PLACE-MAKING: A PHENOMENOLOGICAL THEORY OF TECHNOLOGY APPROPRIATION

Completed Research Paper

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Abstract

We study the introduction of new technology into (organizational) practices. We argue against the dualist under-pinning of typical IS technology appropriation literature and develop a phenomenological theory of appropriation based on Martin Heidegger's analysis of equipment. On this view, technology moves from being an object inspected in the practice foreground to becoming equipment as a transparent means located in the practice background. We show that this transformation occurs through a practice of actively performed place-making in which the technology is accommodated in the practice among existing equipment, practical logics and social identities. We illustrate our theory with a rich case study of social media appropriation, making methodological use of the novel feature that self-referential conversations are captured within the technology, providing access to direct evidence of the appropriation phenomenon. The paper contributes a more nuanced sociomaterial account of the simultaneous transformation of technology and practices occurring in technology introduction.

Keywords: Technology Appropriation, Ontology, Heidegger, Social media, Practices

Introduction

The topic of our paper is the introduction of new technologies into (organizational) practices. While textbooks in Information Systems typically present information technology introduction as discrete steps in a process involving various decisions, a body of literature has emerged characterizing the phenomenon as a time-extended *appropriation* process, described as "*the way that users evaluate and adopt, adapt and integrate a technology into their everyday practices*" (Mendoza et al. 2010, 5). Initiated by the work of DeSanctis and Poole (1994) a core aim of this emerging stream of research has been to explain the variation in (unintended) outcomes when users take new technology into practice. However, the literature has struggled to grasp how exactly both the technology and the practice change in this process. We argue that appropriation research has been limited by certain commitments at the ontology level to a widely held dualist worldview, which leads to attributing change to either the technology entity or the user entity. Moreover, as the focus has been on explaining the variation in outcomes, with some notable exceptions (e.g. Carroll et al. 2002) there has been little research on what exactly happens during appropriation, that is, on what users do. We make this appropriation phenomenon the object of our study and propose a new theory of technology appropriation.

In order to overcome the limitations of existing dualist approaches and to uncover the structure of the appropriation phenomenon, we propose to reframe the problem at the ontology level. We draw on German philosopher Martin Heidegger's existential phenomenology, outlined in Being and Time (1927; 1962). His work will allow us to distinguish IT as an object of inspection and reflection from IT as it is in use, which is captured by Heidegger's concept of equipment (Riemer and Johnston 2011). Using this equipment concept we propose to interpret technology appropriation as the change of IT from an object evaluated by users upon first encounter, to equipment when it is transparently implicated in a practice. We present a theory that explains this transformation as *place-making*, which involves changes in the structure of the practice, accommodation of new equipment among existing equipment, and changes to social identity production, as well as how meaning is produced within the practice.

We draw on a case study in social media to illustrate our theory. Our case outlines the appropriation of the enterprise microblogging service Yammer into the consulting practice at a large multi-national company. With access to first-hand data stored within the Yammer platform we are able to undertake a true phenomenological study of the unfolding technology appropriation by analyzing actual user conversations about the technology and its emerging use as it happened at the time. Access to such user conversations, in which users discuss and make sense of the new technology as they take it into their practice, allows us to study appropriation in a novel way without having to rely on post-hoc accounts provided by users in interviews. This methodological approach allows us to illustrate the plausibility and applicability of our theory by uncovering the structures by which the new technology is accommodated into the existing practice. True to our ontological position this will lead us to interpret place-making itself as a practice, a practice for changing practices.

Our study offers important insights into the nature and structure of the appropriation phenomenon; it provides a rich explanation of what happens when new technologies are taken into organizational practice. We contribute to the IS literature a phenomenological theory of technology appropriation. This differs from existing theory by focusing on how the technology changes ontologically when being enrolled into a practice and how the practice changes as the technology is being accommodated, rather than on the factors that explain and predict appropriation outcomes. As such, it provides an example of a genuine non-dualist analysis in line with recent calls to study the sociomateriality of IT (Orlikowski and Scott 2008). Our theory can be classified as a theory for explaining (cf. Gregor 2006), as it provides a detailed account of how technology is appropriated into an existing practice. Understanding appropriation as a place-making practice has important practical implications, as such a practice may be cultivated by businesses to improve their appropriation capability.

In the first part of the paper we develop our theory. We begin by briefly outlining the shortcomings in IS appropriation studies. We will then present Heidegger's phenomenological analysis of equipment and formulate our theory. In the second part of our paper we illustrate our theory with a case study. We begin by introducing the case setting and spelling out our methodology. After presenting our findings on how appropriation played out in the case, we discuss these findings in light of our theory and characterize

place-making as a second order practice (Reimers et al. 2010b). We conclude by outlining practical implications and contributions to IS literature.

Literature Analysis

In this section we first outline existing conceptions of technology appropriation in the Information Systems literature. We then demonstrate that this body of literature is founded upon a dualist understanding of the relation between technology and users that is grounded in what is commonly known as the Cartesian worldview. We spell out the limitations of dualist approaches to explaining the changes that take place during technology appropriation and propose to rethink appropriation on a non-dualist foundation that we find in Heidegger's work.

Technology Appropriation in the IS Literature

Textbooks in Information Systems typically follow a fit logic (Goodhue and Thompson 1995) to describe the organizational introduction of technology and characterize it as a rational process with discrete steps (e.g. Stair et al. 2011; Turban and Volonino 2011). Typically these steps are: 1) an organization makes the decision to acquire or develop a new technology based on a rational matching of task requirements with technology features, 2) it then implements the new technology through roll-out to the user group (including testing, installation, training etc.), and 3) users finally decide to accept or reject the technology based on their own local assessments. The latter is the subject of typical user acceptance theories in IS (e.g. Davis and Bagozzi 1989; Venkatesh et al. 2003).

However, beginning with the much-cited work of DeSanctis and Poole (1994) there has been explicit recognition in the IS literature that technology introduction is a much less discrete and determinate process than this. These authors introduced the notion of technology *appropriation* to denote that users make technology their own in a time-extended process of adaptation, whereby both the technology and individual and collective practices are changed. They saw this process as both a threat to the rational objectives of management captured in the notion of 'unfaithful use', as well as explaining the variance in outcomes. Consequently, literature in this tradition is typically concerned with theorizing appropriation outcomes while softening the determinism of earlier task-technology fit models (e.g. Dennis et al. 2001).

Concurrently, there has been a struggle in the IS literature to capture and explain the mutual changes to technologies and user practices that occur when new technology is appropriated. At the time, DeSanctis and Poole conceived of technology as inscribing social structures in its features, which are subsequently changed through use, non-use, or changed use. On the other hand adaptation of user practices was seen to occur "when the technology structures become shared, enduring sets of cognitive scripts" (DeSanctis and Poole 1994, 128). Accommodation between these two changing entities is then achieved through a process of *structuration* (Giddens 1984) in which a fit or alignment (Majchrzak et al. 2000) is achieved between social structures inscribed in the features of the technology and social structures reproduced in organizational action. However, this approach has been criticized, for example for inscribing uses into technology features (e.g. see Jones et al. 2004). Others have responded to these criticisms by locating technology structure somewhere between the technology and the user, for instance as relational affordances (Markus and Silver 2008) or in use practices (Orlikowski 2000).

The Cartesian Framing of Existing Appropriation Literature

Evident in the above approaches is an inherent dualism between technology on the one hand and users on the other hand, commonly referred to as the Cartesian worldview (Orlikowski and Scott 2008). The Cartesian worldview comprises a set of beliefs that have entered everyday and scientific ontological understanding and underpins, at least implicitly, mainstream research in the Information Systems discipline (Riemer and Johnston 2011). While French philosopher Rene Descartes' seminal work (1644, 2010) was influential in founding the Cartesian tradition, a range of other influences (e.g. Hume 1740, 2009) have contributed to its proliferation (for a review see Scada 2004). The Cartesian worldview rests on a dualism that places human subjects vis-à-vis an 'external' world that is populated by objects. On this view, humans take in this external world via their bodily senses and hold in their mind an internal

representation of the (objects in the) world. Hence, the Cartesian worldview posits a mind "in here" reflecting on, and directing the body to act upon, a world "out there". It is the mind that turns the external world of initially meaningless substances into the meaningful world that we experience. Consequently, the underlying ontological foundation of this world-view is that the world consists of independently existent things with properties (Bunge 1977; Weber 1997); even humans are conceived in that way, as minds with mental attributes such and goals, beliefs and attitudes (Weber 2012, 2).

Existing approaches in the technology appropriation literature draw on this dualist, cognitivist worldview. It is common in this literature to conceive of technology as bundles of functional or symbolic features. Hence, despite rhetorical devices suggesting that technologies change ontologically as a result of appropriation, e.g. from technology-as-designed to technology-in-practice (Orlikowski 2000) or technology-in-use (Carroll et al. 2002), technology change is severely circumscribed by conceiving it in terms of reconfiguration of the inherent (designed) features. On the other hand, practices are typically described in terms of user beliefs and attitudes or management goals and thus in essentially cognitive terms. Changes to practices then become changes to internal user representations of feature-use, such as cognitive scripts (DeSanctis and Poole 1994) or behavioral templates (Orlikowski, 2000 quoting Barley 1988), which are juxtaposed between technologies as features and users as minds. Under this appropriation logic, change is caused by the 'appropriation moves' of users, while technology merely presents 'structural potential' or 'affordances' upon which users can draw (DeSanctis and Poole 1994). Similarly, others have characterized appropriation as resulting from user activities of exploring and tailoring systems features (Stevens 2009, Draxler et al. 2011).

Challenging the Dualist Ontology underpinning Appropriation

We argue that the dualist understanding of technology appropriation is limiting in that any changes occurring have to be attributed to changes in either the technology object (via changes to its properties or features) or in the user subject (via changes to internal representations, such as cognitive scripts). It is important to emphasize that while appropriation studies aim to explain changes to organizational practices, an authentic articulation of the notion of "practice" requires a break from dualist thinking (e.g. Reimers et al. 2010a; Schatzki 2002) to capture the ontological co-constitution of the material and social aspects of practice. Moreover, we argue that such dualist accounts fail to capture: 1) changes to the technology as experienced by users (what technology becomes in practice, its meaning in the user world); 2) technological agency, as appropriation is typically attributed to the users as the causal agents of change; and 3) how appropriation of new technologies makes the world intelligible to users in new ways.

To address these problems we propose in this paper a theory of appropriation built over the non-dualist ontology articulated by Heidegger in Being and Time (1927; 1962). Heidegger's analysis of equipment proves useful for this enterprise because: 1) it offers a holistic ontology that already implicitly underpins contemporary non-dualist accounts of practices (Reckwitz 2002; Schatzki 2002) and the emerging sociomateriality literature in IS (Orlikowski and Scott 2008), 2) it offers a detailed account of human everyday engagement with material entities, 3) it decenters humans as the locus of agency (so called post-humanism (Pickering 1995)), 4) through its notion of 'ways of being' it allows for an ontological change of material entities in use, and 5) it encompasses the role of equipment in giving meaning to entities and events in the world.

Although Heidegger's work has been used in IS previously, his equipment analysis has not yet been exploited as an analytical framework for explaining technology appropriation. Some studies have mentioned Heidegger's notion of equipment loosely (Dourish 2001; Introna 1997; Turner 2005; Winograd 1995; Winograd and Flores 1987) and others have appropriated related concepts from Being and Time, such as his notion of being-in-the-world to outline situated action (Dourish 2001), humanness (Porra 1999), management in practice (Introna 1997), and mood (Ciborra and Willcocks 2006).

Heidegger's Phenomenological Analysis of Equipment

In outlining Heidegger's analysis of equipment we draw on Heidegger's original work (1927; 1962) and the work by Berkeley Heidegger scholar Hubert L. Dreyfus, in particular his 1991 commentary and his 2007

lectures (Dreyfus 1991; Dreyfus 2007), as well as selected further secondary sources (Blattner 2006; Dreyfus and Wrathall 2008; Harman 2010; Taylor 2006).

Ways of Being

The traditional topic of ontology has been to elaborate and categorize the *kinds of entities* there are in the world (e.g. Bunge 1977; Weber 1997; Weber 2012). Heidegger's innovation in Being and Time is to ask an entirely new question: what are the *kinds of ways* that entities can be in the world?

Heidegger argues that this question can only be answered by first examining the peculiar way of being of that entity for which being is an issue. This being Heidegger calls *Dasein*. For Heidegger the way of being of humans (Dasein) is *engagement in practices*. The unique mode of human existence is to be such-and-such by doing such-and-such. For instance, a doctor not only practices medicine but is a doctor *because* s/he practices medicine. It is important to note that Dasein is not an individual person who gives a mental account of his/her own experiences. Dasein denotes the being of humans, whose mode of existence is distinct from that of other entities, namely to be engaged in social practices that at the same time constitute what they do and who they are. As such, Dasein is fundamentally social ("Dasein's being is being-with" Heidegger 1962, 160); for example, one can only become a doctor in an already existing medical practice.

Heidegger then defines two other ways that entities can be on the basis of how they show up for Dasein in the course of such practices. The first way of being he calls *ready-to-hand*, which means that the entity is encountered in fluent use as a means for a practice. A carpenter who is engaging in hammering encounters a hammer not as an object with properties, but as ready-to-hand *equipment* both for doing what carpenters do (hammering nails) and for being what a carpenter is (a craftsman). On the other hand, an entity may show up for Dasein as *present-at-hand* when it is encountered in a more distanced reflective way (for instance, as objects of curiosity, in a first encounter, when giving an account of them, and when attending to their construction). In this case the entity is an *object* of attention which makes its presence known through its properties rather than through its use in practices. Heidegger shows through a series of careful analyses of every-day phenomena that each of these ways of being has a characteristic structure.

The Structure of Equipment: Holism

The structure of equipment is a referential holism. In our everyday dealings we do not encounter equipment as (a collection of) objects with properties but as a means, or what Heidegger calls an *in-order-to* (Heidegger 1962, 98). In use a hammer is not encountered as a wooden shank with a metal blob but as a 'to-put-nails-in'; a word processor is not seen as a software artifact with a set of features but encountered practically as a 'to-write-letters', 'to-capture-ideas', 'to-edit-a-memo', depending on its place in different practices. Because the being of equipment is what it is *for*, it follows that it cannot be defined except in relation to a use context. First, equipment always bears for what it is on other equipment with which it is used. A hammer can only be understood when one is already familiar with nails and wood and the ways they are used in building houses from wood. Secondly, equipment is always implicated in a practice and draws its particular in-order-to from a chain of practical assignments, an involvement in the *towards-which* of the task at hand and the *for-which* of the practice (Heidegger 1962, 115). We will refer to this structure as the *for-structure* of the equipment holism. For example, the particular being of a word processor as equipment arises from its place in the chain of assignments in a particular practice (*in-order-to* write a letter, *for* making a customer offer, *towards* securing a contract). Finally, the ultimate *for-which* of this chain Heidegger terms the *for-the-sake-of-which*, the bearing that equipment has on enacting a particular identity of Dasein. In the above examples the for-the-sake-of-which might be 'to be a carpenter' or to 'be an office clerk'. The for-the-sake-of-which is not simply a goal or purpose but an identity that is ultimately possible only against certain established and inherently social practices.

These three aspects of the equipment holism - the in-order-to of equipment, its place among other equipment and local practices, and its ultimate connection to Dasein's identity can be thought of as the parts of the equipment holism. At the same time they can be thought of as dimensions of the practice (Reimers et al. 2010a) since, for Heidegger, practice and equipment denote the same holism looked at

from different angles. The structural relationships of these parts of the holism are defined by the for-structure. These relationships are not causal (relations between properties of things) but constitutive (dependencies between entities for their very constitution as such). Moreover, the references in the for-structure are circular. Constitutive of Dasein is to have practices. Practices depend on equipment for their performance. Therefore, Dasein as the human way of being depends on equipment. But the being of equipment depends on practices and therefore on Dasein, closing the loop. This circularity of reference shows that equipment (and hence practice) is a holistic socio-material entity and that it has material, practical and social dimensions that are constitutionally entangled in the way envisioned in so-called sociomateriality studies (Barad 2003; Orlikowski and Scott 2008).

The Structure of Objects: Properties

When entities are present-at-hand as objects of attention they show up as bundles of properties. Thus their structure is a characteristic set of properties. The extreme case would be the independently existent things of the Cartesian worldview, completely defined by properties that do not depend at all on use context or on characteristics (activities, attitudes, intentions) of the observing subject. This contrasts sharply with equipment which when most genuinely in use is not present as properties at all and cannot be separated from its use context at all.

Between these two extremes Heidegger defines another condition of equipment; *unreadiness-to-hand* (he never gives it the full status of a way of being). The fluent, transparent use of equipment may be interrupted by some form of "breakdown" (Harman 2010, 19; Winograd and Flores 1987, 36) such as failure of the equipment or a change in the task context. The equipment then shows itself conspicuously and some level of reflection is required to resolve the problem. In situations of breakdown equipment becomes *unready-to-hand*. Unreadiness-to-hand is encountered in other situations also, such as during learning when the user is acquiring the skill necessary for being involved with equipment in an absorbed way.

Under normal circumstances objects are unready-to-hand rather that completely present-at-hand. Dreyfus (1991) argues that when equipment becomes conspicuous, what shows up initially are certain *aspects* of the use situation that are relative to the task and relative to our involvement in the referential whole, such as 'the hammer is too heavy' or 'the software is too slow'. These are not properties of the tool, because properties are meant to be independent of a situation. If the tool is obstinate (so the situation cannot be repaired in a routine way) these aspects take on more of the character of properties of the tool itself, but only in a completely detached mode of reflection (such as scientific observation) would they become fully independent of human experience of the object.

Heidegger points out that it is only through our (tacit) experience of equipment ready-to-hand in practical activity, and through subsequent breakdown where aspects become conspicuous, that the properties of objects could be intelligible to us at all: if the being of objects were completely defined by context-independent properties, these properties could not have practical meaning for us. This is what we experience when we find archeological artifacts that are clearly 'designed', but for which we have lost the practical context to discern what they are *for*, and hence what they *are* (e.g. Preston 1998). Thus, on the basis of intelligibility (which is the basis of Heidegger's ontology) even present-at-hand objects draw for their being on a background of concernful practical engagement in the world (Dasein).

The Structure of Dasein: Being-in-the-world

The way of being of Dasein is practical engagement in the world, which is at once what Dasein *does* and what Dasein *is*. These engagements of Dasein (dealings with equipment, relating to others, even reflecting) constitute Dasein. Heidegger denotes this as *being-in-the-world* to capture that Dasein is always involved with the entities that make up the (material and social) world and, at the same time, this very involvement is what makes Dasein a particular way of being, distinct from the being of other entities (objects and equipment).

Heidegger shows that every involvement of Dasein with the world (each instance of being-in-the-world) has a common three-fold structure. First, Dasein is always *already-in* the world or thrown into involvement: Dasein is always coming from somewhere and thus brings some motivating perspective

(Schatzki 2010) to every engagement. The consequence is that any dealing with the entities in the world (equipment or objects) is given meaning by the background of existing (historical) social practices (Taylor 2006). Second, Dasein is always *already-amidst* the world, meaning that Dasein is always implicated in the world and cannot stand outside the world and view activity from nowhere. This follows from the conception of Dasein as the being that actively uses the world (as equipment) rather than as an object of detached reflection. Thirdly, Dasein is always *already-ahead*, projecting into the possibilities of the world. This is because use of equipment by Dasein is always directed forward to a for-the-sake-of-which. Table 1 summarizes our outline of Heidegger's ontology.

Table 1. Overview of Heidegger's phenomenological ontology		
Being	**Way of Being**	**Structure of Being**
Dasein is the being of humans	The human way of being is concernful *engagement* in practices.	*Being-in-the-world*: Dasein is always *already-in* the world (past), *already-amidst* the world (present), and *already-ahead*, projecting toward possibilities of the world (future)
Equipment is the being of entities encountered by Dasein in use	The way of being of equipment is to be *ready-to-hand*; withdrawn from experience as a means (*in-order-to*)	*The for-structure*: Equipment is a referential holism with other equipment, practices and social identities
Objects are entities that are encountered by Dasein through attention and breakdown	The way of being of objects is to be *unready-to-hand* as an object of reflective attention, or *present-at-hand* as an object of detached analysis.	*Properties*: objects are bundles of defining aspects/properties

A Phenomenological Theory of Technology Appropriation

Assume initially that a person in a trade or profession encounters a technology that s/he does not yet use as part of the trade or professional practice. According to Heidegger's ontology this technology is encountered as present-at-hand against this practice. The implication is that the entity will be encountered as a bundle of properties, not as an independently existent thing of the Cartesian worldview, but on the basis of already having a practice-motivated perspective for the encounter (*already-in the world*), in a practical and involved way in a situation (*already-amidst*), and with an orientation to the potential use of the technology as equipment for the practice (*already-toward*). Even as the entity is inspected as an object with properties, this inspection is oriented against the background of the practice and its equipment, which influence what properties show up for the potential user. On the material dimension, bodily comportment toward the object will derive from existing skills with equipment and potential uses will be derived from (or in contrast to) the affordances of existing equipment. It will be judged as to whether it feels 'right' against expectations of the practice. At the same time it will be evaluated against a set of logics about what it could be used for compared to existing equipment expressed in the sayings and doings of the community of practice. Finally, it will be evaluated as to whether its use is appropriate against norms of the practice and whether it is consistent with the person's occupational or professional identity. We should note that, as a corollary, the technology will equally not be encountered by the person through the properties it has for its designers or promoters.

On the other hand, if the entity is fully accepted and becomes equipment for the person's practice it has become ready-to-hand. This means that it is no longer generally an object of attention. It is used fluently and transparently without cognitive effort. It has a place among other equipment and uses expressed in the sayings and doings of that practice (Schatzki 2002). It is 'proper' to the practice and it reinforces the professional identity. As a result it withdraws into the background of the practice holism and is not generally a focus of attention (even though it can be). Thus, appropriation of a technology can be conceptualized in Heidegger's ontology as a change in the way of being of the technology from present-at-hand to ready-to-hand. The technology becomes a normal and a taken-for-granted part of the practice, familiarity with which is assumed for being an authentic member of the practice.

But as a result of now being part of the equipment holism (the equipment for-structure), it is also part of the world that the person is already-in, and with which they are pressing into future possibilities. Thus, it is part of the holism of equipment, practices and identities that renders intelligible other encounters with

entities and events. Consequently, appropriation of the technology can also (and equivalently) be conceptualized as a move from the foreground (as something to be give meaning) to the background as a taken-for-granted part of what gives meaning within the practice. We can say it takes part in 'performing', as both a means of the practice and as a source of intelligibility for the practice (Barad 2007).

Dimension	Activities that unfold over time in appropriation		
Table 2. Summary of our phenomenological theory of appropriation.			
Human engagement	**Inspecting**	**Place-making**	**Performing**
Way of being of technology	Present-at-hand	Unready-to-hand	Ready-to-hand
Being of technology	Object	Tool	Equipment
Place in practice	Fore-ground	Middle-ground	Back-ground
Material Dimension	Object properties are inspected using existing skills and expected affordances	Acquiring the skill to use the tool. Discovering what the tool affords	Equipment withdraws from attention and becomes a means
Practical Dimension	Object is inspected against equipment and understandings of the existing practice	Placing the tool among other tools and within the logics of the practice	Equipment has a place among other equipment and practices
Social Dimension	Object is inspected against existing projects and social norms	Making the tool proper in the practice. Placing the tool in social identity production	Equipment is normal and part of social identity

Intermediate between these two situations, the technology is an object becoming equipment, a tool looking for a place in the practice. Its way of being is captured in Heidegger's ontology as unready-to-hand. It has not yet withdrawn to the background of the practice but is no longer in the foreground as an object of reflection: it is in a certain middle-ground. The person's comportment toward the technology can be characterized as 'place-making' which we see as an actively performed kind of sense-making (Vidolov and Kelly 2009; Weick et al. 2005). A skill for using the technology is being acquired and its affordances (its in-order-to) are being discovered by active embodied experimentation; its place in relation to other equipment (its for-which) and in the logics of the practice (its toward-which) must be similarly discovered. It must be placed as socially appropriate against the norms and identities of the practice (its for-the-sake-of-which). However, these activities are no-longer simply evaluative, nor are they primarily cognitive or discursive as in Weick's notion of sense-making (Vidolov and Kelly 2009), but involve embodied activity that disrupts the existing equipment holism, changing socio-material practices as well as the being of the new and of existing technology. It is for this reason that we think the image of *actively performed place-making* is appropriate to characterize technology appropriation, as the existing practice and equipment holism must make room to accommodate the new technology. Table 2 summarizes our theory by analyzing the appropriation phenomenon along six dimensions based on the arguments presented above. The inclusion of practice-oriented and social dimensions indicates that the analysis differs markedly from familiar dualist and cognitively-oriented folk interpretations of this familiar phenomenon.

A Case Study for Illustrating our Theory

In this section we present a case study of social media appropriation at a large international consultancy business, which will allow us to illustrate our theory. The technology in question is Yammer, described by the company Yammer Inc. as "a tool for making companies and organizations more productive through the exchange of short frequent answers to one simple question: What are you working on?". Yammer is typically described as a platform for online social networking through exchange of short messages, termed enterprise microblogging (Zhang et al. 2010).

Research Methodology

Research on technology adoption and acceptance typically has to rely on user accounts, mostly through interviews and surveys, either in anticipation of, or after a technology has been accepted. Having to rely

on already interpreted accounts of the phenomenon as provided by interview subjects brings with it a range of typical epistemological problems that are at the center of much of the methodological discussions in the IS discipline. Essentially, such data does not allow researching the actual appropriation phenomenon as it happens at the time, but only what people think might happen when questioned beforehand, or their post-hoc interpretations of what happened at the time.

Against this background, researching communicative social media, such as enterprise microblogging, brings with it an exciting new methodological opportunity: social media platforms capture all user conversations that they enable, stored as messages on the platform. This includes those messages where users engage in conversations about the new technology itself and their experiences of it. Hence, in contrast to orthodox adoption research these self-referential messages offer a unique opportunity to undertake a phenomenological analysis of the very activities users engage in while appropriating the new technology into existing practice. Rather than having to rely on time-removed, indirect accounts of the phenomenon provided through interviews, we are able to analyze the appropriation phenomenon as it unfolds. This allows more authentic access to the phenomenon and avoids the methodological and validity issues associated with indirect user reportage. In fact, access to such data is essential for what we want show, as we are precisely interested in the changes to the way of being of a new technology over time, its active placing into the practice, and its emerging position within the practice (background). It is for this reason that we use the existing user messages as our sole body of data and chose not to carry out user interviews.

Our data was captured (Riemer et al. 2012) at a time when Yammer was not only new to the user group, but the entire idea of enterprise microblogging and social networking in the workplace was novel. This makes our case particularly revelatory for studying appropriation because people in our case at the time did not adopt a product on the background of an already well-established communication practice that they were familiar with from other contexts. We are thus able to study appropriation of a genuine technology innovation. In fact, the general practice we know today as Enterprise Microblogging emerged only later over time.

Case Company

Yammer Inc. launched its platform in September 2008. The service is organized using the concept of networks, with one network typically representing one company. Anyone can create a network for their company by registering with their email address on the platform. New users can join simply by registering with their corporate email address, which serves as their identifier. The focal element of the Yammer web frontend is a user's personalized message stream. Like Twitter, Yammer is based on the "follower" principle i.e. users can choose who they follow.
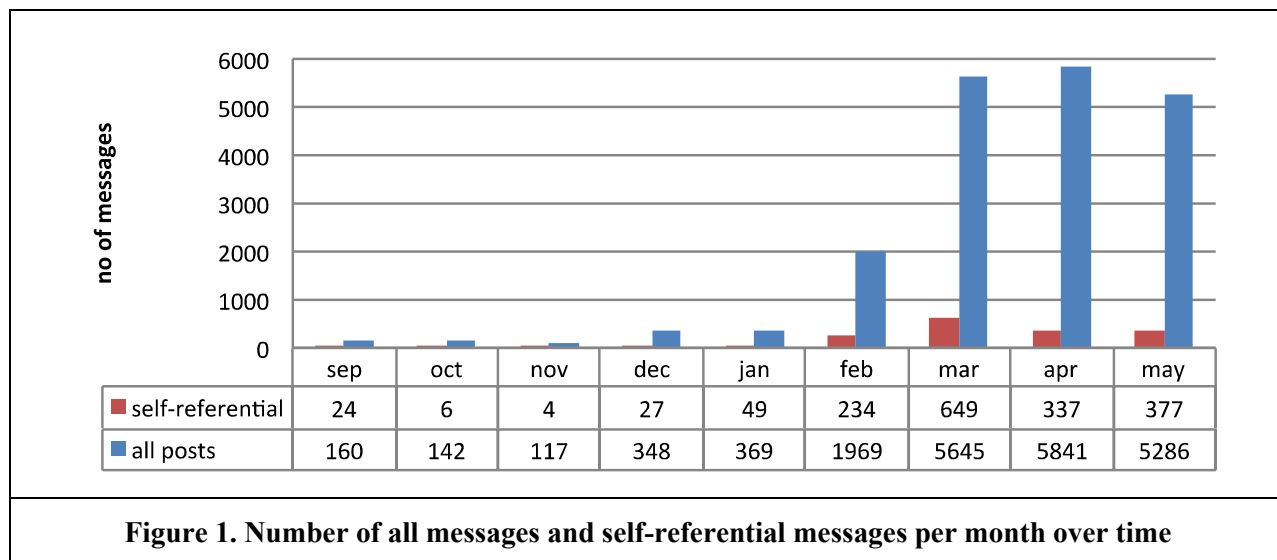
Our data comes from one of the largest Yammer company networks. Our case company is a large international consultancy business operating world-wide engaging in typical consultancy projects with and for clients. In September 2008 a small group of consultants started using Yammer. In the first few months, the number of users grew rather slowly. In February 2009, only about 300 Yammer accounts were counted in the network in total. Shortly after, the *critical mass point* (Markus 1987) seems to have been reached, with user numbers growing rapidly from March 2009 onwards with new registrations of more than 500 per month. Within one year the number of accounts was nearly 6,000.

Data Sampling

Our analysis is based on a sample drawn from the full set of messages provided to us by the company in Microsoft Excel format. To ensure confidentiality, all identifying information (user names and client names) had been removed prior to handing over the data. Yammer messages consist of metadata such as message ID, a reply ID, a thread ID, a user ID and the content of the message. Each message is either a reply to another message that inherits the thread ID of this original message, or it is a new message commencing a thread with a new ID. Thus thread IDs can be used to capture conversations consisting of multiple messages. For our study we are only interested in conversations concerned with Yammer itself, posts that in one way or another are self-referential in their concern with Yammer and its appropriation. Hence, a sample was drawn using a set of keywords (e.g. as yam, Yammer, yamming, reyam and so forth)

identified from a preliminary analysis of a subset of the data and validated by sample testing (Riemer et al. 2012). The sample includes all messages of all threads where any message contains at least one of the keywords as a single word, a word stem or, part of another word. Filtering at the thread level preserves communication context and coherence; the resulting threads were then ordered by time for coding and content analysis.

Our sample had been derived as part of an earlier study we undertook prior to developing our theory, which focused quite narrowly on the types of messages users exchange during technology appropriation. In the following we will draw on some of the analyses undertaken for this previous study (Riemer et al. 2012), but also carry out further analyses of the sample data specifically concerned with illustrating our theory. For the earlier study a design decision was made to analyze Yammer self-referential messages covering the period from the creation of the network until two months after the tipping point was reached (September 2008 to May 2009). This period is appropriate for our purposes as it captures the crucial months in which members of the company actively engage in accepting Yammer into company practice (see figure 1).

	sep	oct	nov	dec	jan	feb	mar	apr	may
self-referential	24	6	4	27	49	234	649	337	377
all posts	160	142	117	348	369	1969	5645	5841	5286

Figure 1. Number of all messages and self-referential messages per month over time

Data Analysis

Coding and analysis of Yammer messages was carried out with the aim to learn about the kinds of messages people send as part of technology appropriation. Accordingly, each message was coded regarding the purpose it serves as part of appropriation. Much like in communication genre analysis, such codes are not imposed top down but identified from the ground up through the qualitative analysis of the "...socially recognized communicative purpose" (Yates et al. 1999, 84) of each single message interpreted against the background of the overall case. From this analysis, patterns in the form of conversation types emerged. Determining conversation types was constantly recursive and reflexive with an aim of being "...systematic and analytical but not too rigid" (Altheide 1996, 16). The data was coded by one researcher with a second researcher acting as a discussant and analyst in a confirmatory role. Iterative recoding continued until both researchers agreed on the outcome. In total, 5,411 messages were analyzed. 1,706 messages were included in the analysis as being concerned with appropriation, with 2,079 codes assigned (some messages serve more than one purpose). Five message categories emerged from this analysis (see table 3). The distribution of these categories over time is plotted in Figure 2 to show quantitative changes in appropriation-related user communication. Please note that we treat the timeframe from September to December 2008 as one period, as there were very few messages, distorting proportional presentation.

The second step in our analysis was to code the data at the thread level. We analyzed all threads in which discussions among a group of users unfolded, excluding all single messages and simple two-message question and answer exchanges. This step complements the analysis at the message level as we are able to capture the social nature of appropriation-related communication. First, we noted in a table the main topic(s) covered in each thread; second, we determined the nature of the conversation in relation to our

theory (as inspecting, place-making, performing); third, we coded the thread in relation to the dimension of our theory framework (material, practical, social); and finally, we interpreted each thread to locate Yammer within the conversation (foreground/background).

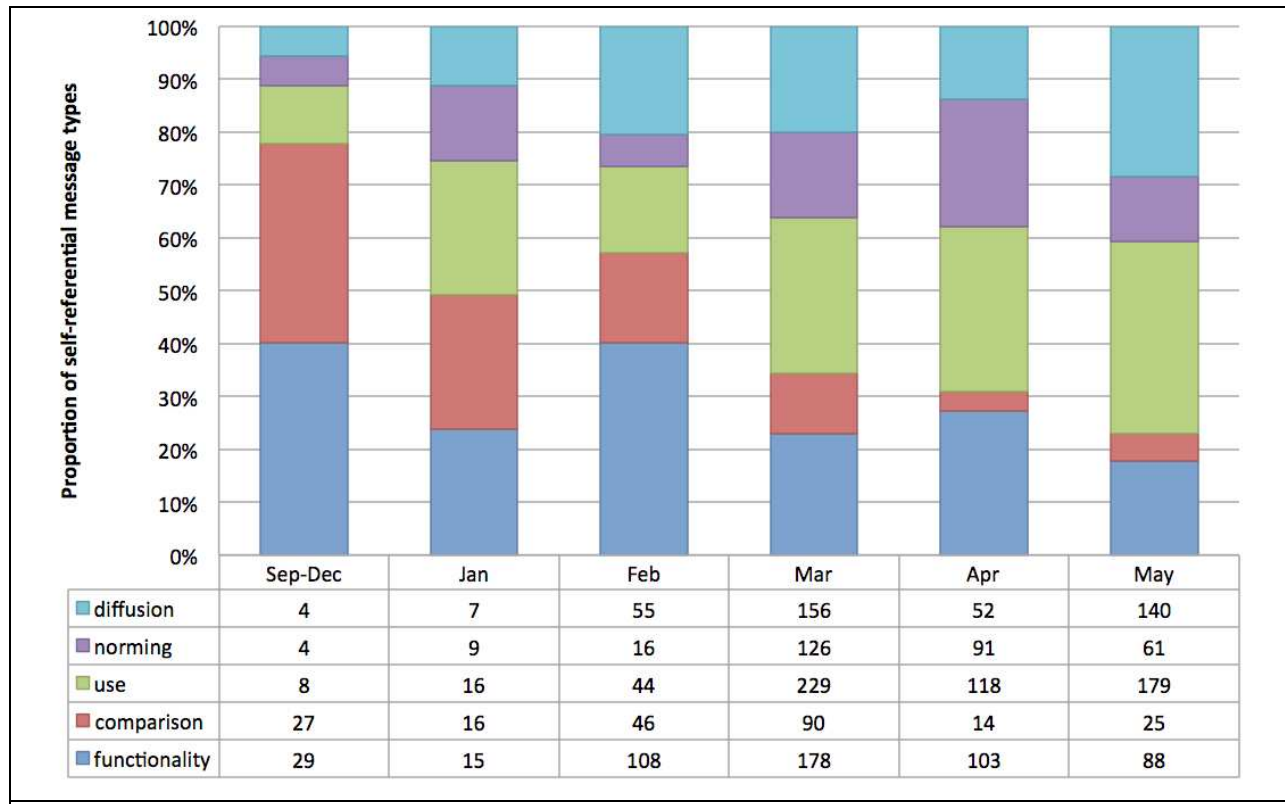| Table 3. Message categories emerging from coding at the message level		
Message type	Description	Example
Functionality	Users ask questions about Yammer features in positive, negative or informing ways, while other users respond to assist.	*"how can I let Yammer make a sound whenever someone does a post?" (28/09/08)*
Comparison	Users compare Yammer to other technologies they are already familiar with (positive or negative or merely informative) or ask questions regarding comparison of Yammer.	*"So this is like a cross between Chatterous and Twitter with a couple of extra 'corporate' features - like the org chart. I think Laconica looks more interesting..." (10/09/08)*
Use	Users envision, share, discuss and scrutinize ways of using Yammer and the emerging benefits and risks they see.	*"Think of Yammer as a way of chatting with your colleagues when hanging around the coffee machine - even though you may be working at a client location or from home" (13/02/09)*
Norming	Users engage in discussions about appropriate language, which content to post in Yammer or how to use it more generally; they also observe 'non-compliant' behavior.	*"Welcome all new Yamsters (or whatever we're supposed to call ourselves!) (...) As we've had many new joiners recently, ... it seems a good time to mention the one Golden Rule: (...) please do not publish anything here that is strictly company confidential." (23/02/09)*
Diffusion	Users discuss ways to initiate, manage or support Yammer diffusion to get more users on board, or ask for assistance in promoting Yammer within the company.	*"i am just composing newsletter (...) about joining Yammer (...) so let's see maybe we will see more german folks here yamming:-) (10/04/09)*

	Sep-Dec	Jan	Feb	Mar	Apr	May
diffusion	4	7	55	156	52	140
norming	4	9	16	126	91	61
use	8	16	44	229	118	179
comparison	27	16	46	90	14	25
functionality	29	15	108	178	103	88

Figure 2. Distribution of self-referential message types over time

Findings

Drawing on the data from the two steps of our analysis, in this section we present our findings. Our analysis of the technology appropriation phenomenon in a real case, using first-hand data, will allow us to illustrate our theory and expose the structure of the technology appropriation phenomenon. We will use the changes in the nature and frequency of appropriation-related messages and conversions as evidence of changes in the nature of the technology against the practice and changes of its place in the practice. In doing so, we will demonstrate how appropriation of Yammer in the case company unfolded, evidenced by how user conversations change over time displaying the activities outlined in table 2. Finally, we will show how Yammer moves from being an object requiring reflection against the background of existing practices, to become a taken-for-granted part of an emerging practice in the background, lending meaning to other aspects in the practice foreground as they are present in conversations in our data sample.

Encountering: Inspecting Yammer against existing Skill, Practice and Tools

When the new technology is first encountered by the group of early adopters it is evident from our data that it is being inspected and judged as an object against existing practice. Almost 80% of all messages in the first few months and at least half of all messages until February 2009 are classified as functionality or comparison (see figure 1). Within the threads people scrutinize the features of the new object *("Looks like there's no opportunity (yet) to link with 3rd party feeds"* 11/09/08) and compare it with other tools that they already use and know (*"internal twitter eh?"* 18/09/08). Consistent with our theory, in these statements Yammer is clearly the object of interest in the foreground encountered through its features about which statements are being made in comparison to what is already used and known (*"always wondered the added value of a business twitter. the low activity here tends to prove that the value is low..."* 01/12/09).

Place-making: Actively Making Room for Yammer within the Practice

In February 2009 we find evidence of people increasingly using Yammer (see number of all posts in figure 1) and beginning to actively place the new tool within their practice. This is reflected in the distribution of message categories: self-referential messages peak in March (figure 1), "use" takes over as the largest message category (figure 2), capturing instances where people exchange ideas for using Yammer and share their experiences. We find further evidence in the discussion threads for place-making along all three dimensions of our theory (see table 2):

Firstly, we find evidence that people actively engage in learning, as they ask for help or share useful tips once they figure out how to work the new tool *("Anyone know how to update a group description? (...) I can't see where to change this"* 10/03/09). Moreover, they share emerging affordances as they put the tool to use (*"you can (if you wish) set group to 'private' - which might be worthwhile for a project."* 06/03/09).

Secondly, people further engage in place-making as they incorporate Yammer within the 'toolbox' and logics of the practice. In doing so, Yammer is no longer just judged against the background of what is already known, but is placed side-by-side existing tools in order to discuss their respective emerging roles. We first find evidence for this in the middle of February 2009: "*Office Communicator is a fundamentally different concept to Yammer. GIMS is IM, not "microblog" – it's audience, range and purpose are different."* 12/02/09). Subsequently, a large number of conversations emerges that engage in placing Yammer in the logics of the company practices (*"Yammer has already proved itself a great way of establishing new contacts. (...) If I need a more real-time conversation with my new-found contact, I can do so via telephone or IM. If I need to swap sensitive information - or just have a lot to say asynchronously, I can use email."* 08/03/09), envisioning how it might link up with the purpose of the consulting practice and the benefits it might yield: *"Some thoughts on how to put yammer to good use in a business:* [Link to online blog post removed]*"* (14/03/09). Furthermore, we find evidence that enrolling Yammer into company practice is not just finding, but actively *making* a place for it, in the course of which other tools change their roles as well. For example, in a conversation in April 2009 it becomes obvious that the company wiki takes up the new role of capturing worthwhile themes emerging in Yammer conversations, while in a conversation in May people discuss ways in which email changes with

the arrival of Yammer in the practice (*"I propose discontinuing email list, and use yammer groups instead. People will get less email pushed to them, and will be able to join any conversation they like. Less emailing, more yamming?"* 05/05/09).

Thirdly, we find evidence of place-making in the social dimension with people negotiating norms and rules for 'proper' tool use and making Yammer 'their own'. The distribution of message categories shows a strong peak in norming-related communications in March and April (see figure 2). In March a group of users begins to jointly create a set of normative rules in the form of a "Code of conduct", which takes place in a wiki with Yammer capturing the accompanying discussions. This norming communication is an essential part of place-making as it establishes a joint understanding of "what one does" within the emerging Yammer practice (*"Should we have a list of things people should do e.g. you should engage, you should ask the group for help, you should talk about your role in [the company], you should be constructive in any criticism etc. something akin to the rules of a barcamp"* 11/03/09). Similarly, users increasingly engage in diffusion-related communication as they try to get others to join the emerging practice and exchange ideas for how to promote Yammer within their local groups (figure 2). Actively promoting Yammer contributes to placing the new tool within the wider company practice and is evidence that users begin to consider Yammer as being "for us". Moreover, we find evidence that people engage in inventing new language for talking about Yammer, e.g. coining the term "Yamming" which subsequently appears on a frequent basis when referring to the emerging practice of Yammer use. This is equally evidence of taking ownership of the new tool. Furthermore, we find increasing evidence that Yammer is being officially welcomed within the company, contributing to a sense of social appropriateness: *"I get the feeling from my team's better take up rate for Yammer rather than Twitter that the "official sanction" of a [company] specific tool means they are more comfortable in using this at work."* (04/03/09) Finally, we find many short conversations in which users help newly joined members to get acquainted with Yammer. Such a form of apprenticeship is further evidence of people taking ownership and making Yammer part of the social fabric of the company.

Performing Meaning: Intelligibility on the Background of Yamming Practice

As Yammer is taken up in everyday use and finds its place in the company practice, it begins to withdraw from discourse as an object. Evidence for this is provided in figure 1, where messages in the comparison category almost vanish at the end of the study period, while in total messages that treat Yammer as an object (functionality and comparison) drop to around 20%. At the same time, a closer look at messages in the functionality category reveals that in later months these messages are mainly concerned with assisting newly joining users in getting acquainted with Yammer, but only rarely contain the kinds of judgments found at the beginning of the study period.

More important for our argument is that Yammer starts showing up in the background of conversation threads, where the newly emerging Yamming practice lends intelligibility to the issues being discussed in the foreground. At the beginning of April we find first evidence of such conversations. For example, when people discuss if one should limit message length to 140 characters an existing Yamming practice is already implied in the discussion (*"Why can't people just be allowed to express themselves as they wish? I agree that brevity should be encouraged, but not that it should be imposed."* 03/04/09). Similarly, a discussion of how to have Yammer messages appear in Twitter is made on the background of existing Yamming practice (Q: *"H2 tweet from yammer?"* A: *"You can't tweet from Yammer but you can yam from Twitter."* 03/04/09). Further examples include a sense-making discussion of what to do when Yammer users leave the company (22/05/09), and a discussion about whether Yammer participation should be rewarded in company performance indicators (KPI). In all of these conversations Yammer is not the subject of conversation. Rather, the conversations take place on the basis of a now assumed familiarity with Yamming practice. Even the evaluation of Yammer features increasingly draws on Yamming practice, e.g. in cases where new Yammer features are launched: *"The [Yammer notification] email no longer lets you check out the person's Yammer profile - you get "follow"... and that's it. I don't like that."* (06/04/09)

Finally, we find evidence for Yammer being in the foreground of some messages all the way through our data set, since new users join the emerging practice all the time. However, those people who join Yammer later do not encounter an object in the same way as the early adopters. Rather they encounter a tool in

use, as traces of Yamming practice are already visible on Yammer: *"Just joined Yammer. Quite exciting stuff going around here!"* (21/04/09)

Performing the Practice: Yammer finds its Place in Performing the Practice

As Yammer finds its place in the practice users reflect on what Yammer has become, e.g. a means to share *"things I find (…) to bring to the attention of the community"* (27/04/09), and a means to *"share my findings on activities in different places in the group [and] on different topics with my colleagues (…) [and for] for gaining access to unstructured updates"* 16/04/09).

People further discuss what it is for, the role it assumes within the practice (*"Yammer is enabling you to know people from the whole globe based on their inputs often with even true cutting-edge ideas. You would have never been able to experience it, by just picking people from formal org structure"* 20/04/09, and: Yammer *"help[s] me achieve a number of things: create awareness of the initiative, establish greater communication, maintain momentum, gather ideas, share knowledge, ask questions, etc."* 27/04/09). As Yammer assumes these roles users express that Yamming practice is now an essential part of the company practice and its logics (*"Yes, it is all about sharing and inspiring! This is how we truly will differentiate us from the small local players and beat the other majors"* 16/04/09).

Finally, we find evidence that Yamming practice is now becoming a normal part of the daily life of consultants in the company (*"Conversations and interactions on Yammer are becoming essential and frequently used tool for many of us during work hours"* 24/04/09, in an online Blog post) and part of their professional identities as consultants (*"I cannot imagine any working day without being logged into Yammer"* 19/04/09). Moreover, it shines through in a number of discussions that users are heavily invested in their shared Yamming practice, which hints at a sense of ownership and "ourness", such as in this response to the idea of incentivizing Yammer participation in the KPIs: *"Yammer works because there is no KPI and because people have choosen to adopt the solution (bottom up) instead of a top down push"* (05/05/09).

In summary, it is evident from our data that Yammer becomes an integral part of the practice for-structure as users share explicit stories about what Yammer has become (its *in-order-to*), how it performs its role (its *for-which*) as part of fulfilling the practice (*towards-which*) and how it has become a normal part of being a member of the practice (*for-the-sake-of-which*). Overall, our analysis has shown that the appropriation phenomenon evident in the user conversations in our case corresponds with our theory.

Discussion: Place-making as a Second Order Practice

On the basis of our theory and the case illustration we can describe what happens when a technology is appropriated into a practice. The technology is first encountered as an object against an existing practice background. When appropriated it becomes equipment for the practice. This means that the technology finds a place in the equipment/practice holism and as such becomes implicated in how the practice makes further happenings intelligible. Equivalently, the technology through appropriation moves from the foreground (as something to be made intelligible) to the background (as a basis of intelligibility).

We have demonstrated that technology appropriation (the becoming of equipment) happens by way of what we have termed *actively performed place-making*. We have shown that appropriation as place-making is not a series of discrete decisions but extends over time as it disrupts an existing practice by way of active experimentation, conversation and negotiation. However, we do not want to characterize the "moves" from foreground to background as a *process* for two reasons. First, there is no clear-cut beginning to it. Practitioners will typically have some level of familiarity with this or similar technology prior to physical encounter and this contributes already to placing. Second, the becoming of equipment does not have any end point. It continues to influence further change through altered meanings that it provides as part of the new background. Additionally there is no traditional causal process chain expressed in our theory. Rather what changes is a set of mutually dependent constitutive relations that make up the equipment holism. The circle of mutually co-constituting parts of the for-structure is altered to accommodate the new equipment.

A causal description of the usual human-centered kind is challenged in this account in other ways. Place-making is a collective activity, which means the individual human is not the sole causal agent in this appropriation story. According to Heidegger's ontology, appropriation *always* has to be a social act because the for-the-sake-of-which of equipment is necessarily a social identity. Thus, it is always a *practice* that meets a technology through the individual agent. Consequently, our theory can equally be applied to individuals accepting technologies against general life-practices as well as professional communities appropriating a technology for specific professional practices. Finally, we have shown that, as well as being inherently social, appropriation also draws on material agency (Pickering 1995) because place-making depends on the material technology as much as on the social projects of the practice, which is to say that the equipment holism is inherently socio-material (as expressed in the equipment for-structure). Table 4 characterizes place-making compared to cognitivist/decision-oriented conceptions of change.

Table 4. Characteristics of technology appropriation as place-making		
Characteristics	Technology appropriation is not…	Rather, it is…
Active	… (simply) a cognitive interpretation of the technology	… actively making the technology a practical means for the practice
Practical	… (simply) learning how to use the technology	… practical experimentation and adjustments to find uses
Social	… an individual decision	… (implicitly or explicitly) a collective accomplishment
Becoming	… a one time or repeated decision to use	… extended in time because it involves disruption to practices
Ongoing	… a process with a definite start or end point	… it is a continuous becoming as the practice evolves over time
Holistic	… (simply) a reconfiguration of an individual technology	… a reconfiguration of the equipment (practice) holism
Identity producing	… (simply) making rules for its use	… finding its implication for a social identity or way of life

We conclude that while place-making might appear as a process with stages to an observer outside the practice (e.g. encounter, placing, performing), from within the practice (as captured by our data) place-making is best interpreted as a practice. This interpretation is consistent with our own theoretical tools. Our analysis of the case data showed that placing Yammer within the focal consulting practice occurs within the three dimensions outlined in table 2. However, the activities of place-making *itself* can also be seen to occur on these same three dimensions:

1. Place-making has its own material dimension: It involves actions (not just cognition), both manipulative and conversational as evidenced by the very existence of our data sample. Moreover, place-making involves embodied engagement and experimentation with the new tool, through which new skills are acquired and affordances emerge contextually.

2. Place-making has its own practical dimension: Place-making draws on its own equipment. In our case this occurs through the use of Yammer (in a self referential way) together with wikis and online blogs. Moreover, the place-making practice has its own logics, activities and stories. People engage in actively finding appropriate roles for the technology, the sharing of use stories, negotiating proper use (in the form of codes of conduct), observing emerging norms, activities of apprenticeship and assisting others, as well as actively promoting the new technology into the wider consulting practice.

3. Place-making has its own social dimension: There is a sense of involvement and identity with the enterprise of place-making, evidenced in the "movement" character by which members of the practice (the early adopters) associate themselves explicitly with the place-making practice as they take the initiative in actively promoting the new technology and enrolling further members into Yamming practice.

Thus, we conclude that place-making has the characteristic of a practice also. It is a practice concerned with changing another practice, which has been termed a second order practice (Reimers et al. 2010b).

Characterizing place-making as a practice also helps us to articulate practical implications of our theory. First, like all organizational practices, place-making can be cultivated. Organizations that have well developed generic technology placing practices will be better able to leverage emerging ICT technologies

to allow them to innovate and differentiate. Thus place-making qualifies as a strategic Dynamic Capability (Teece et al. 1997). Second, the dimensions we have used to describe the equipment holism suggest possible points of leverage, or roles, for facilitating an organizational place-making practice: 1) On the material dimension management can take the form of coaching or mentoring whereby users are assisted in developing skills and discovering emerging affordances through apprenticeship; 2) On the practical dimension management can take the form of promoting and facilitating by way of sharing stories about 'use cases' that emerge from within the practice to help others in placing the new technology; 3) On the social dimension management can take the form of policy-making for deriving and promoting proper technology use, and ambassadorship where management legitimizes and actively promotes the technology. Hence, an appropriate metaphor (Morgan 1986) for managing place-making is "lubricating", whereby users are assisted in "slotting into place" new technologies within existing practice. These ideas will have to be further explored in future research.

Conclusion

We use Heidegger's notion of equipment and ways of being to formulate a phenomenological theory of technology appropriation, which we apply to and illustrate with a unique data set from an empirical case of appropriation of a social media technology into a consulting practice. We demonstrate that when technologies are appropriated into practice they change their way of being from a present-at-hand object encountered as a bundle of features to a ready-to-hand means for the enterprise of the practice, captured in the Heidegger's holistic notion of equipment. Equivalently, the technology moves from being in the foreground as an object inspected against an existing practice background, to being implicated in the background where it takes part in making intelligible other entities and events in the foreground. We have characterized the way in which this transformation happens as a second order practice of actively performed place-making.

We contribute to the IS literature a new theory of appropriation. Our theory does not aim to expose a causal structure for explaining or predicting how appropriation leads to certain outcomes. Rather, it exposes the structures by which transformations happen at the ontological level. Thus it is a theory for explaining (Gregor 2006) how relationships of mutual constitution between entities change over time when new technology is accommodated into an existing practice holism through the sociomaterial practice of place-making. We further contribute to the literature by providing a detailed empirical case on appropriation as a rich illustration of the practice of place-making.

Against existing literature, our study contributes by exposing the time-extended and active nature of appropriation, which demonstrates that putting technology to use cannot be modeled as simple decisions of technology acceptance (cf. Davis and Bagozzi 1989; Venkatesh et al. 2003). We further clarify existing ideas about how technology changes ontologically in appropriation (cf. Carroll et al. 2002; Orlikowski 2000). In doing so, the holistic notion of practice, grounded in Heidegger's ontology, offers a way to capture change resulting from appropriation without the need to locate changes in the properties of one or other of the technology or the user entity (cf. DeSanctis and Poole 1994; Mendoza et al. 2010). Moreover, we demonstrate that the changes to practice are neither simply cognitive or discursive (cf. Weick et al. 2005), nor are they the sole result of human agency. Rather, place-making is always practical, socio-material and performative (Barad 2007), and as such contributes to a post-humanist understanding of agency (Introna 2007; Latour 2005; Pickering 1995). Given that Heidegger's work and the emerging stream of sociomateriality research (Leonardi and Barley 2010; Orlikowski 2010) share similar ontological commitments, our work represents a detailed worked example of a non-dualist and socio-material approach to the study of technology.

We further contribute to IS practice by exposing the workings of a place-making practice with a rich case study. As such, our theory and case illustration provide the basis for identifying effective points of leverage for facilitating place-making of new technologies into organizational practice. Further research is needed to derive more detailed guidance for managers who want to facilitate place-making practice. In the context of enterprise social media, our study contributes to unraveling the phenomenon of social media emergence, previously described as the self-organizing way in which social media appear in organizations (McAfee 2009), which has been treated as a somewhat mystical black-box so far. Our case study offers rich insight into this phenomenon by characterizing it as the result of successful place-making practices.

Our study is novel in various ways. First, we use Heidegger's for-structure of equipment and the three-fold structure of Dasein in an analytical way in an empirical study, which demonstrates the usefulness of his work in guiding research in the IS field. Second, we demonstrate the advantages of using the content of social media as on innovative methodology for studying its own appropriation. Finally, as a quasi by-product of our study we offer a novel account of how practices change.

Our research is bounded by the particular nature of our data set. First, we can only draw on conversations and place-making activities visible in the Yammer data set. Second, the data set does not allow accessing the phenomenon of readiness-to-hand, where equipment functions as a transparent means in the everyday dealings of the members of the practice. Having characterized technology appropriation in this way, future studies might complement such data with observational enquiries.

References

Altheide, D.L. 1996. *Qualitative Media Analysis* Thousand Oaks: Sage Publications.

Barad, K. 2003. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs* (28:3), pp. 801-832.

Barad, K. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.

Barley, S.R. 1988. "1988. Technology, Power, and the Social Organization of Work.," *Res. Soc. Organ.* (6), pp. 33-80.

Blattner, W. 2006. *Heidegger's 'Being and Time:' a Reader's Guide*. London: Continuum Books.

Bunge, M. 1977. *Treatise on Basic Philosophy: Volume 3: Ontology I: The Furniture of the World*. Dordrecht, Holland: D. Reidel Publishing Company.

Carroll, J., Howard, S., Peck, J., and Murphy, J. 2002. "A Field Study of Perceptions and Use of Mobile Telephones by 16 to 22 Year Olds," *Journal of Information Technology Theory and Application (JITTA)* (4:2), pp. 49-62.

Ciborra, C., and Willcocks, L. 2006. "The Mind or the Heart? It Depends on the (Definition of) Situation," *Journal of Information Technology* (21), pp. 129-139.

Davis, F., and Bagozzi, R. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management science* (35:8), pp. 982-1003.

Dennis, A.R., Wixom, B.H., and Vandenberg, R.J. 2001. "Understanding Fit and Appropriation Effects in Group Support Systems Via Meta-Analysis," *MIS Quarterly* (25:2), pp. 167-193.

DeSanctis, G., and Poole, M.S. 1994. "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory," *Organization Science* (5:2), pp. 121-147.

Descartes, R. 1644, 2010. *The Principles of Philosophy*. Whitefish, MT: Kessinger Publishing.

Dourish, P. 2001. *Where the Action Is : The Foundations of Embodied Interaction / Paul Dourish*. Cambridge, Mass. :: MIT Press.

Dreyfus, H., and Wrathall, M. 2008. *A Companion to Heidegger (Blackwell Companions to Philosophy)*.

Dreyfus, H.L. 1991. *Being-in-the-World : A Commentary on Heidegger's Being and Time, Division I / Hubert L. Dreyfus*. Cambridge, Mass. :: MIT Press.

Dreyfus, H.L. 2007. "Philosophy 185 Heidegger (Podcast)." from http://webcast.berkeley.edu/course_details.php?seriesid=1906978475

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structure*. Berkeley, CA: University of California Press.

Goodhue, D.L., and Thompson, R.L. 1995. "Task-Technology Fit and Individual Performance," *MIS Quarterly* (19:2), pp. 213-236.

Gregor, S. 2006. "The Nature of Theory in Information Systems," *MIS Quarterly* (30:3), pp. 611-642.

Harman, G. 2010. "Technology, Objects and Things in Heidegger," *Cambridge Journal of Economics* (34:1), pp. 17-25.

Heidegger, M. 1927. *Sein Und Zeit*. Tübingen: Max Niemeyer Verlag.

Heidegger, M. 1962. *Being and Time; Translated by John Macquarrie & Edward Robinson*. London: SCM Press.

Hume, D. 1740, 2009. *A Treatise of Human Nature*. Merchant Books.

Introna, L.D. 1997. *Management, Information and Power*. Houndmills et al: MacMillian Press.

Introna, L.D. 2007. "Towards a Post-Human Intra-Actional Account of Sociomaterial Agency (and Morality)," in: *Moral Agency and Technical Artefacts Workshop*. The Hague: Institute for Advanced Study.

Jones, M., Orlikowski, W.J., and Munir, K. 2004. "Structuration Theory and Information Systems: A Critical Reappraisal," in *Social Theory and Philosophy for Information Systems,* J. Mingers and L. Willcocks (eds.). Chichester, UK: John Wiley & Sons, pp. 297-328.

Latour, B. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.

Leonardi, P., and Barley, S. 2010. "What's under Construction Here? Social Action, Materiality, and Power in Constructivist Studies of Technology and Organizing," *The Academy of Management Annals* (4), pp. 1-51.

Majchrzak, A., Rice, R.E., Malhotra, A., King, N., and Ba, S. 2000. "Technology Adaptation: The Case of a Computer-Supported Inter-Organizational Virtual Team," *MIS Quarterly* (24:4), pp. 569-600.

Markus, M.L. 1987. "Toward a 'Critical Mass' Theory of Interactive Media: Universal Access, Inter-Dependence, and Diffusion," *Communications Research* (14:5), pp. 491-511.

Markus, M.L., and Silver, S.M. 2008. "A Foundation for the Study of It Effects: A New Look at Desanctis and Poole's Concepts of Structural Features and Spirit," *Journal of the Association for Information Systems* (9:10/11), pp. 609-632.

McAfee, A. 2009. *Enterprise 2.0: New Collaborative Tools for Your Organization's Toughest Challenges*. Boston: McGraw-Hill Professional.

Mendoza, A., Carroll, J., and Stern, L. 2010. "Software Apprpriation over Time: From Adoption to Stabilization and Beyond," *Australiasian Journal of Information Systems* (16:2), pp. 5-23.

Morgan, G. 1986. *Images of Organization*. London: Sage.

Orlikowski, W.J. 2000. "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations," *Organization Science* (11:4), pp. 404-428.

Orlikowski, W.J. 2010. "The Sociomateriality of Organisational Life: Considering Technology in Management Research," *Cambridge Journal of Economics* (34), pp. 125-141.

Orlikowski, W.J., and Scott, S.V. 2008. "Sociomateriality: Challenging the Separation of Technology, Work and Organization," *The Academy of Management Annals* (2:1), pp. 433-474.

Pickering, A. 1995. *The Mangle of Practice: Time, Agency, and Science* Chicago: University Of Chicago Press.

Porra, J. 1999. "Colonial Systems," *Information Systems Research* (10:1), pp. 38-69.

Preston, B. 1998. "Cognition and Tool Use," *Mind and Language* (13:4), pp. 513-547.

Reckwitz, A. 2002. "Toward a Theory of Social Practice -- a Development in Culturalist Theorizing," *European Journal of Social Theory* (5:2), pp. 243-263.

Reimers, K., Johnston, R.B., and Klein, S. 2010a. "The Difficulty of Studying Inter-Organisational Is Phenomena on Large Scales: Critical Reflections on a Research Journey," *Electronic Markets* (20), pp. 229-240.

Reimers, K., Johnston, R.B., and Klein, S. 2010b. "Toward a Theory of Iois Variance: A New Framework for Studying Interorganisational Information Systems," *International Journal of Information System Technologies and Applications* (1:3), pp. 36-56.

Riemer, K., and Johnston, R.B. 2011. "Artifact or Equipment? Rethinking the Core of Is Using Heidegger's Ways of Being," *Thirty Second International Conference on Information Systems*, Shanghai.

Riemer, K., Overfeld, P., Scifleet, P., and Richter, A. 2012. "Eliciting the Anatomy of Technology Appropriation Processes: A Case Study in Enterprise Social Media," *20th European Conference on Information Systems ECIS 2012*, Barcelona , Spain, 13th June 2012

Scada, J. 2004. *Cartesian Metaphysics: The Scholastic Origins of Modern Philosophy*. Cambridge: Cambridge University Press.

Schatzki, T. 2002. *The Site of the Social: A Philosophical Account of the Constitution of Social Life and Change*. Penn State University Press.

Schatzki, T.R. 2010. *The Timespace of Activity*. Lanthan Maryland: Lexicon Books.

Stair, R., Moisiadis, F., Genrich, R., and Reynolds, G. 2011. *Principles of Information Systems*. South Melbourne: Cengage Learning.

Taylor, C. 2006. "Engaged Agency and Background in Heidegger," in *The Cambridge Companion to Heidegger (2nd Ed),* C.B. Guignon (ed.). Cambridge: Cambridge University Press.

Teece, D., Pisano, G., and Shuen, A. 1997. "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* (18:7), pp. 509-533.

Turban, E., and Volonino, L. 2011. *Information Technology for Management*. Hoboken, NJ: John Wiley & Sons.

Turner, P. 2005. "Affordance as Context," *Interacting with computers* (17), pp. 787-800.

Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. 2003. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* (27:3), pp. 425-478.

Vidolov, S., and Kelly, S. 2009. "Distributed Communication as Collective Socio- Material Sensemaking in Global Software Work," *Thirtieth International Conference on Information Systems* Phoenix, Arizona.

Weber, R. 1997. *Ontological Foundations of Information Systems*. Blackburn Australia: Buscombe Vicprint.

Weber, R. 2012. "Evaluating and Developing Theories in the Information Systems Discipline," *Journal of the Association of Information Systems* (13:2), pp. 1-30.

Weick, K.E., Sutcliffe, K.M., and Obstfeld, D. 2005. "Organizing and the Process of Sensemaking," *Organization Science* (16:4), pp. 409-421.

Winograd, T. 1995. "Heidegger and the Design of Computer Systems," in *Technology and the Politics of Knowledge,* A. Feenberg and A. Hannay (eds.). Indiana University Press.

Winograd, T., and Flores, F. 1987. *Understanding Computers and Cognition: A New Foundation for Design*. Reading et al: Addison-Wesley.

Yates, J.A., Orlikowski, W.J., and Okamura, K. 1999. "Explicit and Implicit Structuring of Genres in Electronic Communication: Reinforcement and Change of Social Interaction," *Organization Science* (10:1), pp. 83-103.

Zhang, J., Qu, Y., Cody, J., and Wu, Y. 2010. "A Case Study of Microblogging in the Enterprise: Use, Value, and Related Issues," *28th annual SIGCHI conference on Human factors in computing systems*, Atlanta.