articles about the museum's art collections. At the time 120 new Wikipedia articles had been produced. This reflects the Open Knowledge community's devotion of 'opening up' cultural commons to the public by creating online interfaces to access galleries, libraries, archives and museums. The link points to a concise description of the project along with instructions for volunteer participation to the project. This concrete case scenario that describes a project where practitioners worked with a major art museum to bring their collection online using Wikipedia.

Sharing benchmarks in #okfest involves scrutinizing and analyzing cultural products that arise from authentic practical scenarios in the field. The #okfest activity exhibits a thirst for the new that stems from its innovative culture. The practice of benchmarking cultural products describes how practitioners in #okfest are forwarding innovation in their domain

through constant sharing and analysis of cultural end products. Disseminating emerging trends and designs directly from practitioner to another creates a global feedback loop that serves the innovation potential of the entire domain.

The activity reflects a desire to discuss cultural developments in the domain among a globally dispersed network of practitioners. The shared products within the analysis are mostly related to solutions that employ open data to create visualizations and interactive web services. The community is looking to share and celebrate inspiring projects to aspire towards and learn from. The cultural resources are expressive of the shared practices of the domain. Sharing cultural artifacts and resources to #okfest is a way of disseminating solutions, innovations and know-how for the benefit of the globally dispersed network of practice. The repertoire of shared artifacts reflects prevailing trends but also delineates the limits of the practice by imposing norms and standards. By sharing and acknowledging good examples and clever solutions, the community develops new ideas and propagates working solutions and best practices for the benefit of the entire field.

The shared solutions reflect the shared values among the practitioners e.g. the democratization of knowledge, educating, active citizenship, fighting discrimination and dispelling crime and corruption. In a sense all the shared products and solutions are built upon the core value of advocating social change. The social mission of the domain brings its own brand of inspiration and agenda to the culture of innovation in the domain. In most of the cases it is central to express how the solutions are affecting change in society. Other central themes are visual design, narratives and storytelling, interactive solutions and user experience design.

The fact that the projects are shared openly creates a cultural exchange and promotes practitioners' awareness of what is happening in their field. In this activity new trends emerge, new technologies are discussed and different design principles adopted. All these developments in the professional domain of practice spread fast to the benefit of all participants and followers of #okfest.

The innovative practices of #okfest keep the entire professional domain in a state of dynamic development. New cultural practices are constantly developed as practitioners collectively push the limits of innovation in their craft. There is a perpetual activity of inputs and outputs in the field that allow best practices to emerge and be disseminated in

the domain. A critical mass of practitioners are pushing the limits of practice, sharing their progress and collectively developing mutual knowledge and capabilities.

6.4 TOOLS AND RESOURCES

This theme of activity in the #okfest hashtag space concerns the circulation of tools and resources relating to the practice. These may be instructions, discussions, blog posts or even jokes discussing some aspect of the practical dimensions of the shared practice. This theme also includes disseminating the raw materials of data science, namely open data offered for appropriation. The sharing of tools and resources reflects a characteristic of collegiality in the open knowledge domain. A special characteristic of the practice of open knowledge is the deliberate creation of elaborate conceptual artifacts that facilitate the promotion of open data principles and values in society.

@mvonwillebrand: http://t.co/O5tQdUHp Kimmo Karhu's one point how iOS, WP8 suck for developers (dev human rights violated) #omind #okfest
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In a blog post shared by @mvonwillebrand (Martin von Willebrand) software developer, Kimmo Karhu, bemoans over the pitfalls of different mobile software development platforms (namely Apple iOS and Windows Phone 8). He goes so far to humorously imply that the platforms' terms of service violate software developers' human rights. The linked post goes on to describe in detail why software developers should think twice before working with these platforms. The post advocates the usage of other available mobile platforms, and is a prototypical example of a practitioner's blog post discussing some aspect of the practice.

@gquaggiotto: RT @smfrogers: "PDF is where data goes to die" #okfest
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This statement by @smfrogers (Simon Rogers) conveys the notion that PDF is a document format that should not be endorsed when the intention is to publish data so that it may be readily re-used and built upon (a core value of open data). This terse statement endorses a 'best practice' related to publishing data so that it would be most useful and reusable to potential users. Even though the statement is presented in jest, it contains a practical prescription. The style of ironic humor presumably reflects the practitioners' experiences of working with stakeholders who are not technically savvy and who sometimes resort to suboptimal practices. This tweet is also an example of circulating bite-sized information in the constraints of Twitter's 140-character limit. Although it may seem quite light and even insignificant, it is a common mode expression fitting the parlance of Twitter's pithy genre of expression.

@pudo:	CSV is the data Kalashnikov: not pretty, but many wars have been fought with it and kids can use it. #okfest
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This is an example of ironic humor that nevertheless contains a concrete lesson. The tweet by @pudo (Friedrich Lindenberg) lauds the practical simplicity of CSV data format (comma separated values). CSV is an open and non-proprietary data format that can be universally applied. The comparison to a Kalashnikov rifle implies its practicality, robustness and universal applicability in various kinds of applications. The tweet makes the case for CSV as a staple tool or standard that belonging to any aspiring data scientist's toolbox. Saying "kids can use it" alludes that beginners in the field of data science should be able to use it without running into much problems. Albeit ironic and short the tweet contains a grain of wisdom transmitted in the form of a joke describing the practices of a data scientist.

@mokka:	"The excel below includes the fundamental data set that was generated to calculate the current CO2 footprint" #okfest http://t.co/tjeeN3Cg
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User @mokka (Roope Mokka) shares a free dataset (in Excel format) of the results of a study on how to reduce Helsinki's CO2 emissions. The description of the data includes a notice that two professors and two masters thesis students participated in the research from Aalto University and that two masters thesis studies have been produced based on the data. The data includes contact information to all the researchers involved. If one might require assistance in deploying the openly shared data set, assistance would be near. This reflects the practice of sharing data and other resources for the network or practice and others to build upon. It also signals the researchers' openness towards potential collaboration or mutual assistance.

@psychemedia: Wikipedia search logs data <http://t.co/LYSerCco> #okfn #okfest #ukdiscovery /via @andysc

User @psychemedia (Tony Hirst) shares another free data set about what people are searching Wikipedia for. The link includes instructions on different aspects of the data. The linked website also includes an employment offer at Wikimedia Commons to anyone with expertise in search engines. There is also an open call for ongoing co-development and a request to join a mailing list or IRC channel. This signals how it is common for practitioners to be involved in collaborative projects of software development. This is most likely based on the domain's history in open source software development.

@mpedson: The 5 stars of open data, by @timberners_lee, <http://t.co/DhgHPUQL> ("The more stars you have, the more we like you." @jpekel) #OKFest

User @mpedson (Michael Peter Edson) shares another conceptual tool to help popularize open knowledge culture created by @timberners_lee (Tim Berners-Lee), whom is often cited as the father of the Internet. A link leads to a site '5stardata.info' that is an analytical framework standardizing the process of publishing open data for any kinds of organizations. The framework proposes a five star scheme to evaluate the quality of the data by its practical usability. The website is a good point of reference in planning and

evaluating an organization's open data strategy. It can also be a useful resource in lobbying the open knowledge agenda to different stakeholders.

@maxious: RT @ajturner: @piawaugh checkout http://t.co/FmEKtHWg for a good overview of the various realtime stream processing tools #okfest
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User @ajturner (Andrew Turner) offers technical programming advice to @piawaugh (Pia Waugh). The user @maxious (Alex Sadleir) has found it interesting or useful and has thus retweeted the original message. This resource is related to programming and contains specialist information for practitioners involved in the practice. The real time stream processing tools have been shared with all of #okfest since it may be interesting to other practitioners. The blog post lists and evaluates different kinds of solutions addressing a specific programming need. Different products and solutions are listed and compared in a matrix according to their specific properties. The post is a significant conceptual artifact that discusses a very specific niche of programming and its different solutions.

@scilib: EU prototype portal http://t.co/E5PIA6Q0 #okfest
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User @scilib (Richard Akerman) shares a link to PublicData.eu, a pan-European data portal providing access to freely usable datasets from local, regional and national public bodies across Europe. The portal is a single point of access to public datasets that might be difficult to attain otherwise. The portal is part of the initiative working to open up official information in the European Union for the public to use. Plans are to combine a large number of datasets from a large number of different sources. The integration of data will allow developers to create new digital services addressing complex societal phenomena. The portal promises to serve non-technical users, including researchers, journalists, regular citizens, who will be able engage in data based inquiry. The portal's front page also features case examples of digital services developed using publicly available data.

This fourth thematic category of tools and resources relates to the concrete practice of open knowledge domain. The core values of openness and transparency are also reflected in its practicalities. The field's roots in the open source software movement are reflected in its culture of mutual aid and sharing of resources. The mentality of open source software denotes the appropriation of work done by others and mutual sharing of useful resources. In the field of software programming it is characteristic that solutions can be reused and modified for new purposes. Practitioners within the culture are accustomed to appropriating programming solutions developed by others and consequently contributing to the collective pool of knowledge when they have produced something worthwhile.

Sharing work and resources among the community is a core aspect of the culture of #okfest. Thus the sharing of resources, guides and knowledge comes very naturally. The two first items in the analysis were ironic or humoristic commentary concerning the practice. Circulating jokes or ironic anecdotes that discuss the practice is a form commentary expressing collective experience and shared frustrations.

Different aspects of the practice are discussed in blog posts that are easily shared and disseminated for the benefit of others. A blog post as a knowledge artifact discusses a potential challenge or timely theme that other practitioners may have likely encountered. Like the blog post exploring real time stream processing tools is a knowledge artifact that addresses a carefully delineated problem with a complex and erudite solution. What emerges from the exchanges are niche artifacts imbued with personal experience exploring a specific subdomain of the practice. In the example above the blog post is disseminated with an informative heading "a good overview of the various real-time stream processing tools".

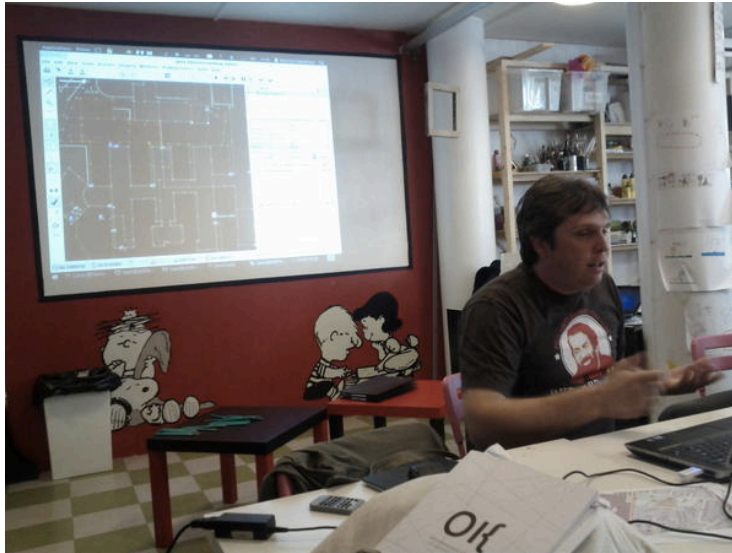
The sharing of data is a central practice as it is the raw material of the open data practitioners' craft. Commonly open data and is accompanied with contact details and even offers to help in deployment and application. A culture of collegiality and openness towards collaboration is conveyed along the sharing practices. The open data portal (publicdata.eu) is an interesting conceptual artifact as it caters towards less technically savvy practitioners in the domain such as journalists and graphic designers. The portal takes into consideration the differences in skill and aims to empower a wider base of practitioners in the domain. This is reflective the core values of the domain, bringing data and knowledge closer to the everyman.

An interesting phenomenon is the purposeful creation of conceptual artifacts for the benefit of the entire community. The 5stardata.info website is a paragon of the conscious collective effort of lobbying for the mutual cause. It is a set of best practices for data-intensive organizations to plan the deployment of their data as open data. The specification has a system of stars to evaluate how well the open data effort is going. The tools and resources offered here are ready for deployment by any practitioner. It is also evident that help is available when running into difficulties in trying to deploy the resources or build something of their own.

6.5 LIVE REPORTING

Being a real-time service it is a common practice of discussing events in Twitter as they unfold. The immediacy and real time nature are Twitter's strongpoints as a social media platform. For this reason it has become common practice to launch conference hashtags, like #okfest was, to enable a forum collecting impressions and reports and enabling remote participation. Live reporting is a practice that offers the followers of a hashtag glimpses of an event. It is a quasi-journalistic practice of relaying interesting discoveries to an online audience of practitioners.

Image 9. OpenStreetMap Hackathon @napo showing off JOSM by @houndbee.



@houndbee:	OpenStreetMap Hackathon at #OKFest. @napo showing off JOSM to edit OSM. http://t.co/iau1UHL2
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In the tweet above user @houndbee (Kaustubh Srikanth) is reporting at Open Knowledge Festival from the Open Street Map hackathon session. A hackathon is an event in which computer programmers and others involved in software development collaborate intensely on software projects. The tweet includes a photograph from the setting of the hackathon. The tweet identifies the person in the picture as @napo (Maurizio Napolitano) and tells how he is "showing off JOSM to edit OSM". This technical jargon means that Maurizio, who is hosting the session, is showing the other participants how to use JOSM, a programming tool, to edit Open Street Map (OSM), an openly licensed world map created by volunteers.

Live reporting expands what is happening in closed quarters at conference session to a global audience of practitioners. This creates a brief status report of one session and its happenings at the conference. The tweet identifies who are present, @houndbee in the audience and @napo, who is presenting. In the tweet Maurizio is established as an expert or aficionado on the topic of Open Street Map since he is holding the session. This assumption is corroborated by @napo's Twitter profile. His bio description is a stoic list of technical terms: "fbk, openstreetmap, gis, neocartography, okfn italy, open data, open

source, software libero, sociologia, trento, pallavolo, digital commons lab” confirming the assumption.

This practice of live reporting to Twitter serves the purpose of identifying present practitioners by their Twitter handle thus connecting their online persona to the tweet enabling followers of #okfest to discover peer practitioners. With a single tweet the session and its topic have been communicated to the #okfest stream and reported to the followers of #okfest. Certain people are being identified in conjunction to specific topics (e.g. Open Street Map) in a certain situation. These contextual associations get reported to the hashtags audience.

@tkb:	Awesome to hear @UNDP building web based project sites and dashboards directly on top of #IATI #opendata - great quality motivator. #okfest
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Above @tkb (Tarik Khokhar) is sharing something he just discovered attending a session at Open Knowledge Festival. @tkb reports how @UNDP, or the United Nations Development Program is creating new projects based on open data of from the International Aid Transparency Initiative (IATI). It is a substantial news item in the context of #okfest that Tarik has just discovered himself and then reported to the hashtag. IATI is an organization that publicizes information and data about aid spending and promotes its use and analysis. The newsworthy bit most likely is how UNDP is building software solutions based on open data shared by IATI. This is a practical scenario of how open data is being applied and thus another interesting case for practitioners to discover. It is clearly an inspiring example as well of how useful and meaningful solutions can be built upon open data. This tweet is also an example of how organizations’ Twitter accounts can be included in Twitter discussion by including their Twitter handle. This way @UNDP’s Twitter account is given credit for their work and they will be notified about the discussions concerning them.

@cottagelabs:	very excited to be making a small contribution to the @okfn research data management handbook, in a session at #okfest http://t.co/TwUIXcCb
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Above @cottagelabs (an open source software consultancy) describes how he enjoyed making a small contribution to the @okfn's (Open Knowledge Foundation) Open Data Handbook. The tweeter is essentially narrating an experience at the conference. He is advertising an interesting initiative, which he has contributed to himself. The Open Data Handbook is a project of the Open Knowledge Foundation discussing the legal, societal and technical aspects of open data. The handbook is hosted at it's own website (www.opendatahandbook.org) and it is also downloadable as a .pdf file. Live reporting about participating to the project means promoting the initiative to others as another central conceptual artifact that is currently under open co-development.

Live reporting is an interesting practice as that has the potential to extend an event to an online audience. Live reporting is done by practitioners who are active practitioners in a certain culture. Event participants use their personal Twitter accounts to relay significant experiences. Twitter communiqués are a multimodal expression consisting of text, multimedia, hashtags, Twitter identities and hyperlinked contents. It is common to identify people who are present by mentioning their Twitter handles in a tweet. This gives the tweet more context and contributes to the construction of well-rounded practitioner identities. It is also commonplace to snap a picture of the presenter of a session or their presentation slides. A photograph overcomes the 140-character limit of a tweet's length and is an effective way of delivering the contents of a presentation slide. Also a photograph communicates a more vivid context complementing a written message.

Live reporting promotes awareness of what is happening at a special interest event like as reported by its participants. In this sense it is a peer level practice of narrating one's experience of an event and sharing significant discoveries or learnings. Live reporting can also be used in promoting an issue or theme important to the tweeter. It allows for new and most remarkable content and ideas to seep out of the special interest event into various networks and contexts on the Web. #okfest was a successful backchannel for the event and the richness of its content that is explored in this thesis shows how rich and meaningful a parallel virtual gathering in the open Web may be.

Live reporting gives the ideas and knowledge emerging at a conference an external existence as codified knowledge artifacts carried in tweets. The practice of live reporting means actively selecting and curating content to share with others. In this practice the

reporter identifies and codifies encountered knowledge into tweets on the fly. As issues are reported to Twitter, they are objectified into conceptual artifacts that are readily shareable as self-standing tweets, which may travel far beyond original contexts where they emerged.

In addition to delivering streams of ideas and nuggets of knowledge, reporting also identifies active practitioners present at the event connecting them to certain themes and ideas. Identifying practitioners, substance experts and thought leaders in relation to their thematic dispositions serves the community by promoting mutual awareness of practitioners in a domain. The connecting of practitioners' identities with content and themes serves to construct their online persona. The construction of well-rounded identities serves the purpose of creating an authentic situated expert culture and strengthening community ties and mutual connectivity.

6.6 INVITING PARTICIPATION

This theme covers ways in which practitioners invite participation from their colleagues in #okfest. This theme includes sharing tweets with invitations to participate in some kind of collaborative initiative. This category also includes employment offers and competitions directed towards the practitioners. In practice this means that #okfest is recognized as a point of convergence for experts and enthusiasts in the field of open knowledge. The hashtag feed of #okfest is being followed by practitioners, who are likely to be receptive to invitations to collaborate. The intentions of these invitations are to create opportunities for co-creation that addressing the shared interests of the domain.

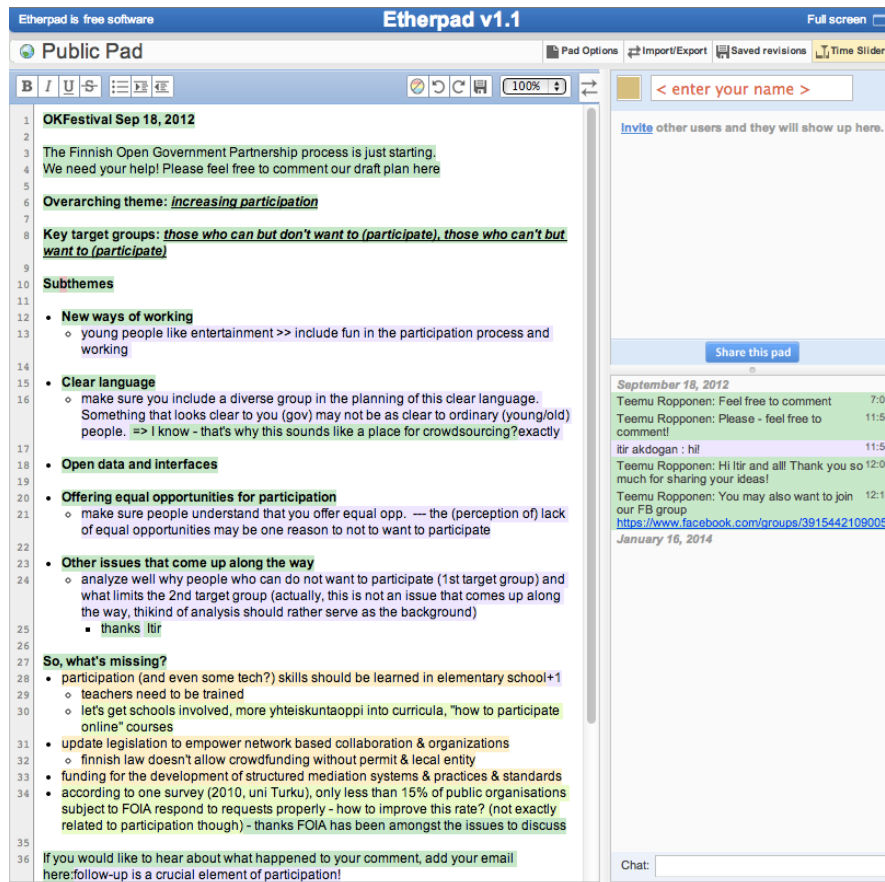
@tkb: RT @troppone: Comment on the Finnish #ogp plan at http://t.co/byZUrxUK - #okfest

User @troppone (Tuomo Ropponen) requests commentary and participate in co-drafting a plan for Finnish open government partnership. The link points to an Etherpad document, a wiki style document that anyone viewing can freely edit. The invitation opens participation to anyone the message reaches is interested in collaborating on a shared document. The

document is a draft of a plan to make democratic participation more accessible to a wider base of citizens. The document discusses practicalities of the effort (e.g. discussing foreseeable obstacles). For example there is an effort for schools to integrate more civics studies into their curriculum and to acquaint pupils with online participation. The document also discusses existing limitations in legislation hindering network-based collaboration.

The document includes an invitation to comment on the draft and an invitation to a face-to-face session. It urges contributors and interested parties to leave contact details to follow up developments on the issue. The Etherpad document also includes a chat window where a moderator asks people to comment the document. Even if one does not participate by leaving any mark or commentary into the document, they can freely browse it. After discovering the content users can also promote the initiative by retweeting it. That would amplify it within in the #okfest feed as well delivering it to the network of users following the user.

Image 10. Comment on the Finnish open government partnership process by @tkb



@johannaberg: RT @kresin: Prospective coder, designer & activist? Apply for the fellowship of Code for Europe at <http://t.co/5vFjWf3#c4eu> #OKfest

An organization called 'Code for Europe' is looking for socially engaged software developers to help governments become more transparent and collaborative through open data initiatives. The tweet announces a job opportunity in an innovative project among six European cities. Participants are expected to develop solutions to common challenges that cities are facing so that the results can be shared with other cities. The job advertisement is directed to the "professionals" who are likely to be following the #okfest hashtag as an attempt to directly reach potential candidates and to spread word of the opportunity to their networks. We can see that the original tweet was sent by @kresin (Fank Kresin) and has been retweeted by @johannaberg (Johanna Berg) perhaps to amplify the reach of the tweet and pass it on to the user's own followers.

@Uutisraivaaja: Innovation contest @Uutisraivaaja open now! 250 000 e to the best idea on renewing distribution of information! <http://t.co/0etNLgCc> #okfest

Uutisraivaaja was an innovation contest in the field of journalism organized by Helsingin Sanomat Foundation. The contest seeks ideas to renew the distribution of information and creating sustainable business models for journalism. As the field of journalism is in a state of upheaval, there is a need to discover new revenue models and to explore alternative ways of publishing. The tweet was sent by @Uutisraivaaja, the official account for the innovation competition. By sending this tweet to the #okfest hashtag community, the organizers are addressing the open knowledge community to advertise the contest directly to the open knowledge practitioners and their networks. #okfest is regarded as a potential site from which new ideas might arise that the news industry might benefit of.

@Ulkoministerio: Recap in case U missed it: Competition on visualising Finnish aid statistics has begun: <http://t.co/y8Hw05ng> #OKfest #opendev

In this tweet the Finnish ministry of foreign affairs is announcing a competition on visualizing Finnish aid statistics. Three 500€ awards are offered to most interesting solutions and a possibility to discuss their further development. The competition aims to find new ways of visually demonstrating how Finnish taxpayer money is used in developmental cooperation abroad. The link in the tweet points to the competition website, where the data on Finnish foreign aid is offered. The data can be in Excel format, accompanied with other specifications, contest deadlines and details outlining the challenge. Here again the account @Ulkoministerio, the official Twitter account for the Ministry for Foreign Affairs of Finland is directly notifying the practitioners in the field about the competition. The competition is open to all individuals and legal entities residing in Finland who have expertise on data visualization.

@ceptional: RT @MatToddChem Open letter to ARC, about importance of open data. With @ceptional Please read (+ sign!) #okfest <https://t.co/mQONdmGQ>

User @ceptional (Alex Holcombe) is sharing an open letter to the Australian Research Council (ARC) about the importance of open data in scientific research. The letter underlines the importance of openly accessible data and efforts to broaden access to scientific publications and to release research data openly. The initiative aims to promote and lobby an 'open science' mindset to the academia. The expectation is that scientific practices could be opened to wider non-academic participation and collaboration. The open letter has been initiated by Matthew Todd (@MatToddChem) who is the first signee. The second signee is Alex Holcombe (@ceptional) who has retweeted the tweet above.

The linked letter is hosted in a Google Docs document that has been left feely editable so that anyone reading it can leave their signature. This way of sharing enables anyone reading the tweet to see the drafted letter and if they want to support it, to sign it. Proponents agreeing with the cause may also retweet the message to give it exposure and distribute it to their networks. Of course it can be shared via e-mail or other social media. As a follower of #okfest comes across the tweet they can investigate the Twitter accounts of the mentioned practitioners and discover the identities accounts of the two academics who have initiated the open letter. This lends transparency and credibility to the cause. Anyone can dive into the social profiles and evaluate what issues they are discussing and what kind of content they are sharing.

@networkedres: Call for action! #OpenAccess Week 2012 @NetworkedRes Blogging Unconference - <http://t.co/5UfmE9YT> #HigherEd #okfest

This call to action above is to participate in a 'blogging unconference' taking place in accordance to Open Access Week 2012. The event is a global function happening on the Web advocating for free, immediate, online access to the results of scholarly research, and the right to use and re-use such results as needed (www.openaccessweek.org). The idea is to collect a body of topical blog posts in the topic of open access. Participation to the conference is through submitting a blog post addressing some aspect of Open Access. The account @NetworkedRes, stands for Networked Researcher, which (according to its Twitter profile) is a collaborative publishing platform encouraging for e-learning research.

Potential participants are reminded that participation is an opportunity of raising one's academic research/publication profile by reaching a targeted and specialized audience. This is yet another interesting niche or subdomain of open knowledge scholars and their collaborative activities.

@Sarah_Stierch:	We have a page started to draft a doc on why contemporary artists should release their work CC: http://t.co/2Rs6GdDN #openglam #okfest
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Here Sarah Stierch (@Sarah_Stierch) is calling #okfest practitioners to co-author a set of guidelines for contemporary artists to encourage them to release their art with open licenses. The topic is the very common objective of lobbying for open culture and open practices to a new field. The target field is artists. In the spirit of open culture and collaboration Sarah is rallying interested parties to draft a shared document. In the document below people have inputted their contact details and affiliations. There are also some structuring questions and a projected goal to help people participate in the document.

Image 10. Drafting a doc on why contemporary artists should release their work CC

The screenshot shows a 'Public Pad' interface with a toolbar at the top containing options like 'Read-only Version', 'Pad Options', 'Import/Export', 'Saved revisions', 'Time Slider', and 'Home'. The main editing area contains the following text:

3 This pirate pad exists to examine how to develop documentation which promotes the importance and benefits that contemporary artists will find in releasing their works via open license.

4

5 Please add your name, affiliation, email, and Twitter, and Skype here:

6

7 • Johanna Berg | Digisam/National Archives Sweden | johanna.berg@riksarkivet.se | @riksarkivet.se | @johannaberg

8 • Sarah Stierch | Wikimedia | sarahstierch@gmail.com | @sarah_stierch

9 • Maarten Zeinstra | Kennisland/CC-NL | mz@kl.nl | @mzeinstra

10 • Primavera De Filippi | OKFN/CC-FR | pdefilippi@gmail.com | thisk0

11 • Sam Leon | OKFN | sam.leon@okfn.org | @noel_mas

12 • Sandra Fauconnier | Wikimedia NL and independent contemporary art historian | fokky@fauconnier.nl | @sanseveria | (Got this lead from Maarten Brinkerink!). I am VERY interested in this; have worked for contemporary art collections and archives for 10+ years and am extremely frustrated that 99,9% of all materials I've worked with so far, are unusable for further sharing. I think this is a pure waste of public spending.

13 • Joris Pekel | OKFN | joris.pekel@okfn.org | @jpekel | jpekel

14 • Elliot Harmon | CC | elliot@creativecommons.org | @elliiotharmon

15 • Chiaki Hayashi | CC | chiaki@creativecommons.org | @chiaki | chiaki0808

16 • Greg Grossmeier | CC | greg@creativecommons.org | @g_gerg / @greg on identi.ca | greg.grossmeier

17

18 **GOAL**

19

20 To develop a documentation guide to share with contemporary artists that promotes the use of open licenses (public domain, Creative Commons). This publication, which will be available CC BY SA, will be geared specifically towards artists and their representatives. It will be able to be utilized by GLAMs, open stuff community members, and organizations to promote the use of open license in the contemporary art world.

21

22 **QUESTIONS TO EXPLORE**

23

24 • Where will this document live?

25

26 • What names will be on it - as in organizational names ?

27

28 • What is our dated goal? before december (so it can be used for CC@10)

29

30 • What is the length of the document we want?

31 • a one page fiver ?

On the right side of the interface, there is a section for user interaction: a name input field with the placeholder '< enter your name >', a link to 'invite other users and they will show up here.', a 'Share this pad' button, and a chat log showing messages from 'September 19, 2012' and 'November 12, 2014'. At the bottom right, there is a 'Chat:' input field.

The #okfest hashtag has been recognized as a point of convergence for experts and enthusiasts in the field of open knowledge. The hashtag is used to directly address the network of open knowledge practitioners. The analysis shows how the hashtag space is being used to invite participation into different kinds of initiatives of collective cultural production. This category also includes invitations to participate into different kinds of competitions and job opportunities aimed for practitioners in the field. The initiatives shared to #okfest are framed by the joint enterprise of the practitioners. Participation to these efforts is linked to their collective interests as open knowledge practitioners.

The analysis shows how #okfest is a site for invitations to authentic online collaboration among the network of practitioners. Collective drafting an open government partnership plan, signing an open letter to an official, or submitting a blog post to a 'virtual conference' are all efforts of collective cultural production. There were also initiatives of collective lobbying of open knowledge practices. The blogging unconference is a wonderful example of a new kind of practice of organized knowledge production

coordinated entirely over the web. The analysis shows how online collaboration is a viable practice of collective production. All the presented examples are manifestations of an emergent culture of collective epistemic production on the Web.

The collaboration in #okfest is peer-to-peer and not mediated by any organizations. Active practitioners are trying to recruit and mobilize their peers to take part in their initiatives. However, the collaboration is not situated solely on the Twitter platform, but dispersed to other online services connected a links. Collaboration takes place across a wide range of online services offered on the Internet such as social network services, websites, blogs and collaborative documents like Google Docs. The #okfest hashtag serves as a rallying point where collaborative projects and ventures are advertised and discussed. The hashtag is backbone that enables the convergence of #okfest practitioners' collective activities.

The fact that these projects and ventures were announced on #okfest in this manner, reflects an authentic open culture on open collaboration is at play. Collaboration has been opened to the online public and anyone whom the messages reach. Participation was genuinely open to anyone interested. It is notable that in most of these invitations to collaborate the offer is immediate and unconditional. One can take part in these ventures immediately without any procedure of pre-screening or approval. This is an example of a new epistemic cultures residing in the open web.

7 CONCLUSIONS AND DISCUSSION

This thesis had two main objectives. First, to explore Twitter as an infrastructure for networked expertise and situated interaction among expert practitioners. And secondly to describe how practitioners engaged in communal knowledge building in #okfest. To answer the first question I describe Twitter as a social media service and it's features and practices that supporting the maintenance of public expert identities and a site of microblogging.

7.1 COMMUNAL KNOWLEDGE BUILDING IN #OKFEST

By incorporating keywords called hashtags into their tweets, users can address their tweets to an online public that is following a certain hashtag. Twitter users' ability to follow and post to a hashtag conversation makes it possible to create transient networks among practitioners (Bruns & Burgess, 2011, 2). The lightweight technical infrastructure and bottom-up emergence of hashtags is a mechanism, which can be used for the rapid formation of ad hoc issue publics. Using the hashtag functionality Twitter users can form discursive spaces in support of dissemination of information for a multitude of applications. When a significant number of tweeters adopt a certain topical hashtag the consequence is the formation of an ad hoc collectivity of tweeters with a common agenda. Hashtags also make knowledge and knowledge producing networks more findable. In this study the hashtag was explored as a mechanism of coordinating epistemic production in a shared domain.

This study gives an account of a globally dispersed network of practitioners engaged in communal knowledge building around a Twitter hashtag. The analysis revealed six core practices of communal knowledge building that were observed in #okfest. The hashtag became a point of convergence for a network of practitioners in the field of open knowledge and its neighboring domains during the Open knowledge Festival (17. – 22.9.2012). Even though the hashtag was initiated as a backchannel for the conference, the analysis indicates how it was collectively appropriated to serve as a node of communal knowledge sharing beyond mere reporting from the conference. The analysis demonstrates how the hashtag functioned as a site of situated epistemic activity parallel to, but independent of its relation to the on-going conference.

Table 1. Communal knowledge building in #okfest with thematic examples.

Theme	Tweet example
Negotiating a joint enterprise	"A piece of content or data is open if..." A definition of "open" content: http://opendefinition.org/ via @jpekel #OKFest
Developments and news	steps today in EU #transparency push for oil, mining cos. #euopendatastrategy #okfest #doddfrank http://t.co/toNjK1k7
Benchmarking cultural products	Gay Rights by State - how does your state measure up? #visualization #guardian #OKFest http://t.co/UCgY61J8
Tools and resources	@piawaugh checkout http://t.co/FmEKtHWg for a good overview of the various realtime stream processing tools #okfest

Live reporting	very excited to be making a small contribution to the @okfn research data management handbook, in a session at #okfest http://t.co/TwUIXcCb
Inviting participation	Call for action! #OpenAccess Week 2012 @NetworkedRes Blogging Unconference - http://t.co/5UfmE9YT #HigherEd #okfest

The analysis identified six themes that describe how practitioners were engaging in communal knowledge building (See Table 1. above). In the first theme, *Negotiating a joint enterprise*, the practitioners discussed a joint venture for the field of open knowledge. This included discourse about fundamental values and about clarifying core concepts. In the second theme, *New knowledge and developments*, practitioners shared all kinds of new knowledge and informing their peers of recent developments in their field, which they had only recently discovered. In the third theme, *Benchmarking cultural products*, practitioners circulated innovative examples of projects to others for scrutiny and inspiration. In the fourth theme, *Tools and resources*, practitioners shared practical resources relating to the practice such as tools and raw materials such as data sets or programming advice. In the fourth theme, *Live reporting*, practitioners operated as quasi-reporters, sharing significant discoveries, experiences and musings from the conference. In the sixth and last category, *Inviting participation*, practitioners shared collective initiatives of cultural production and invited their peers' attention and participation to them.

Sending a tweet containing the hashtag #okfest connotes submitting content or an idea to the community's scrutiny. A perpetual process of rapid peer review takes place in the hashtag space, as significant content is amplified through retweets in the hashtag space. It must be noted that very seldom any lengthy discussions concerning these contributions take place in the hashtag space. The Twitter platform is hardly an optimal platform for in-depth discussions due to its restrictive "affordances".

Many individuals participating to the Open Knowledge Festival tweeted their experiences and things they learned, discovered or found significant. This led to a process of collective curation where individuals created a collective narration of content in the field of open knowledge. Thanks to #okfest acting as a backchannel the conference became extended to the Web and attracted a considerable following and participation of individuals who did not attend the conference themselves.

The hashtag space of #okfest was used for co-constructing mutual understanding and professional practices in the shared domain. The discourse clearly took place among seasoned practitioners, who communicated using terminology that only an encultured member could fully understand. Practitioners participated by sharing their experiences, information and expertise related to the field of Open Knowledge. The practitioners engaged collectively in activities of producing and sharing actionable knowledge that others can learn from, appropriate and build upon.

Activity in the network showed evidence of negotiating and developing common values and goals. The network also operated as a dynamic resource of timely, vetted domain knowledge shared by evident expert practitioners. The hashtag space is a kind of trading post for exchanging knowledge, skills and practical case examples. The practitioners were also sharing invitations for both online and face-to-face collaboration. A collective intention towards the advancement of domain knowledge was an obvious goal in #okfest reflected by the epistemic activities. In general the community also exhibits a dynamic sense of moving forward and celebrating progress and developments across the domain.

Networks of practice like #okfest (on Twitter) have their own localized cultures and shared practices that govern their epistemic activities. They commonly create flows of pertinent, vetted domain knowledge that participants and followers can draw on. The functioning of #okfest resembles the conceptualization of innovative knowledge communities (IKC) that operate in technology-enhanced collaborative contexts (Hakkarainen, 2009, 214–215). A central tenet of IKCs that is also characteristic of #okfest's is the *pursuit of newness* (ibid.). Practitioners are always on the look out for news, developments and new solutions that can be appropriated to improve the collective knowledge and shared practices. The active probing of promising directions and ideas undergone in #okfest could be described as *innovation seeking behavior* that is aimed for the deliberate reinvention of prevailing practices (ibid.). Therefore #okfest seems to resemble the conceptualization of IKCs as an innovation seeking node of expert practitioners meeting around a shared knowledge commons in the open Web.

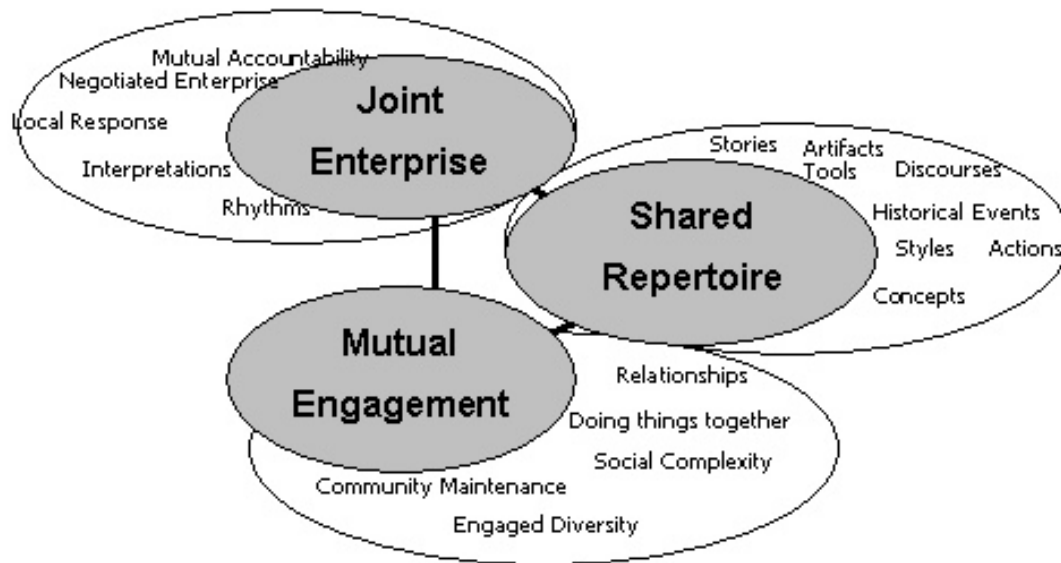
The epistemic activities of practitioners in #okfest were characterized by a quality of *promisingness*, meaning practitioners' sensing and sharing of promising emergent themes in their field (Bereiter and Scardamalia, 1993, 133–152). The hashtags epistemic activity represents a systematic pursuit of knowledge and constantly working on the edge of

competence. Thus the continuous sieving and sorting through ideas, conceptual artifacts and developments in a field may support practitioners' understanding of the current state of affairs and perhaps even promote their ability to project to the future. A significant part of the content shared in #okfest implies the exploration of promising trajectories and other realms of possibility in the field of open knowledge. Much of the content shared in #okfest discusses trends, latest developments and weak signals pertaining to the domain.

Although there weren't any salient guidelines directing the activities in #okfest, the analysis revealed patterns of systematic epistemic activity identified as the collective negotiation of meaning in the open knowledge domain. Wenger et al. (2011, 12) have described that a key aspect of collaborative learning in networks is the potential for collective exploration without collective intention or design. Even though the activities in #okfest were in no way coordinated, the active practitioners who tweeted with the #okfest hashtag self-organized towards a process of collective production of meaning.

The analysis suggests the assumption that the tweeting practitioners in #okfest belong to an overarching network of practitioners in the open knowledge field. A network of practice is a loose social form that exhibits characteristics of communities of practice (Brown and Duguid, 2002, 141–142). #okfest might also be recognized as an electronic network of practice which is described as a social online space where people with shared interests or similar professional practices self-organize to help each other and share experiences or knowledge (Wasko, Teigland and Faraj, 2009, 255). The network of practice converged on the hashtag, which created an instance of epistemic activity lasting for the duration of a week while the conference also took place. The hashtag and conference acted as a call to action, which galvanized the loose network of open knowledge practitioners from around the world. The hashtag was appropriated as trading post for domain specific knowledge where practitioners joined to barter and broker their epistemic contributions.

Diagram 2. Dimensions of a Community of Practice (Wenger, 1998, 73).



The first category of communal epistemic activity in #okfest comes very close to a central theoretical construct of the communities of practice framework (see Diagram 1. above). The analytical category was called negotiation of a joint enterprise, corresponding to Wenger's theoretical construct of the same name. The common enterprise delivers coherence and meaning to members' individual efforts as practitioners in a domain. It creates and mobilizes social energy, spurs collective action by giving it focus. Defining a joint enterprise is seen as a continual process of negotiation and not a static agreement. (Wenger, 1998, 77-82).

Negotiating the joint enterprise in #okfest included discussing a shared mission among the practitioners. Also core terminology of the field was discussed and definitions of key concepts negotiated. In practice this negotiation happened through practitioners' sharing of content and materials that discuss a shared mission and collective values of the domain. A practical dimension in the discussions was about the challenges of applying open source ideals to practical realities. The shared materials were also building up an identity of the open knowledge practitioners as activists and change makers of society. Celebration of the field's potential of having an impact on society was a central theme in the discussion. An essential observation concerning the domain was it being quite a young and burgeoning field, one that is still in the process of defining itself. Presumably for the same reason, there was a lot of enthusiasm concerning the joint enterprise, which was seen as shared content glorifying their agenda.

The negotiation of meaning in #okfest took place in mediated fashion rather than through conversational dialogue. The negotiation of meaning underwent primarily through sharing content that discussed or elaborated certain points of the practice. The practitioners sharing digital contents to #okfest are simultaneously discoursing and exchanging cultural artifacts. This engagement leads to the accumulation of a shared collection of cultural knowledge in the hashtag space. In the community of practice terminology, participants' interactions in #okfest are contributing to a *shared repertoire* among the practitioners (Wenger, 1998, 82–83). The shared repertoire is a domain specific collection of knowledge-laden cultural artifacts. This means that the artifacts are permeated with cultural knowledge and are used to negotiate and communicate the shared practice.

According to Wenger a shared repertoire combines both reificative and participative aspects. This means that the interactions of a network of practitioners include the production and appropriation of artifacts as part of the mutual engagement. Reification means the production of artifacts that embody common knowledge. Reified artifacts contain an externalized history of engagement that also serves as a resource for the negotiation of meaning in the future. (Wenger, 1998, 82-84). Thus full participation to a network of practice means engagement in its cultural production. Becoming an active practitioner within an expert culture entails producing content that is both useful and relevant to the goals of the expert culture. As the hashtag functions as an aggregator of individual practitioners' inputs, sharing content to the hashtag always adds value in the form of discursive contribution to the shared repertoire.

In the case of #okfest, active participation constitutes tweeting with the hashtag #okfest and including a contextually relevant contribution to the shared practice of the network. Assuming the role of an active epistemic practitioner in #okfest means participating by introducing relevant content for the benefit of the network of practice. This might be cumulating the shared repertoire with knowledge artifacts or merely retweeting noteworthy content to amplify its visibility in the stream of content. In a sense all #okfest tweets that carry any informational value are reificative. Such knowledge-laden tweets sent to #okfest become self-standing knowledge artifacts that communicate and negotiate some aspects of the shared practice.

All the artifacts shared to #okfest are collated together into a dynamic stream of tweets that make up the shared repertoire. The burgeoning shared repertoire is not a cohesive body of

knowledge, but rather a jumble of miscellaneous artifacts that are loosely affiliated to the shared practice. In the hashtags stream of tweets new artifacts become juxtaposed and attached to the previous content creating a mishmash of conceptual objects that are loosely connected and related to one another. The hashtag stream, that runs in reverse chronological order represents the history of engagement among the practitioners in the #okfest hashtag space.

The third dimension of the communities of practice conceptualization is mutual engagement. Optimal interaction among practitioners in communities of practice is a hybridization of engagement and the exchange of artifacts. Wenger wrote how “artifacts without participation do not carry their own meaning; and participation without artifacts is fleeting, unanchored, and uncoordinated” (Wenger, 2010, 1). In the context of well functioning social learning systems, it is only through the interplay of artifacts (models, words, frameworks, etc.) and social participation that meaningful learning occurs.

The epistemic collaboration observed in #okfest clearly expresses characteristics of hybridized engagement. The negotiation of meaning in #okfest was primarily based on the exchange of artifacts rather than direct dialogue or discussion. The shared tweets in the hashtag space carried a mishmash of objectified knowledge ranging from hyperlinked blog posts to snapshots of presentation slides, to quotes and even scientific papers. The analysis showed how knowledge was acquired from diverse sources ranging from a practitioner personally observing something and reporting it to the network, to creating user-generated content and appropriating content created by others. The interactions in #okfest could be described as a mediated discourse through the sharing of conceptual artifacts.

Wenger (1998, 109) has theorized that communities of practice interact with the outside world through a process of brokering. Brokering means the import–export of ideas between different communities and contexts. Knowledge brokers are involved in the creation of meaning and introducing new ideas to communities of practice. Brokering involves multi-membership in different communities and networks of practice and traversing across organizational boundaries. Wenger (1998, 109) writes that brokers in traditional communities of practice required enough legitimacy to influence development of a practice, mobilize attention and address conflicting interests.

Brokering knowledge and ideas is very different in open networks such as hashtags compared to traditional communities of practice. On Twitter everyone participating to a

hashtags discourse is a potential knowledge broker, operating on the principle of equipotency (Dron, 2014, 161). Through tweeting anyone can have a voice and introduce content or ideas to the hashtag network. The hashtag is an aggregation of the collective activities of those who choose to participate to it. Participation is open to anyone and there is no moderation or further guidelines that define participants' activities. Participation to a hashtag discussion is based on everyone's individual interpretation the meaning of the hashtag. As the process of meaning making takes place through sharing materials to the hashtag also the interpretation of the hashtags meaning may shift.

7.2 EXPERT MICROBLOGGING

As described in the previous section, microblogging has emerged as a relevant genre of cultural production on the Internet. The communicative affordances and wide scale adoption of Twitter have created a global community platform that is a hotbed for different kinds of epistemic collectivities. Twitter is a habitat for meaningful public interactions among practitioners and their loose networks and affiliations. Twitter enables new forms of epistemic productivity among such networks of practitioners. The nascent practice of *expert microblogging* leads to the emergence of networked expertise situated in Twitter's public agora.

Twitter has proved potent as a medium supporting the spontaneous creation and dissemination of knowledge on the fly. Twitter benefits of mobile devices with cameras, GPS and mobile Internet access. Hashtags enable bottom-up formation of ad-hoc collectivities, which coordinate collective action and meaning making. All these qualities have expanded the productive potential of individuals and enabled a new form of cultural expression on the Web. The publicity, mobility, micro-incrementality and real-time nature of Twitter are the characteristic strongpoints of microblogging.

Microblogging has emerged as a *lightweight operating system* empowering practitioners to share their experiences, musings and ideas with their networks and followers, while keeping connected to one's own relevant sources and outlets. A new communicative genre has emerged. In this modus individual practitioners (and sometimes organizations as well) assume the practice of curating and creating content related to a specific domain. These

specific characteristics of microblogging make it an effective but economical mode of communication and production. Expert microblogging enables cultural production that is epistemically cogent, but light in conversation. The lightness of Twitter, both production and consumption wise, means that a microblogging routine is easy to maintain beside other daily routines.

The analysis of #okfest demonstrated that a great number of tweets sent to #okfest were highly knowledge-laden. Most tweets were complemented with hyperlinked content and stand as highly shareable conceptual artifacts that are both light and mobile. This reflects the high degree of epistemification of the practice of expert microblogging observed in #okfest. Microblogging creates epistemic patterns, content flows and contextual threads that anybody can follow and learn from in the open Web. Microblogging is a concrete example of produsage, the hybridization of epistemic production and consumption (Bruns, 2008). Thus each individual Twitter account is a potential outlet for original and repurposed epistemic content obtained from other practitioners and sources. Microblogging is thus established as a lightweight, but epistemically potent genre of expert communication on the Web.

Most tweets in #okfest are conceptual artifacts, that are both light and mobile. Their lightness comes from the 140-character limit that forces a concise but comprehensive mode of expression, giving tweets their uniform format. The constraints and affordances of microblogging impose a terse but vigorous genre of expression. Crafting tweets forces to condense broad ideas and issues into an abridged account fitting a tweet. The condensed expression of tweets makes them readily consumable units of knowledge, which can be delivered in micro-increments.

Mobility of tweets is afforded by the fact that tweets are highly shareable. Publicly available tweets are self-standing wholes, which can easily be lifted out of their original context, without truncating their meaning. This enables tweets to travel far from their original context, retaining their comprehensibility. Retweeting is a potent mechanism of amplifying content in the hashtag network and introducing it to new audiences. Retweeting launches a tweet to new audiences, but it also retains a trail back to the original context of the where it originated. Thus a retweet containing a hashtag will always point back to the original hashtag context for anyone interested to discover.

Collectively coordinated microblogging enables production of content and value in a dispersed micro-incremental fashion. When the practice of expert microblogging is combined with an engaging call to action, such as a conference hashtag, a new instance of collective expression and epistemic production emerges. When content from multiple practitioners is aggregated through a hashtag, tweets are collated into a uniform stream of knowledge.

The activity around a hashtag should be recognized as an instance of peer-production of knowledge and epistemic structures with very little coordination required on the collective level (Benkler, 2006, 138–139). A network of practitioners engaging in expert microblogging creates a dynamic social learning system that combines social interaction with the production and dissemination of knowledge (Wenger, 2002, 34). Wenger stresses that "the community element is critical to an effective knowledge structure" in such social learning systems. Individual practitioners interact based on shared interests, reciprocal relationships and mutual commitment. Such a social learning system may also function as a filtering mechanism that helps practitioners deal with knowledge overload (Wenger, 2002, 34).

7.3 NETWORKED EXPERTISE ON TWITTER

Expert microblogging on Twitter results in an ecology of *networked expertise* on the open Web, that arises from interactions, knowledge sharing and collective engagement (Hakkarainen, Palonen, Paavola & Lehtinen, 2004). The effects of individual epistemic practitioners' outputs are compounded among networks of practitioners who practice microblogging in a shared domain. Networked expertise yields an agglomeration of complex relational knowledge and networked affiliations.

The epistemic potential of Twitter is based on the lightweight and hi-octane communications platform, which creates feeds and aggregations of information originating from individual epistemic practitioners. The Twitter platform brings into existence a global 'agora', a public arena that is sometimes referred to as the Twitterverse. Microblogging represents a relevant form of public discourse and cultural production in our globalized network society. A key attribute of microblogging is its publicity and that it's spoils can be

exploited by anyone. Shared ideas and content can be appropriated by anyone who discovers them, no matter whether they themselves participated in their production or not.

Twitter is a global arena, where practitioners construct and maintain public identities and connect with others whom they wish to include into their personal networks. A personal Twitter account offers a site to discuss and output content pertaining to a practitioner's professional domain or other interests. The Twitter platform enables connecting practitioners' Twitter identities to content they are sharing. This denotes an expert culture operating in a specific domain with authentic identities reflect their interests and professional persona. Practitioners' Twitter profiles present their interests, epistemic histories and latest interactions with other practitioners. Twitter makes relations and exchanges between practitioners visible. One may discover who is following whom and delve into histories of practitioners' past interactions.

These key dimensions of the Twitter platform enable an ecology of networked expertise. Expert cultures arise from practitioners' social interactions and knowledge sharing on the Twitter platform. These cultures are characterized by authentic situated practice and coordinated interaction among practitioners. The domain-specific activities on the Twitter platform represent a development in which expert cultures have expanded into the online realm of the public Web.

In a network the 'unit of learning' is not the individual, but on the level of a community, an organization, or even an entire expert society (Hakkarainen et al. 2014, 214). Networked expertise is thus regarded as the *competence of networks*, sometimes referred to as wisdom of crowds (e.g. Surowiecki, 2005). A loosely affiliated network of practice pulsates with the exchange of epistemic inputs and outputs among practitioners. Such a network is a complex social entity consisting of loosely coupled practitioners with a multiplicity of motivations. Their collective activity creates and sustains an occurrence of networked expertise.

A fundamental aspect of networked expertise is the actualization of *epistemic agency* on a collective level, where online communities and networks assume responsibility for the development of collective expertise and knowledge. This is also referred to as '*higher level epistemic agency*' which is foremost relational and something that emerges between suspended in the social spaces of the open Web. (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004, 212). Such networks of practice produce and disseminate vetted and

eclectic epistemic content pertaining to a shared domain. There is a lot of original user-generated content and not only sharing news items or official bulletins. Blog posts are used to reflect on specific issues often based on personal experience in a professional domain. Also authentic projects are shared and discussed along with tools and instructions that forward the development of a shared practice.

The activity upon a hashtag such as #okfest results in a collectively narrated *information experience* on a topic. This eclectic information mix consists of facts, opinions, knowledge, humor, pictures and miscellaneous items that have been discovered and reported by practitioners in the open knowledge community. The hashtag is like a teeming bazaar of miscellaneous knowledge artifacts hand-picked by practitioners in the field. The knowledge artifacts may be slightly fragmentary such as a snapshot of a slide or a partial quotation. But when content is amassed in the hashtag space, items become related to other items and a new context is established that is framed by the shared domain.

Twitter discourse in a hashtag space that represents a shared context for a network of practice (e.g. #okfest) creates a *cornucopia of connected knowledge* that is sparse on dialogue but rich in other contextual factors. The hashtag is a multidimensional aggregation of networked expertise that is dynamic and alive. By exploring such a hashtag one will discover a complex web of relations made up of ideas, artifacts and active practitioners.

A central tenet of networked expertise on Twitter is the *multiplexity* of its relations. The discourse and shared artifacts are distributed to various online services and platforms. The burgeoning body of knowledge is not situated on a single platform, but is rather a network of relations. Twitter however might be the most coherent 'window' to explore these cultures of networked expertise. Twitter perhaps functions as a backbone or home base for networked cultures of expertise, but most likely there are other relevant contexts and interfaces where collaborative activities are situated.

Hashtag discourse upon a Twitter hashtag creates *ambient affiliation*. Twitter functions as a social awareness system that can be polled to find out *what Twitter thinks* about an issue. Hashtags render Twitter discourse findable and group contextually related content together. The hashtag makes associated ideas and interpersonal meaning visible. (Zappagavina, 2011). Essentially, ambient affiliation means making talk on Twitter searchable. Anyone interested can navigate a hashtag's discourse, linked artifacts and

practitioners. Ambient affiliation thus enables the exploration of interpersonal meanings constructed in the agora. Ambient affiliation means that the epistemic value of a hashtag discourse is extended beyond a stream of tweets, into an interlinked web of meanings, artifacts and practitioners.

Operating fully in public, hashtag collectivities offer significant windows into various professional cultures and specialist domains. Coming across a contextual hashtag means discovering a link to an authentic expert culture situated in the open Web. A hashtag enables to observing and participating into an authentic process of collaboration among a network of practice. Wenger (2008, 100) refers to this kind of open possibility to participate as legitimate peripheral participation. This means that people can become included into a network of practice with a very peripheral role. In the case of expert cultures situated in the Web following the activities is open to non-participating lurkers who can however benefit of the shared knowledge and discourses.

In today's reality of multi-disciplinary work we can no longer remain singular experts in our own domains, but we must be able to delve into new domains and foreign cultures. Twitter can be used to maintain and cultivate personal networks and contacts external to one's own organization and stakeholders (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004, 91). Hashtags and networks of practitioners might offer such possibilities of taking a peek to such cultures. Twitter social significance is its functioning as a hotbed for dynamic discourse communities that anyone can follow and explore. Anybody can profit from the public discourse on Twitter and dive deeper into a topic or specific domain. As all the communications on Twitter are publicly available it has emerged as a central locus of globalized cultural production serving different kinds of communal epistemic functions.

The potential gain of discovering a culture of networked expertise is not just having access to high quality pertinent knowledge, but becoming socialized into an expert culture and crafting authentic relations to other practitioners to learn from in the future. Socialization entails becoming an active practitioner and assuming a contributing role in the activities of a network of practice. This means learning the language, becoming acquainted with the shared repertoire and central discussions. It also means participating to the collective effort of sense-making in a domain and becoming recognized as a practitioner in a field by others. In the participation metaphor of learning socialization into the culture entails simultaneous learning and acquisition of skills and expertise.

7.4 CONCLUSIONS AND RELEVANCE OF THE STUDY

The attainment of actionable knowledge and understanding are so vital for individuals, businesses and our society, that it is imperative to understand how knowledge is created, disseminated and validated in the contemporary media landscape (Schuller & Theisens, 2010). Social media and especially Twitter create social spaces and contexts, where cultures of expertise may reside and develop. This study explored Twitter as a site of communal epistemic production. Twitter and its wide scale adoption have created a global community platform that is home to different kinds of epistemic collectivities developing knowledge and practices in shared domains.

The results of the present study are hoped to contribute to the knowledge in two main areas: 1) collaborative cultural production and 2) networked expertise. The study has explored how expertise and expert communities function in the network age in the context of social media. The study has focused on epistemic production in the open web; where as much of the previous research has concentrated on communities and production within organizations. The intention of this study was to locate epistemic cultures in areas where they have not before been studied. The present study offers an insight into the acclaimed affordances of Twitter as a platform for networked expertise.

This study gave an account of authentic situated collaboration among expert practitioners in the domain of open knowledge during the Open Knowledge Festival. A process of peer-production of knowledge and epistemic structures took place as practitioners self-organized in the #okfest hashtag space. The activity represents an actualization of higher-level epistemic agency i.e. collective commitment towards the forwarding of knowledge in their domain. The analysis revealed six core themes of communal knowledge building in #okfest. The hashtags' activities were noted for their resemblance to the community of practice conceptualization (Wenger, 1998).

“We are drowning in information but starved for knowledge” as John Naisbitt put it. Communities and networks of peers offer a way of tackling information overload by relying on a peer review and recommendations of content. Peer networks of practitioners like #okfest serve to direct our attention towards meaningful content and developments in a

domain. Networks of peer practitioners function as social filters sieving out valuable content and helping cope with information overload. To make sense of developments and new information in a domain, it pays off to connect with relevant online collectivities of epistemic navigators. By following a hashtag space one becomes exposed to central terminology and recurring themes in a domain. The shared values, goals and practices of the field become salient. Such networks provide an eclectic information mix of timely curated knowledge. What follows is a collective process of sense making, which emerges in these networks with minimal coordination.

Such online collectivities offer an opportunity to participate in authentic expert cultures situated in the open Web. Participation and socialization to such expert cultures on Twitter is regarded as a driver of professional development. Secondly active participation in a specialist domain may lead to mutual networking and awareness among practitioners with shared interests. Networking and connecting with peer practitioners may open up rewarding opportunities for reciprocal collaboration and discourse.

Hakkarainen, Palonen, Paavola, & Lehtinen (2004) have expressed how knowledge-creation processes have been very difficult to capture in research and therefore not much is known about them. This study has explicitly focused on the epistemic dimension of communal collaboration on Twitter where the activity takes place in public for anyone to follow and benefit from. The collaboration happens among loosely associated practitioners with a wide base of participation and with the principle of equipotency. The activity of epistemic production has been explored very closely in the analyses. Six categories representing different themes of epistemic collaborations arose from the analysis.

The significance of Twitter is how it makes practitioners, their activities and relations salient for anyone to follow and explore. The activities result an epistemic conglomeration of networked expertise that is a multi-dimensional relational construct. The concept of *ambient awareness* candidly expresses the attributes of the epistemic construct that is created as the result of collaborations. It consists of systemic association of themes, ideas, artifacts and practitioners whose mutual relations can be explored. Twitter activity creates epistemic paths that can be followed, self-standing artifacts that can be scrutinized and shared and finally public expert identities whom stand as possible partners for engagement or learning.

The study yielded a novel theoretical concept of *expert microblogging*, which is recognized as a significant genre of cultural production in a specialist domain on Twitter and in the open Web. In expert microblogging individuals construct a professional persona on Twitter and assume the role of an active epistemic practitioner. By crafting a identity of an expert practitioner on Twitter, individuals can engage in systematic epistemic inquiry in their own domain(s). Through building a profile and beginning to output content a practitioner can build connections to others through interactions on the Twitter platform. From these relations and cultural exchanges, networked expertise, the competence of networks, emerges.

We know a great deal about learning in purpose-built contexts and communities, but we know far less about how it happens among loose collections of people linked together through social media, web services and mobile applications (Dron & Anderson, 2014). This study has crafted an account of how informal learning takes place on Twitter among practitioners of the same domain with minimal structure and stewardship. The learning is largely based on collective emergence and individual motivations to share relevant content to one's peers. All practitioners who tweeted or retweeted something to #okfest are regarded as active practitioners, who have taken epistemic initiative by sharing content to the hashtag. A phenomenon of higher-level epistemic agency was observed in #okfest as loosely affiliated practitioners shared topical content to the hashtag.

Learning in open networks concerns a wide segment of individuals, who not themselves share or produce content and essentially remain invisible to one another but might be benefiting greatly of the hashtag's discourse and contents. The same of course applies for informal learning on the Web in general, as we cannot see who is profiting from publicly available content. These developments are characteristic of the Internet's contemporary significance as hotbed for cultural knowledge in many contexts providing a profusion of knowledge.

The effects of epistemic production in online communities are amplified when the information commons is made available to non-participants (sometimes called lurkers). If the process of epistemic production and its products are happening in the open, the effects are much wider. If the products of the process can be studied by anyone, it opens wonderful opportunities for learning and benefiting from the created knowledge. If the entire process is undergone in publicly then it creates opportunities for anyone to be

socialized into a specialist culture, learning the language, terminology and common practices. Any casual onlooker may thus take part to the discourse in the community, and get to know the active practitioners and perhaps be accepted and acknowledged as a participant by other members. We have moved from a position from where expert knowledge was scarce and expensive to a position of knowledge abundance.

7.5 IDEAS FOR FURTHER RESEARCH

The present thesis might be a valuable point of departure for follow-up research in areas of epistemic production and networked expertise situated in public and semi-public social media services. In general epistemic communities and the manifestation of networked expertise in the open Web would be interesting themes for further study because a lot of significant interactions and valuable cultural production is already happening there.

Expert microblogging is a novel term yielded by this study. However it is regarded as a prevalent genre of communication for domain experts who wish to construct a public identity on Twitter and the rest of the web. The phenomenon of expert microblogging should be studied further to better understand the cultural generativity of the genre. What are the strengths and shortcomings of this mode of epistemic production? As expert microblogging it is often understood as personal branding, it may be valid to explore what kinds of motivations lie behind its practice. It is also relevant to question what the relation is between content marketing materials versus pure content. Expertise in the public Web also creates many questions about credibility and reliability of the self-proclaimed expert practitioners.

Networked expertise is a phenomenon that is often visualized with social network analysis (SNA) methodology concerning social media but also organizations. These visualizations alone often don't go very far to qualitatively assess what the connections and relations between practitioners actually mean. The combination of SNA with qualitative interviews and quantitative analyses might better capture the complex system of situated interaction among expert practitioners in online spaces. Interestingly these expert cultures may not be situated on any single service platform but they may be distributed across many systems.

A central proposition of this study was that individual practitioners could complement their professional development by leveraging extra-organizational networks and relations in social media and especially Twitter. It would be interesting to study what kind of value such connections provide individuals and whether there is a clear return on investment (ROI) in relation to professional performance. This kind of argumentation is essential to be able to sell the idea of informal communal learning to organizations, to enable employees to engage in personal development as part of their work. Another variation of this study's setting would be to explore the possibilities for intra-organizational networks for discourse and knowledge building. This might be easier for companies so that proprietary knowledge does not have to be shared outside the organization. An interesting theme to explore further would be how epistemic communities emerge and whether they can be initiated and facilitated.

An interesting thematic to explore would be self-organized learning that takes place in informal online communities and contexts. The Internet and new media have produced a novel contemporary learning environment. It would be interesting to study the circumstances of learning at play in this new context. It would also be valuable to explore its relation to institutional learning? There is an evident mismatch between institutional technologies and the social systems built by self-organizing collectivities. How do open environments compare with purpose-built Learning Management Systems? Is there middle ground to be found, or are the cultures of institutional and emergent learning at all compatible?

An interesting topic for study is epistemic agency on different levels. On the individual level it means people taking responsibility for their own professional development. On the collective level it means communities of practitioners' of epistemic collaboration in a mutual domain. Epistemic agency is a central concept to explore because informal learning is based on an active attitude towards learning and epistemic exploration. It is a skill and proactive mindset that modern knowledge workers need to adopt. It would be interesting to explore how epistemic agency develops and what kinds of organizational factors support it. Presumably a great deal of learning in networks and communities in social media is based on individual interest rather than by organization decree. In such cases it would be vital to explore how the personal interest emerged. Are some people just predisposed towards exploration and curiosity, or is it a quality we can teach?

7.6 LIMITATIONS OF THE STUDY

The present study has limitations that need to be acknowledged. This study has emerged from my personal experiences and keen interest with Twitter. I have been especially interested in the role of the Internet as a site of cultural production and as a novel conduit for direct peer-to-peer relations between individuals. I must disclose my positive bias in respect to the study at hand. This undertaking has in no way been a critical examination of the phenomenon at hand. It is clear that the complex phenomenon has facets that require more critical approaches to explore the challenges it presents on societal and individual levels.

My predisposition towards Twitter and its potential has remained determinedly the same throughout the process. In the course of this research I feel I have succeeded in articulating what my infatuation with Twitter was based on. My observations are however grounded on data and its systematic analysis. I hope to have succeeded in crafting a composition that is expressive of the potential I see for epistemic collectivites and networked expertise in the open. I have tried to be systematic and transparent in my analysis, so that my conclusions can be followed. I also hope that the theoretical framework presenting the global paradigm shift affecting work and learning is sufficiently erudite to convince the reader of the change at hand. I hope this work will be approached with the same caveats as any epistemic artifact today.

This study explored collaborative knowledge building in the context of a Twitter hashtag and cast a wider eye towards expert microblogging and networked expertise on the Twitter platform. The problem regarding assessment of qualitative research is that the criteria have been under prolonged dispute. The classical criteria of reliability and validity have been adapted from quantitative positivist research and reformulated to fit the qualitative paradigm. (Flick, 2006, 367-238)

Flick presents a framework of "grounding qualitative research" to ensure quality. The first dimension covers assessing the procedures and results of a qualitative study. The second category assesses the generalizability of the results. The third category discusses other

dimensions of quality assessment beyond the core criteria. The fourth category of quality discusses the presentation of the procedures and results of the research. (Flick, 2006, 368).

The first category of assessment begins with the most common criteria of quality: reliability and validity. Reliability has been discussed from various specific perspectives. *Quixotic reliability* aims to evaluate whether a certain methodology will repeatedly yield the same results. *Diachronic reliability* evaluates the stability of results over time. However qualitative phenomena tend to be organic and constantly changing. *Synchronic reliability* on the other hand deals with acquiring the same results with different methods that were applied simultaneously. (Flick, 2006, 368).

Procedural reliability evaluates how well the study can be replicated according to the provided documentation and provided materials. It requires describing how the data was obtained or generated and how the analysis proceeded after that. (Flick, 2006, 368). In this study the tweets were collected directly from Twitter.com into an Excel document without leaving any room for interpretation. The tweets that were selected for the analysis are presented in their original text format so that anyone reading the research can assess how well the analysis is grounded in the empirical material. Therefore anyone reading the study can assess what the tweeted content was and what the analytical contribution of the researcher was. Also in the case of tweets that contained hyperlinked content, a snapshot image was included in the analytical text to illustrate and communicate the linked content to the reader. The procedural reliability could have yet been improved by taking more specific field notes expressing how the knowledge artifacts were analyzed. Another way to have the increased procedural reliability would have been to have reflected on the interpretation and coding of the content with a peer researcher. However such reflexive collaborations were not undertaken in this study.

Validity boils down to the question of whether researchers see what they think they are seeing. Three errors of validity are: 1) seeing something that is not there, 2) rejecting a phenomenon when it is valid and 3) asking the wrong questions. The core question is whether the research produced represents the studied phenomenon? It is a challenge to explore this link between "reality" and the study produced by the researcher. And in what degree is the version produced by the researcher grounded on the live phenomenon? (Flick, 2006, 371).

The concept of validity has been refurbished by Mishler (1990 in Flick, 2008, 16) into the idea of procedural validation, which is regarded as the "social construction of knowledge" by which we "evaluate the trustworthiness of reported observations, interpretations and generalizations". Altheide and Johnson (1998 in Flick, 2008, 16) regard validity as "reflexive accounting" of the process of research and the different relationships at work in it:

- 1) The relationship between what is observed (behaviors, rituals, meanings) and the larger cultural, historical, and organizational contexts within which the observations are made (*the substance*);
 - 2) The relationship among the observer, the observed, and the setting (*the observer*);
 - 3) The issue of perspective (or point of view), whether the observer's or the members', used to render an interpretation of the ethnographic data (*the interpretation*);
 - 4) The role of the reader in the final product (*the audience*);
 - 5) The issue of representational, rhetorical, or authorial style used by the author(s) to render the description and/or interpretation (*the style*).
- (Flick, 2008, 16).

The research was grounded on empirical materials, the #okfest tweets. The analysis was oriented according to previous research exploring communal online phenomena and especially from the epistemic perspective. The object of study is a social formation of individuals engaging with one another in the hashtag space that bears a contextual topic, which was the Open Knowledge Festival. Thus #okfest was understood as a locus for situated activity of practitioners in a mutual domain. The network of practitioners that materialized upon the hashtag is an example of an authentic expert culture situated in the open web. The activities of #okfest are taken to represent a wider phenomenon of networked expertise in the open as practitioners engage in expert microblogging. All the behaviors that were observed in the sharing of tweets to #okfest are gauged towards the phenomenon of networked expertise.

The relationship of the researcher towards the observed is not directly applicable to this context as the interaction took place in public agora of Twitter, where the practitioners are clearly conscious about their acting in public view. Since the empirical materials were publicly available no specific relationship emerged between the researcher and the observed parties. It is notable that the practitioners' self-presentation on the Twitter platform clearly exhibited characteristics of constructing and maintaining a professional public persona. Therefore the practitioners' performance in communication and self-presentation reflected their consciousness of dwelling in the public eye of the Internet.

The third point concerning interpretation is not applicable to this study as the observed practitioners were not contacted or interviewed in the process of this study. Taking into consideration the role of the reader in this study is other students interested in the field of social media and its communities. The study was written in English to have the possibility to share the results with other interested parties who might be reached directly through social media. The style of this work has been attempted to be transparent enough but also expressive and precise in description.

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APPENDIX

APPNDIX 1. ANALYSIS OF KNOWLEDGE BUILDING IN #OKFEST

Research Question 2:

How do practitioners engage in communal knowledge building in #okfest?

- What kinds of communal knowledge practices can be detected?

Research question 2:	
1) Negotiating a joint enterprise	Negotiating an agenda Negotiating core values Negotiating participant identities Negotiating core concepts Negotiating a mission / agenda Building cohesion and alignment Applying values to practice Reflecting on the novel domain Lobbying Open Knowledge
2) Developments and news	Advertising one's own presentation slides Sharing a news bulletin about new legislation

	<p>Core rationale of open data in the EU</p> <p>Sharing a photograph of Post-it notes</p> <p>Sharing a pre-press version of research article</p>
3) Benchmarking cultural products	<p>Sharing a visualization of Wikipedia articles</p> <p>Sharing a gay rights per US state web application</p> <p>Redefining conceptions of poverty web application</p> <p>I paid a bribe: Exposing corruption in India</p> <p>Ateneum GLAM project with Wikipedia</p>
4) Tools and resources	<p>Blog post discussing a dimension of the practice</p> <p>Circulating humorous statements about the practice</p> <p>Sharing open data sets</p> <p>Sharing conceptual artifacts that define the practice</p> <p>A blog post comparing different technical aspects</p> <p>EU prototype portal for data and on-going</p>

	initiatives
5) Live reporting	<p>Person X is on the stage talking about Y</p> <p>”I just heard about a wonderful initiative”</p> <p>I have just contributed to this project, plz have a look</p>
6) Inviting participation	<p>Comment on the Finnish OGP plan</p> <p>Job advertisement for aspiring programmers</p> <p>Announcing an innovation competition</p> <p>Drafting an open letter to the ARC</p> <p>Join a blogging unconference with your contribution</p> <p>Co-drafting: why artists should release their work CC</p>