How are boundaries constructed in the cloud?

Introduction

The thesis could be said to tell a fairly straightforward story. That of Microsoft and its translation into the cloud. I follow the new Microsoft system as an actor throughout my chapters.

In the two first chapters in **part on**e the system only plays a subliminal role. First **(ch.1)** as a common platform for accessing the Internet. In this chapter I try to grapple with the materiality of the cloud. It was conceptualized as something directing the flow of instructions and work between the teacher and pupils in a mobile way. They link with content, but the separation between content and instruction facilitates different spaces of materialities of learning, some mobile and other more fixed. I find that these devices work as instruments of search that help frame lessons.

And secondly **(ch.2)**, as a common interface.

-I use the idea of the boundary object, and perform an infrastructurial inversion with the teachers. I try to tell the story in an autobiographical account as I look at how issues arise among different expert-cultures, or groups, in the school.

-What does it mean to have a platform? Rather than seeing the platform as a neutral mediator in a bi-directional relationship I try to understand how the cloud is meant to facilitate the sharing and circulation of resources. However, already then I am forced to look beyond the computer network in the students’ ‘online learning environment’.

-It is no one boundary between the extended network of the teachers, the administration, the national, and the Internet. Rather these systems needs to be studied in a distributed fashion, as the mesh they entangle with in the contexts they are designed for.

-I want to study the middle-ware; students do not simply use the Internet as a resource. There are resources that are not distinguishable in their context (i.e. Christmas tradition search). The question of what makes the resource distinguishable withstands, almost as a kind of trail of strength. What is it that bind the resource to ‘them’ (group, not simply individual)

>The idea of continuity is important; it causes the conditions for evaluating these associations to change. In the ‘group’ (pre-network) there might have been a stronger sense that pupils were met with the same conditions when entering the classroom, and perhaps even that they got to know whether their associations had been right when getting tests handed back.

-I try to be more specific about the technology that makes it possible for the cloud to facilitate virtual learning in networks. Here I try to understand the difference between the ‘old’ local computer network and the new way of networking through this form of ‘cloudification’. It is clear that the cloud-technologies work to wash out the boundaries between the Internet og internets of the former intranet. The meaning and agency of the ‘mobile’ is linked with the internet-like technologies of a mobile platform, seeing that it does not make sense to talk about ‘work-stations’ or computer-libraries.

In **part two** I make an effort at ‘seeing’ the school as a space shaped by the ‘social life’ of the computer. In a way I start off **ch.3** by looking at how the spaces of the school is co-created with the computer-systems running on the Microsoft platform.

-Not presuming ‘access’ into the classroom as a ‘pedagogic room’ I was rather more aware of how I theorized where I was able to go to study these different expert cultures. In the beginning I had perhaps been hoping that I could compare student- and computer-networks according to the school’s strategy. However, I had discovered that each there were parallel strategies of infrastructure building in the different rooms and groups. I could not access and monitor all of these virtual spaces. I therefore had to try to figure out the consequences of having access in some spaces and some rooms, as well as the ‘value’ of having such access.

In **ch.4** I then flip this idea on its head and ask how these spaces are enacted through the co-evolution of the computer(multiple).

-Feide performs essential work in the computer and outside.

In the final two chapters in **part three** I try to make use of the ‘model’ I’ve formulated in part two to critically expand upon the theories of educational information infrastructure. I go back through the two dimensions of Callon’s model of translation and try to put them onto an axis.

First, in **ch.5**, I look the role of the Microsoft system in the expert cultures that dominate the ‘backstage’ of ‘virtual educational governance’. This is the dimension in which boundary institutions facilitates hybrid forums in which political technologies, market technologies, and experimental cultures within the technopedagogic apparatus are aligned. I am particularly interested in how the macro- and micro-structures could be co-created within the fixing of authorship and legitimate claims to knowledge. This chapter shows how such an politics of digitalization (and the digital economy) translates into designs for work/use, and it suggests how friction within such processes hinders the fixation of ownership within local organizations working with the application of the documents that result from the boundary work. Importantly I do not begin my analysis of the translation process earlier as I now assure some kind of social symmetry, while also being able to account for where the social categories have derived from.

Then, in the **final chapter** of the thesis, I test out my own theoretical standpoint within the tensions that were built up within my accounts of the two former contexts (the classroom and its organization). I try out the idea of ‘co-ordinating presence’ in the work of accounting for care-practices and how such practices work to perform a guaranty of ‘the right to education’ in the local government. In the second part (the organization of the classroom organization) I was looking at how the institutionalization of the computer was causing the different actors to try to incorporate (the infrastructuralization of the school corpus) heterogeneous data ‘sources’. In my effort to re-scribe accountability through my analysis of separation and presence I look at how such a separation is performed between data and its sources, and how this works to prescribe a (PaaS) of associations between these digital and virtual objects (or framings). In the process of formalization - and de facto standardization (non-political ethics) – an ontological separation is performed that is evident in the epistemological account of ‘mobile’ learning as placed resources. The virtual frame of the online simultaneously ‘processes’ accounts of teachers as being aligned with the students as users in a system, and it distributes responsibilities of ordering these virtual processes (a differentiated access-right) in such a way that teachers ‘could’ (possibly) also have the role of professionals. In this distributed(ion) architecture (virtual frame) it becomes possible to determine certain relationships between the data as action and sources. When the teacher is made into an lay-person this also makes possible an idea of interventions into the democratic features of teachers work as mediators in the political economies of classrooms. On the one hand, the teacher is taken out of the school in which measures of accountability is treated as detached from the realities of their hybrid roles.

I conclude by discussing how such an re-enactment of bureaucratic politization fascilitates a sort of professionalism in which hobby enthusiasts are discouraged from both sides to engage with the politics of ‘recursive publics’. In this light the historic strikes mid-reform could be seen as becoming about time-management, when they could have been about content-management. Instead of demanding more management and a stronger government the unions are equally allied with the work-processes that are assured in the local systems – with the measures of competence that resulted from negotiations with UDIR as a curator of content. In the wake of PaaS, the idea of the neutrality of the Internet and the symmetry of a previous (post-human) analysis must be reconfigured. Both government and educational institutions have to re-assess the politics of the web2.0, and what it means to be a content creator vs. owning content.

In this story the Microsoft system is challenged by the platform economy, and ‘free’ programs online. My analysis also has baked into it a tension between international standards in government (GDPR) and the fluent ‘openness’ of dynamic market technologies (AI). Microsoft’s position of power and interestment arise from a de facto standard that I choose to analyze as part of the government infrastructure. I therefore do not regard Microsoft as external to any of the other actor-networks, but rather try to see it as an facilitator of externalization of services.

GDPR is said to be made against/for social media. This is essential in my story, because computers as we know them have been built to fascilitate the Internet; a compromise in the ‘openness’ of the technology. The regulation of content and its distribution is an essential part of the history of computers, informatics and cryptology. The Windows metaphor have been essential in the development of the political economy of autonomy.

Windows from the start intervened in the graphical user-interface, as an interestment in a standard. An intervention into the folder structure of the computer and the facilitation of the computer-multiple. The computer-multiple is what has allowed for updates to be a regulated event in which folder-structures must be ordered so to remain ‘virtually’ alike, no-matter the underlying process. Cloud technology is essentially a continuation of this process of abstraction, but one in which the relationship between de facto and de suito standards again are in question. I see this as a relationship between two kinds of politics.

-Metode:

The thesis is based on participatory observations performed throughout a year long multicited ethnography of cloudification and personal information management practices in the Norwegian education system.

It is based

Chapter 1.

In chapter one I discuss the challenge of studying using a grounded approach to study the contexts of the Internet in the present day classroom, as it is an ubiquitous media enmeshing paper and cloud technologies in a number of different ways. I follow the mobile devices that make up the computer network in the students digital learning environment. It is no one boundary between the extended network of the teachers, the administration, the national registry, and the Internet. Rather these systems needs to be studied in a distributed fashion, as the mesh they entangle with in the contexts they are designed for.

I try to study the materiality of ‘the education cloud’ as a place within the student online environment, but I am forced to be very critical about whether such an object exist at all. I had approached cloud technologies almost like an (singular) abstract object. The chapter therefore starts off by describing my own surprise with the ease with which I could observe and discuss digital technologies as highly concrete and visible parts of the school already at my arrival.

I describe the flow of these objects - some mobile and other stationary – through the spaces of the school and the school-day. I have picked four situations that I which to use as examples of classroom contexts.

First, there is the ‘experimental’ context of the science room:

-The context is that of the active investment programs of the newly refurbished science room. The space is not the only differentiated room within the school, so instead of beginning in the ‘normal’ classroom I begin with the room as an example of an experience oriented room. It could perhaps be categorized together with other rooms like the art room and the crafts rooms, as well as the music room and even the gymnastics room as dependent upon the learning materials.

Second, there is the ‘basic’ classroom context.

I call it basic because of the way it introduces and frames different topics. It is highly human dependent, and as opposed to the science room in which all the students were centered around benches (enacting a scene in which everyone is watching each other study something in-front of them) the students are sitting in rows. More readily representing their own opinions. In the English group they got the option to run up and write something, in the Norwegian class they talk about their own experiences, and even in the maths class they have to use memory from previous tasks. The room is filled with posters of class-schedules and artistic depictions of the rules that have been ‘collectively’ formed at the school.

Third, there is the ‘flipped’ context.

Lastly, I want to describe the ‘gamified’ context.

1. the Christmas tradition search: pre-programmed instructions in this ‘virtual’ game (no real game).

2. I also use the example of when Tina and I was playing along in the game. This game was made by teachers, but in a sense it did not matter (to us teachers) since it ensured a sort of context neutrality (a virtual division).

Ch.2

-Dette gjorde at jeg tilnærmet meg digitalisering som 'et' abstrakt objekt. Når jeg kom til skolen ble jeg derfor likevel overrasket over at det digitale kunne forståes som noe svært konkret. Heller var det det digitale sin heterogenitet som var 'issue'. Dette passet godt med mine observasjoner i den tidligere oppgaven. I denne oppgaven (som var om innovasjon innen skolesektoren) kommet frem til at mye av grunnen til forskjellene mellom teknologiene slik de ble sett på en LSP sine nettsider og slik de fremsto i forskningen var at ekspertkulturene i skolen og i en LSP var svært forskjellige. Dette var et problem som lignet svært mye på Oertzens studie av databaser i laboriatoriet, hvor forskere og programerere forventet at kodingen av dataen var et arbeid som tilhørte den andre parten.

Ch. 3

-Etter å ha vært på forelesningen ønsket jeg å skrive om den enkelte skole sin teknologi, og hvilken sammenheng dette hadde med de strategier jeg fant for å integrere det digitale i undervisningen. Men i bunn og grunn var det et spørsmålet om hvordan skolen som organisasjon ble endret av en fremvoksende sektor. Eller det som i den tekniske literaturen ble kalt 'Platform as a Service' (PaaS).