Knowledge Utilization in Projects – a Practice-based Perspective

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Abstract

Drawing upon Practice-based theorizing in general and Actor Network Theory and theories of Communities of Practices in particular the paper develops an analytical strategy for understanding "life" in projects. The analytical strategy is applied on empirical material from an 18-month ethnographic study of a construction project. The project is interpreted as constellation of networked practices, which always is in the making. Participation in this project is a learning process where existing practices are reproduced and developed. This understanding of "life" in the project, frames a concluding analysis and discussion of the utilization of knowledge in the project.

Keywords: Actor Network Theory; Community of Practice; Project, Practice, Knowledge.

Suggested track: G. Practice-based perspectives on knowledge and learning

1. Introduction

Most contributions to organizational learning and knowing from a practice-based perspective implicitly refer to rather stable organizations and downplay inter-organizational and temporary forms of organizing. Existing studies are characterized by stability and well-defined contexts like flute-makers (Cook & Yanow, 1993), photocopier repairmen (Orr, 1996), and claims processors (Wenger, 1998). However, many ways of organizing today are dominated by projects, which often are characterized by temporary heterogeneous project teams. These are according to Meyerson, Weick, &

Kramer (1996, p. 167) characterised by performing tasks with high degree of complexity and lack of formal structures that facilitate coordination and control. Furthermore they depend on an elaborated body of collective knowledge and diverse skills and they often entail high-risk and high-stake outcomes. Another key characteristic that might be added is the mutual dependency of the participating partners, which stems from a division of labour where each task is dependent of another.

Despite the importance given to projects in mainstream organizational literature and practices there are few studies which aim to look at projects per se – looking at team practices – and even fewer tracking their development over time (Hosking & Morley, 1991).

Project organization is everyday life in the construction industry. Here the supply chain exhibits a specific division of labor and institutionalized roles such as the manufacturers of the basic parts and components, contractors, engineering companies and architects. Although there are examples of transcending these roles, they are generally maintained in the majority of building projects. Consequently, almost every project is organized across organizations, thus making the knowledge production in the project a temporal and inter-organizational task. According to practitioners Bønnelykke (2003), a critical process in this production of knowledge is the utilization of knowledge, as errors in beginning of the project (i.e. the design activities) can have a considerable impact on the final product.

2. Ambition

This leads us to the two-fold aim of the paper. First, the paper will develop a practice-based perspective for understanding the "life" in projects. This perspective will act as a foundation for discussing the knowledge utilization in a project.

3. The method

The paper adopts an analytical strategy from a "mature" theory dealing with practice – Actor Network Theory (ANT) supplemented with theories of Communities of Practices (CoPT). Throughout the paper, the analytical strategy is applied on empirical material from an ethnographic study of a construction project.

The intention is not to develop a full-scale Actor-Network analysis, but draw upon some fundamental ideas and strategies in the understanding of the project practices. In this

process, inspiration is drawn from a wide range of sources including the key-contributions within the field of Communities of Practices Theory (CoPT) and Actor Network Theory (ANT). This includes studies like John Law's analysis of the Life and Death of a military aircraft development project (Law & Callon, 1994) and Jean Lave & Etienne Wenger's development of situated learning theory (Lave & Wenger, 1991; Wenger, 1998). This analysis also draws on contributions from several others studies. These include Oborn-Barret & Dawson's (2003) study of transfer and development of medical practices and Gherardi & Nicolini's 2000) study of the circulation of safety-knowledge among construction workers.

The empirical material subject to the analysis stems from an ethnographic study of a construction project – with a primary focus on design activities. During an 18 month period the author was present on a daily basis in the project participating in the "main" design activities, covering all design meetings, workshops, and some internal and external meetings. Apart from participant observation, interviews of project members were conducted. An extensive part of the material (i.e. meetings and interviews) has been taped resulting in more than 90 hours of recordings. Furthermore, the formal documents created by the actors have been made available such as contracts, resumes, drawings etc.

Since it would be an impossible exercise to present all this material in the format of a conference paper, small vignettes of the material works as figurative elements in the development of the approach for understanding projects. However, the analysis of the utilization of knowledge will draw upon a more detailed description from a design meeting.

4. The Case: constructing a world-class school system

The objective of the studied project was to develop a world-class school system for a Danish municipality. This included construction of a new school and refurbishment of four existing schools. The main companies in the project were, besides a main-contractor, an architect, a technical consultant, and a client advisor taking care of the contact with the municipality. The contractor comprised a team with members from two different departments for the refurbishment of the existing schools and building of the new school. The technical consultant had four specialists from different departments and a project leader assigned to the project. The architect had around six people working on the project with two different teams and one project leader.

5. The project - a constellation of networked practices

At first sight, the act of designing and building the schools appears complex or even chaotic. How might we understand this unfolding process?

Actor Network Theory enables us, with the fundamental notions of "actor and network", to understand how important components (actors) of the project's practices are tied together (networked) such as offices, schedules, goals, budgets, resumes, engineers, project leaders, clients, titles, and resources. In this process ANT operates with a fundamental principle of symmetry, where human and non-human actors are treated equally (Latour, 1994; Law, 1994)[1].

This implies that practice is a socio-material configuration of persons and artifacts. For instance, the practice of designing the construction principle to be used in the school consists of calculations, a structural engineer to make the calculations and an assistant for producing the CAD drawings, information about material, supplies etc.

5.1. Professional practices - formed by Communities of Practices

A central point in ANT is that actors are defined by their relation to other actors – strong or weak. Within the actor-network of the project, there are differences in the strength of the ties. In this way, certain areas in the project's network have a higher concentration of actors (actors with strong relational ties). The practices of these areas might be concentrated in a way that it is being black-boxed by outsiders (actors with weak relational ties). In the project, this is typically professional practices - experts such as structural engineers. Lowe (2001) supports this, positing that black-boxes are an important feature of post modern society in that their role has become centrally constitutive of professional practice.

Looking closer at the individuals of the professional practices we find them using similar tools and language, have similar identities and worldviews. It is useful to consider that these groups form around Communities of Practices.

By introducing Communities of Practices Theory, we have a theoretical framework for understanding how the professional practices in the project are developed and reproduced. Drawing on symbolic interactionism (e.g. Blumer, 1969), Etinnie Wenger

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[1] This principle often generates an unproductive discussion among academics whether non-human actors have agency or not. In this analysis, I'll make this an empirical rather than ontological question.

explains this as a "meaning making" process with two equal components - reification and participation (Wenger, 1998).

A central process of this is how newcomers learn the practice of the community through legitimized peripheral participation (Lave & Wenger, 1991)[2]. In Jensen's (2001) words, this term indicates, "that the newcomer initially is given relatively easy tasks, where errors have relatively minor consequences (peripherality). But these tasks are nevertheless useful contributions to the community (participation), and therefore the person is granted acceptance as a participant (legitimacy). In the process of doing relatively simple tasks, the newcomer is placed in a position where she can observe, hear about and get a feel for more mature practices. So legitimate peripheral participation entails access to learning resources that are relevant to the person's future participation. Her position should not merely be viewed in terms of the simple tasks, which she carries out at the moment. The present position is a part of a learning trajectory that leads to more and more involvement in the community. Consequently, the position is also constitutive of her identity as a member of the community of practice." (Jensen 2001, p. 22) Vignette I illustrates this learning process in the project.

Vignette I: mastering the practice

Shortly before the start of the design of the school, the architectural company hired a young architect Rasmus – who just graduated from the "Royal Academy of Fine Danish Art" in Copenhagen. In his new job, he was placed among the experienced architects at the drawing office and was spending most of his time in front of his computer drawing details – a very fundamental element of an architectural practice.

Susanne was employed by the contractor two years before the start of the school project. Most of her time was spent on managing small subcontractors – running around on the site monitoring them. After half-a-year, she complained about her workload to the project leader. She told him it was impossible for her to do her work in the quality that she wanted. The reply she received was "You must learn to scam professional".

This statement illustrates the core of the mastery of the practice - the necessity of doing the right things, well enough, but not perfect!

Focusing on the learning trajectories of the project's participants, it's interesting to notice the local effect of the institutionalized educational system. When members such as engineers and architects have ended their education, they are usually employed at companies heavily populated by either engineers or architects. In this way the educational system maintains a strong division of labor of the professional practices organization in the projects. Because of this institutionalized effect the professional

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[2] (Jensen, 2001) is making an interesting critique of situated learning theory from an ANT perspective.

practices can be assumed to cross organizational boundaries (Bloor & Dawson 1994). Thomassen (2004) discusses this as a key characteristic of construction projects.

The members of the project constantly "reveal" the boundaries between these professional practices. The distinction is found in their applied language, often prejudiced, but also in the material artifacts, they produce, such as drawings. Even the design meetings follow a structured agenda with a separation of the practices.

Having introduced CoPT in order to throw light on the reproduction and development of the professional practices in the project, it is important to notice that we implicitly inherit the notion of boundaries. This might seem problematic as ANT rejects the notion of boundaries by using another topology – the network. This position is highlighted by Tsoukas (1992), stating that "the most controversial element in a social system is its boundaries" (p. 441). We therefore now return to the network topology.

5.2. Coordinative practices - boundary practices

The focus of our attention is now on the weak ties between professional practices of the project. These are important for understanding how the project's practices are coordinated and aligned. Here actors who/which span the different practices such as drawings, the physical school, and the design leader play central roles. From a CoP perspective these actors can be interpreted as boundary objects and brokers, which are founded in the "meaning making" processes of reification and participation (Wenger 1998).

Boundary objects

CoP can interact by reification: the exchange of boundary objects, which are tangible or intangible artifacts than cross boundaries between CoPs and are objects of reification in these.

Etienne Wenger's discussion of boundary objects draws heavily upon Star & Griesemer (1989) who see boundary objects as anchors or bridges between practices. According to Star & Griesemer (1989) "boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (p. 414). This implies that boundary objects are assigned different meanings in different CoPs but their structure is common enough to more than one community to make them recognizable. In ANT this process is explained in the concept of interpretive flexibility,

where objects mean different things to different actors due to the variable geometry in the network of relations (Law and Callon 1992, p. 24).

Various types of *boundary objects* knit the design process together. Some of the most visible are drawings spanning from sketches to detailed CAD-drawings, resumes, descriptions of customer wishes, spreadsheets, economical calculations etc. These objects are constantly developed throughout the process gradually getting closer to the final representation. Some of the *boundary objects* are an outcome of a practice – Carlile (2002) terms these "Ends". An example is the drawings, which are produced in the engineering and architectural practices while the contractor produces the economical calculations. This does not keep a professional practice from "commenting" on *boundary objects* produced in another practice, as objects from one practice might be applying constraints to the work in the other practices. This element of dependency makes the design process a matter of negotiating the right solutions suiting the different professional practices.

Brokers

The other type of interaction is by participation; that is, by sharing individuals – brokers in Wenger's terminology – who actively participate in several CoPs. Through this connection across CoPs people can introduce elements from one practice into another.

Star & Griesemer (1989) also touch on this element in terms of multiple memberships of 'social worlds' which they term 'marginal man'. They are referring to work from the beginning of the last century discussing problems of identity and loyalty with multiple memberships of social classes. This discussion of marginality is also found in Wenger (1998) as brokers not are at the very centre of the CoP, which they are a part of but usually work in the boundaries through legitimized peripheral participation. What however characterizes an "effective" broker is the ability to introduce new possibilities for meaning which requires some kind of status in the community.

The existence of brokers in project is more "rare" compared to the crowded population of *boundary objects*. The closest match we find is the "bridge" between the "design team" and the professional practices. In the design meetings the professional practices are represented by one or two persons functioning as *brokers* between the design team and the home base. From the participating practices, the *brokers* might be marginal but in a larger perspective, these persons are critical in the coordination of the professional practices – being responsible for the negotiation of the right solutions and

delivering the right design to the customer in the end. The mastery of this coordination is central to the learning process of the members of the professional practices, illustrated by Vignette II.

> **Vignette II: mastering the coordination**
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> Even if the architect Rasmus initially used most of his time drawing details, at the end of the project he was given the "responsibility" of designing a small extension to an existing building. In this process, he more frequently participated in the design meetings, representing the architectural company together with an experienced colleague.
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> An experienced architect expressed the learning process that Rasmus was going through during a workshop:
>
> "Young architects is often the most idealistic, but as you start to work together with the other partners of the building project you continuously get better at finding compromises"
>
> Also Susanne started to learn the skill of coordination, as she explained after having attended her first design meeting.
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> "It was the first design meeting I attended – and I was disappointed, really disappointed about the communication between people. The way that people talked to each other and past each other. I had at least expected that people were talking nicely to each other and had the same visions about designing the best school"

We have now looked into the weak ties between the professional practices by bridging actors. But in what situations – like the design meeting above – does these elements come into play? The CoPT has on direct answer to this though Wenger (1998) points out that it is often advantageous to have artifacts and people traveling together as accompanied artifacts stand a better chance of bridging practices (p. 111).

Negotiation space

Therefore we might draw on the term 'negotiation space' (Law & Callon, 1992) to emphasize the importance of considering the spaces between the actors through which the coordination of practice must occur.

In the project, both actors as *boundary objects* and *brokers* are represented in the negotiation spaces making it possible to negotiate and discuss solutions. The design meetings are examples of spaces for coordinating the different practices. There is however also examples of 'virtual' spaces such as conversations, which might be mediated by actors as telephones and drawings.

We see different 'intensity' in the negotiations spaces based on the level of participation of *brokers* and the amount and "quality" of the *boundary objects*. This implies that different spaces are suitable for solving different types of problems in the project as some can be solved over the phone while others needs to be discussed 'face to face'. Vignette III illustrates such a 'face to face' interaction.

Vignette III: Coordinating practices

During a visit by the project team to the manufacture, which produced the glue-laminated timber for the schools the professional practices were coordinated – in relation to the construction principle.

Standing in front of the real rafters and pillars, the carpenters, the structural engineer and the producer discussed the construction principle. In this dialog confronting each other with their perspectives, they developed an optimal solution that was technically secure and 'buildable'. The foundation for the development of this solution was the existence of a negotiation space (i.e. the shop floor of the supplier), the brokers and a boundary object (i.e. the pillar of glue-laminated timber).

By combining the theory of CoP with a fundamental ANT analysis, the construction project is interpreted as a constellation of networked practices with strong relational ties outside the actual project team. Gherardi & Nicolini (2002) develop a similar view.

Until now, the analysis has been rather static – a phenomenon which is deeply problematic from a practice-based perspective in general – and in ANT particularly. John Law in fact highlights the dynamic component as a fundamental principle of ANT by using the verb "ordering" rather than the noun "order" (Law, 1994), a shift which is seen other places within organizational theory, such as (Chia, 1996).

5.3.   The "life" in the project

Based on the fundamental framework where the project is interpreted as a constellation of networked practices. We will now try to understand the "life" in the project.

In order to conceptualize the "life" in the constellation (including the fulfillment of the task of the project), it is useful to examine the processes by which actors and practices form ties and alliances and produce actions. These processes are understood in ANT's concept of "translation", which refers to the key processes of negotiation and representation such that practices are aligned and order is produced (Latour, 1987).

In the project, the process of translation is fundamental to the act of building the school, in the way the ideas of the municipality, the teacher's vision, the architect's design, the structural engineer's calculations and the project leader's goals at last materialize in a part of the actual school.

The production of order is what occurs inside the professional practices when newcomers learn to master the practices of the old-timers. But the production of order also is the key process in the development of the coordinative practices.

These negotiations between the different practices are full of contradictions and dilemmas as the actors' engagement in the project often is driven by colliding values and ambitions – as illustrated by Susanne's experiences of her first design meeting. Despite this, the ties between certain actors might be strengthened, and transient practices (boundary practices) might evolve within the project. In this process, the practices don't have to reconcile. They can stay together with all their misalignments and contradictions. A parallel situation is identified by Lucy Suchman in her study of bridge building (Suchman, 2000).

The dependencies (power/knowledge relations) between the different professional practices also introduce issues of power and political processes. ANT approach for understanding this process is by the concept of obligatory points of passages – passages in the network through which some translation processes must occur (Fox, 2000). Obligatory points of passage (OPP) play an important role in the project. The OPPs are characterized by being more or less institutionalized (regulated) / locally negotiated. Additionally they are more or less visible as they might be embedded in practices and therefore hard to identify.

In the beginning of the design process, the design group consists of the persons representing the professional practices (like the electrical engineer, the architect etc.). Each of these representatives are present to assure that certain design areas are covered and certain basic rules and norms are followed, but also to create new options and constraints in the gradual fixing of the design. The representatives can therefore be viewed as OPPs due to the power/knowledge relations. As the design increases in detail and people are "getting to know each other" and their mastery of their practice, the OPP is either stabilized and objectified, diminished or strengthened. This negotiation of power/knowledge relations is a never-ending process, which does reach a certain stability / order.

The power/knowledge relations make the design group vulnerable to substitution of certain actors. The *brokers* are especially crucial in tying the constellation of practices together. It was shown in the case, as the broker representing the architects had a personal tragedy that meant he left the project for at least a month. It had a huge impact on the constellation of networked practices due to the interdependence; the internal time schedule drifted and people were assigned new roles – a "new" order/stability was produced.

We will now look more into these ordering processes within the project trying to understand the utilization of knowledge in the project.

6. Analysis: The utilization of knowledge in projects

A practice-based approach rejects a positivistic account of knowledge, which takes principles of rationality and linearity for granted. Knowledge is instead assumed to be a complex form of social and technical bricolage where context and content is juxtaposed – a traditional dyadic spilt within knowledge and learning discourses.

Developing a social-constructionist view of knowledge Gherardi & Nicolini (2000) state that knowledge is (p. 330):

 ➢ situated in the system of ongoing practices.

 ➢ relational and mediated by artifacts.

 ➢ always rooted in a context of interaction and it is acquired through some form of participation in a community of practice.

 ➢ continually reproduced and negotiated, and hence it is always dynamic and provisional.

In this way, they highlight the social-materiality in the study of knowledge – elements that are non-existent or at least only play an inferior role in many other research traditions on knowledge and learning.

We will now look into a small part of the empirical material – a cutting from a recorded design meeting. In the "cut" an architect, a structural engineer, and a contractor (responsible for the design) negotiate the "construction principle" of an extension to one of the existing schools. The cut is rather simplified in order to make it fit with the format of the paper.

6.1. Outlining the context

In order to frame the cut, and the following analysis, we will start with a short characteristic of the participating professional practices – represented by an architect, an engineer, and contractor.

The architectural practice

Over all the architectural practice tries to balance the appearance and functionality of the schools in order to make them an optimal place for learning. This practice is rooted in the educational background of architects, and drawings and the practice of drawing

constitute a core part of this practice. This is illustrated by members preferring to communicate by the use of this medium and the drawing office is a mess of drawings.

With respect to the actual design, the division of labor within the practice is very limited which means that more and less everyone masters the practice of sketching and doing detailed design. The process of negotiating the design with the contractor and engineers develops this practice and shapes the understanding of what is possible. Novices of the practice – like Rasmus – play a central role in the initial design phases where creativity is required. They are seen as unbiased by the interaction of the other practices within the construction industry and thereby not constrained by what is possible.

The structural practice

The structural practice is heavily rooted in the educational background of engineers typically with a long education (more than five years at a technical university). Due to the educational background, there generally exists a strong focus on technical calculations and detailed drawings including the work with CAD. Within the practice, there exists a strong division of labor. The engineers do a lot of hand-sketches and calculations while they leave the actual drawing in CAD to technical assistants. This is a major difference compared to the architectural practice. The division of labor also means that the engineers are usually participating in more than one project at a time – in average of about four.

The contracting practice

In the contracting practice, tools such as time-schedules, accounts, contracts and economic calculations are very common. Compared to the other practices, CAD is not a central part of the contracting practices – but the use spreadsheets is a fundamental part of the practice. The contracting practice has a very strong focus on buildability and economy as they, due to the contractual arrangement, have the overall economic responsibility in the project. A part of the practice – the management of the design process – focuses on the co-ordination of knowledge between the design practices. This implies that the phrase 'it's a costly solution' is very common, illustrating the economical constraints which are applied to the solutions proposed by the architectural practice, for example.

6.2. The cutting

The cut stems from a design meeting at the construction site of the new school. Besides the above mentioned actors, two other engineers, one architect and a apprentice from the contractor (Susanne) are participating in the meeting. The meeting starts out with a discussion of the construction principle of the existing building onto which they will design the extension.

Engineer:	I suppose that it is appropriate to continue with the same construction principle – by prescribing a timber structure in the roof where forces from the roof and the frontage are moved to the bearing walls by the use of wind braces.
Contractor:	…is there just a beam of glue-laminated timber to ensure the angled sealing?
Engineer:	No… it's a scissor-rafter[3].
… later…	
Contractor:	We have budgeted for DK Kr 10,000 DKK per square meter – which needs to include everything. But it is a special roof construction with the scissor-rafter. Therefore, it is not a cheap construction principle.
Engineer:	Well we don't need the scissor-rafter!
Architect:	Yes! We <u>do</u> need them. Because we need to have a room height which is fair – and the frontage is already not that high.
Contractor:	… we need to take care of our economic spending!
Engineer:	Yes! We should reconsider whether it is necessary to make those scissors-rafter.
Contractor:	Yes! because in relation to our initial sketches, then there is a sliding door there and a drainage there (he points to the drawing). This was not a part of our initial calculations – right!? So I think we can easily use all the money.
Engineer:	Yes and the music[4] has also grown higher.
Contractor:	But I don't have the guts to say something about the "prices" on the music before I have a more detailed construction principle!
Engineer:	But in the music its obvious to use "roof-cassettes"[5] and to reduce the amount of variants we could also use this principle at this extension by prescribing a glue-laminated timber construction in the ridge (he points to the drawing)…
Architect:	Yes (he listens interested)
Engineer:	…and then roof-cassettes on. – The same principle as we are actually using here (he points out the window on the construction of the new school). Then the room height will be greater
Architect:	Yes (he appears elated)
Engineer:	and then we have a supplier less!

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[3] A direct translation for the Danish "saksespær" – a special type of rafter which has the same form as a pair of scissors.

[4] A metaphor for another extension to the existing school - housing the music facilities.

[5] A direct translation for the Danish "tagkassetter" – a specific principle where the roof is constructed with prefabricated cassettes.

Contractor:	I could easily imagine it would be able to compete with the scissor-rafter construction.
Engineer	Yes! Scissor-rafter is a "piece of shit" to say it directly. You get all kinds of movements in it (he points at the drawing).
Contractor:	Then we could use asphalt paper on the roof-cassette-construction and we will have a good construction of a roof-boarding which we easily can put roofing slates on.
Architect:	Yes!

6.3.   The analysis / discussion

A wide range of elements in this negotiation space / situation influences the utilization of knowledge.

It is interesting to see how the knowledge is deeply bound to the artifacts of the situation, the drawing and the new school, all of which are in play in the shared meaning making process. The drawing is used as a navigation tool for negotiating different types of solutions of the construction principle. In this negotiation process, they interpret the drawing in a way, which facilitates an "unambiguous" understanding. Through this unambiguous understanding, it also mediates the flow of knowledge about the existing construction principle from the structural engineer to the contractor.

Another element which is interesting is the "shared practice" or frame of reference which the participating actors share. They have shared vocabulary, in technical references and a shared history of the project team and the existing school outside the window as a reference point.

The black-boxed "parts" of the constellation of practices – the professional practices - play a central role in the negotiation of the construction principle. In many situations in the cut we find contradictions in the practices. The architect wants an open room with a high ceiling, the structural engineer would like to get rid of the particular type of rafter that lacks stability and the contractor is constantly skeptical about the economics of the solution. It all ended up nicely by using an existing solution, which was able to bridge all the contradictions. The existing solutions – and the knowledge embedded – is translated into the new context. This translation process both alters the solution and the surrounding actors. Araujo (1998) discusses a similar process.

Furthermore, it is worth noticing that this small cut was taken from a meeting where a number of other actors from the project were participating, including the two other engineers and another architect. The interesting element is their silence during the

negotiation of the construction principle. This shows how the construction principle is negotiated within a mixture of architectural, structural and contracting practices. Here in this situation we see the institutionalized division of labor where three practices are in play; later in the project the solution was renegotiated by the craftsmen, and the supplier. This illustrates the dependencies the practices and power/knowledge relations. In this situation, the wishes of the participating practices were conflicting. But it was solved by the use of the a "shared" solution. The duration of the cut was approximately 5 minutes; in these 5 minutes they negotiated a stability, which literally is still standing.

7. Conclusion

The developed "story" in this paper is of course strongly linked with the studied project. An attempt to generalize the findings would be against the fundamental beliefs of the theoretical framework – due to the interpretive flexibility of the researcher and the multiplicity of orders Law (1994). The ambition has not been to create a unified theory, but to develop an analytical strategy situated in a mature theoretical tradition in order to understand life of projects.

The project followed has been interpreted as a constellation of networked practices, which is always in the making and constantly seeking order. Participation in the project is a learning process where existing practices are reproduced, challenged, reformulated and renewed. In this process, newcomers on one hand learn how to master the professional practices and on the other hand, the negotiation processes between practices.

With the developed approach, it is possible to illustrate the complexity of the project while still making it possible to generate an overview of the practices. The ability to work with complex situations makes the approach well suited for supporting studies of practices within temporary and heterogeneous systems. Furthermore it enables the discussion of power and politics. Thereby it creates a solid foundation for analyzing learning and the utilization of knowledge.

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