LAPTOPS IN CLASSROOM INTERACTION: THE DYNAMIC REACH OF THE LAPTOPED SITUATION

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ABSTRACT

Laptops and other networked technologies are commonplace at university campuses. While a range of studies researches the negative effects of multitasking, screenpeeking and other laptop related side effects this article emphasize the situational impact of student-laptop interaction. Departing from Goffman's framework on unfocused interaction and Meyrowitz concept of middle region we explore the technology mediated, situated, social interaction. In particular focus is the non-spoken interaction emphasizing both student-laptop interaction and the social interaction within and around the classroom. The article expands the concept of middle-region by connecting it to different modes of interaction, which are labeled intra-, inter-, trans-, and extra-situational interaction. The research thus aims at providing educators and researchers with a model to advance their understanding of situations ingrained with mobile technologies.

KEYWORDS

Laptops, ethnography, situation, unfocused interaction, middle region

1. INTRODUCTION

With the rather dramatic increase of laptops, mobile phones and tablets that have co-constructed new use patterns in everyday life, our interpretation of what a situation is, changes accordingly (Meyrowitz, 2004; Jenkins, Ford and Green, 2012; Lee and Wellman, 2012).

The laptop, now part of students' and teachers' everyday activities, changes the norms in the classroom (Fried, 2008; Lindroth, 2008; Young, 2006). Mobile technologies and ubiquitously available services introduces these new use patterns into the classroom and raise questions regarding traditional definitions of a situation and the mode of interaction the participants expect.

Generally, and not very surprising, research on mobile technologies in education has analyzed if and how technology affects learning, didactics or instructional design. Both Sana, Weston & Cepeda (2013) and Aguilar-Roca, Williams & O'Dowd (2012) focus on the possible negative impact of laptops in traditional lecture halls. However, this article takes a different approach. Instead of a traditional learning or pedagogic perspective it deconstructs the networked situation and, from a micro sociological perspective, dissects its interactional parts. The contribution with this approach is a thorough understanding of a networked situation. Which, in turn, may prepare higher education on how to educate networked individuals as described by Lee and Wellman (2012).

Within the tradition of situational studies, Goffman offers several basic frameworks for analyzing situated interaction. However, scholars such as Meyrowitz (1990) and Thompson (1995) have extended Goffman's definition to also suit mediated interaction, stating that a situation including mediating technologies (in Meyrowitz case, the TV) is not delimited by barriers of perception, but through the notion of perceptual field (Meyrowitz, 1985; 1990 Rettie, 2009). According to Meyrowitz, technology, such as the TV, affects interaction, increases our perceptual field and thus alters the delimiters of a situation. The laptop, with arguably different characteristics than television, has in different ways challenged how new modes of interaction redefine a situation. These emerging situations Meyrowitz (1990) refer to as *middle regions*. Meyrowitz expansion of the situational model has been critiqued for not describing the actual consequences of the concept of middle region (Julsrud, 2005). What does this blurring of social and situated boundaries

mean to the interaction within this middle region? The paper at hand explores the notion of middle region and its applicability to the studied networked situation.

This article answers the following questions. What types of interactions are enacted within a the networked situation and what are the consequences from an educational perspective?

The research presented in this paper focuses on the interaction in a higher educational classroom endowed with laptops. The findings are based on an ethnographic field study with data from interviews, observations and video recordings. Through a first round of categorizing the data, four sets of interaction were identified: *connecting*, *sharing*, *leaving*, and *layering* (presented in section 4). Furthermore, we propose that for educators, instructional designers and researchers these modes of interaction can serve as valuable analytical tools for reducing the complexity of the laptopped classroom.

2. UNDERSTANDING LAPTOP INTERACTION

Goffman's work on the *interaction order* focuses on situated face-to-face interaction in general, talk, body language, eye works etc. Within this order there are two modes of interaction, focused and unfocused where focused interaction revolves around the spoken word such as turntaking. Unfocused interaction is according to Manning (2005) and Burns (1992) in particular about the non-spoken interaction. In our analyses we focus on non-spoken interaction since the interaction with, through and around the laptop in general are about mouse movements, clicks, writing and how the students divide their attention between the screen, the teacher and other subjects and objects. The notion of the Interaction Order puts emphasis on the norm and expectations on behaviour patterns while co-present with, and mutual monitored by others. This order or norm is constantly negotiated as people are entering and leaving situations. This norm is what people use to make sense of a situation, to understand what mode of situation it is and how one is expected to behave, that is, what 'definition of the situation' is applicable (Thomas, 1923). A definition is formed when people act on their judgement of the situation (Goffman, 1963; Burns, 1992; Manning, 2005; Meyrowitz, 1985). The understanding a person will come up with becomes the definition of possible behaviours within the situation. While Goffman states that this area of research is about unmediated interaction Meyrowitz sees the potential also for mediated interaction.

2.1 Perceptual Field

For Meyrowitz, the two notions, co-presence and barriers of perception, are subcategories of the more inclusive notion perceptual field. While Goffman's unit of analysis is the physical situation, Meyrowitz argues that if the perceptual field is altered by the use of technology, also the situation, or how we interpret the situation may changes accordingly. To use Meyrowitz own words:

"For while situations are usually defined in terms of who is in what location, the implicit issue is actually the modes of behaviours that are available for other people's scrutiny" [Meyrowitz, 1990 p. 88] Hence, when technologies such as Instant Messaging (IM) make a user digitally present in other locations the perceptual field is increased to include aspects of this location as well. As such, it also affects the very definition of the situation as it also increases the perceptual field, that is, the reach of our senses within as well as outside of the physical location. Laptops and other technologies such as mobile phones and tablets increase the available action space to also include aspects that are digitally represented. Hence, what we do and say is affected not only by location as such but the patterns of interaction and access to information. This makes the situation more dynamic. It may increase the situation to also include others not locally present. But, it may also be more divided or layered since there may possibly be different streams of information not accessible to everybody taking part of the situation. As such, the situation is more dynamic, more divided but also more outreaching, with technology present (Meyrowitz, 2004).

2.2 The Middle Region

Following this line of argument Meyrowitz states that the alternation of the perceptual field contributes to a connection between different situations, i.e. technology increase the reach of our senses and thus, of the situation. Equally, when the mobile technologies and with them associated use patterns are performed in new

and different situations, the patterns and situation merge or integrates into a new situation with its own ”behavioural patterns”, as Meyrowitz express it (1990). He argues that TV, computers and other media technologies thus contribute to, what he calls, middle regions. The notion of region is a reference to Goffmans (1963) widely known work on front and back regions (or stages) and how we behave differently depending on the situation. The classic example is at the restaurant where the waiters change their behaviors as they move between the kitchen (back stage) and serving§ customers (front stage). Hence, digital and portable technologies support what Meyrowitz (1990) calls situational integration. Others, outside of the local situation able to ‘monitor’ a situation and thus make these situations partly integrated. It is argued that as users of these technologies mix different situations the result may be experienced as less differentiation between the private and the public (Meyrowitz, 1990). Thus, the middle region is a mix of both front and back stage, but lacks the extremes. As such, the notion of middle region means mixing of situations as a result of portable technologies used in different situations.

3. METHODOLOGY

The empirical material used in the analysis here is a subset of a larger longitudinal study, conducted by the first author. The data has been collected and analyzed using qualitative, ethnographic methods (Clifford and Marcus, 1986; van Maanen, 1988; Hammersley and Atkinson, 1995). The students and the department in this study are located at one of Sweden's largest universities.

The ethnographic material was gathered using open-ended interviews with the students and through video recordings of lecture settings. While each activity was conducted to get a different perspective of the studied phenomenon it also saturated the researchers’ understanding of the practice, i.e. the ethnographic work can best be described as explorative. 16 persons have been interviewed within a total of 10 interviews, (seven female students and nine male). Out of these, two were group interviews. The interviews were open ended and lasted between 45 to 90 minutes. They were transcribed and analyzed together with the observations. The interviews especially contributed with a better understanding of the students’ way to express themselves around the experience as laptop users. Four lectures were video recorded from the back of the classroom with the purpose to capture the minute-by-minute interaction around the laptop computer and on the screen. Each lecture was analyzed and relevant parts of the video recordings were transcribed. Video recording during lectures have been made with written consent from both students and lecturers.

The field notes and interviews have been transcribed and iteratively organized according to an analytical scheme. This transformation of data into empirically and analytically viable interpretations is indeed an active and creative work of the researcher. It is therefore the researchers’ interpretations that become visible also in the descriptive accounts produced during the study. During the analysis of the empirical material we looked specifically on interactions involving the laptop, i.e. interaction with resources and persons that affected mutual monitoring, copresence and barriers of perception. The analysis involved categorizing observed use. First in rough categories such as 'interaction with distant others' and 'interaction with non-educational resources'. In the second cycle, the analysis focused on the situational characteristics of these interactions, creating sets defined by their similarities or differences concerning their relation to the situation where they were observed.

4. LAPTOPS IN CLASSROOM INTERACTION

Here, we present empirical material from the ethnographic study divided into four different sets of interactions where the laptops play a central part.

4.1 Connecting

The section below describes one student and the first ten minutes from one of the in-class video recordings of a lecture. When entering the lecture, the student establishes herself by opening the rucksack, picking up the laptop and placing it on the desk. The student then connects the cable to an electrical outlet and opens the lid

of the laptop. The student then sits down and log in to the wireless network. The laptop is in standby-mode. Thus, the screen has several open windows from the last use session. A web browser is visible, with several open tabs and a few other unrecognized applications. The student switch applications, from the browser to Spotify. During the following minutes Facebook is visited, Gmail, and two of the biggest daily newspapers, before a document with plain text is opened.

This is a preparation for the lecture and a setup of some form of, for the situation, proper workspace. Additionally, the use pattern of visiting these web services is a habit developed elsewhere but brought into the lecture situation with the mobile technology. As the student navigates to different web sites, the browser suggests site-addresses through the auto-complete function in the browser's address bar. These are based on the users browsing history. This is one of the ways where previous interactions and activities, initiated in other situations, reach into the classroom situation. Different use patterns follow into the classroom as the laptop is carried between different locations. Additionally, when students log in to the Wireless LAN at the university, the login webpage urges the user to shut down possible peer-to-peer downloads of copyrighted content. The main reason for this is not that students frequently start these peer-to-peer services in class, but rather that it is common for students to have their laptop in standby mode when moving between home and school and the peer-to-peer software reengages with the download activity as soon as the laptop is opened.

In interviews, the students often refer to how the laptop facilitates a connection with their past activities through the access to information from past. Thus, the interaction with the same portable and personal device, with software, and online services, enables what one student describes through terms of intimacy and feeling of safety, a relationship that is about a personal association with documents, URLs, chat messages, that is, information that means something specific to that particular student. These traces or breadcrumbs of interaction have a specific meaning to the creator. But this is a resource built up over time and over a range of different situations. It is the sequence of use; the trace of use is engraved in the laptop that builds such a relationship. Then the resources of past interaction are available to support the user without the need for further preparations. This transferability of use patterns between different situations suggests what may be called transsituational interaction. A mode of interaction that due to the mobility of the device is possible to bring between different situations.

4.2 Sharing

Instant messaging, Facebook-updates and tweeting are part of the ongoing interaction in the classroom. In interviews the variation in students´ attitudes regarding Facebook and chatting during lectures become evident. Several of the students state that they do not engage in non-lecture related activities. Others state that they try to keep use at a minimum level but if the lecture becomes too boring they may engage in non-lecture related activities anyway. The video recordings confirm these heterogeneous patterns. The attitudes towards interaction with non-present others range from something some student never do to minute-to-minute communication during the lecture.

These synchronous or near synchronous interactions with non-present students, friends and others become an additional mode of interaction and a sort of mutual monitoring that extends outside of the local situation. During interviews student talk about this monitoring of others online presence as comforting and as being among friends. During participant observations the researcher and student's talked about social media as district heating. Meaning that it is not only the actual messaging that has a meaning, but also the awareness of others online presence.

4.3 Leaving

During a lecture there are a range of different use patterns coexisting such as taking notes or instant messaging with the present others. Some students engage in use patterns that have nothing to do with the local situation. In the video recordings of the classroom the following mode becomes visible when students read or play online games for 30 minutes, during a lecture and only once in a while gazes towards the teacher. In interviews, student comment on this as an act of habit, politeness but also for practical reasons. As they explain, out of habit because both themselves and others expect them to attend lectures. Out of politeness because of a perceived personal obligation toward the teacher and for practical reasons since the lecture might touch upon an interesting subject. During the interviews it was also mentioned that a few of the

students had experienced efficiency during these situational breakouts. However it's an efficiency regarding other assignments or tasks not obviously related to the present situation. It is a mode of interaction that is of extrasituational charactar. They do not engage with the present others at all. It is as if they are physically present but from an interaction perspective they are absent.

4.4 Layering

Laptop use in the studied setting is characterized by a variety of parallel activities. The following description is taken from one of the video recordings. The camera is placed in the back of the classroom. 46 students are attending the lecture and most of them use their laptops on and off during the lecture. One of the authors was also present during the lecture, taking notes. During the lecture it is observed how the students alternate the lecture related material open on their laptops with chat-sessions, online java-libraries, online games, online newspapers and Facebook. From moment-to-moment the students shift their attention, between the teacher's activities and more personal on-screen activities.

In the video-recordings we can observe instant messaging between co-present students in the classroom. It is possible to group the messaging into two groups; instant messaging between pairs of students in the classroom, as well as online group chat involving more than two students. Chatting between two students is common in the data, for instance through online instant messaging services. The group chats requires a more structured approach where there needs to be some shared area for the discussion. There needs to be some mode of negotiation on what service to use. During interviews Google Wave, IRC and Facebook have been mentioned as channels for such communication. These channels are often talked about as back channels (McCarthy and Boyd, 2005). A back channels is a form of secondary channel that complement the talk in the classroom. While these modes of back channels have been used on several occasions they are, according to the interviews, rare and have only involved a subset of students. Still, within these back channels, collaborative notes have been gathered, images or pictures of tables or slides have been shared. Students have been seen taking pictures with their mobile phone and when asked about it confirmed that they shared them in a Google docs.

Different screens affect the use patterns in the classroom in different ways. The teachers projected screen affects the on screen behaviour but so does the screen-peeking between the students. Depending on the perspective (lecture or leisure) or position (back or front of classroom) of the participant within the situation there will be different sections or layers of the interaction that are accessible.

We see the screen-peeking and the related spreading effect as a form of local interaction that is internal and stays within the specific situation. It is characterised by the screens visibility within the classroom to others than the owner. One other local interaction is the back channel interaction. It is also an interaction primarily between the participants of the same physical gathering but this interaction relies on online services such IM. It is a mode of interaction that is parallel to the material or analog interaction. It is mediated by the screen and various services and sometimes open only to parts of the group. These two examples: screenpeeking and back channel, are example's of internal interaction, that is interaction that primarily involves people locally present.

5. MODES OF INTERACTION IN CLASSROOM SITUATIONS

The modes of interaction presented below are analyzed based on their interactional characteristics, interaction that affected mutual monitoring, copresence and barriers of perception, that is, the basis for a middle region. But, it is not sufficient to state that the studied classroom shares the characteristics of a middle region. We also need to break down the studied middle region into its interactional parts.

Hence, the different modes of interaction are analysed based on their characteristics and relationship towards the situation as a middle region. To assist the discussion around these modes they also need a name. Considering the characteristics of the first mode of interaction where use patterns and services from one situation are transferred to another. Hence, its about *transsituational interaction*. The second mode exemplifies synchronous interaction between situations, that is, *intersituational interaction*. The third mode illustrates patterns and interaction that to a large extent lack connection or relevance to the present situation.

Thus, a mode of *extrasituational* interaction. Finally, we call the last mode *intrasituational* interaction since the interaction stayed within one single situation.

These modes are only theoretically distinct, in practice students flow between and integrate the different modes. First we analyze the modes and in the final section the focus is on the dynamics between them.

5.1 Intersituational Interaction

When students engage in interaction with persons not in the same physical location, the barriers of perception that Goffman (1963) use to define a situation can be questioned. If a situation is defined by the physical setting, online interaction involving people in different locations would have to be understood as a new, combined situation: a *middle region* framed and defined by the situational norms from several situations. Rather than focusing on our un-aided perception that acts as a delimiter of a situation, the notion of perceptual field is less rigid and focuses on mediated presence in all its various forms.

Students talk about these dynamics in the perceptual field as comforting. In educational situations students have access to online friends for support, advice and to pass the time. But, there is a distinct difference between students' motivations for engaging in intersituational interactions. Obviously it is a difference if the interaction is initiated by the student or by one online, non-local contact, that is, if you are the initiator or receiver. Many students talked about the opportunity to engage in intersituational interaction as a kind of a safety valve. At times, when the lecture felt irrelevant they engage's in intersituational interaction, not to disconnect them selves completely from the situation, but to make it bearable. However, it is also a fact that many students felt a need to have strong self-discipline to deal with a constant temptation. The increase of the perceptual field and the expansion of the reach of the situation that the technology makes possible is a challenge for the individual to handle.

5.2 Transsituational Interaction

The perspective presented here sees students' interactions as an ongoing continuous unfolding stream of activities. What they do with their laptops is obviously connected to previous activities. Almost every single resource used on their laptop is accumulating use history over time. For example web browsers collect history information of the past visited web pages, they could also be adapted with included bookmarks, quicklinks, autofill functions, which are more dependent on users interest, previous use and effort to design a local setup of the browser. IM, Facebook, Skype and other communication tools are dependent on students adding new contacts over time, they also support search and history of previous communication. As users access these resources, developed over time, we argue that they engage in past interactions. Interactions could in this sense form a chain of connections between different situations. Our interaction and information history is embedded in our technology: documents, log files, open tabs, play lists and documents are always present. The technology together with this information support the transcending of procedures and patterns from one situation to another.

5.3 Extrasituational Interaction

In extrasituational interaction we point out a mode where students actually stop partaking in the co-located activities. In some ways they even stop to continuously and attentively concern themselves with addressing the locally present persons or interaction.

Students can engage in extrasituational interaction using mobile technologies, and obviously it can be achieved without any technology support – students occasionally let their minds wander in class, even before mobile technologies were commonly available. The reasons for extra situational interaction are different but sometimes not as arbitrary as one may think. Some students attend lectures with the intention to participate but resign to the online temptations. Others attend explicitly to engage in extrasituational interaction in parallel to the lecture and only listen in to certain specific parts. Thus, during the lecture they work on other assignments and engage with the situated interaction when specific topics are up for discussion. The technology is used to make the surrounding situation stay out of the students super local situation. The interaction mode is a mode that is characterised by its excluding qualities.

5.4 Intrasituational Interaction

Students access to several screens around them in the classroom allows for non-verbal interaction. This is done by screen peeking or glancing (as described in Lindroth and Bergquist, 2009). Participants within the same context engage in mutual monitoring of other participants' on-screen activities, which allows for interaction concerning specific content or use. For example, on-screen material is used for engaging in non-verbal interaction through pointing and gesturing towards the student's own, or other students' screen. The on-screen resources employed in the intra-situational interaction vary from very closely related to the topic of the lecture to topics obviously non-related. It is observable how particular activities or use spread within the classroom. As students have visual access to other students' screens viewing specific content or engaging in use often spreads among other students who are able to observe these activities e.g. visiting certain webpages.

However, intrasituational interaction also addresses the activities among students, which employs online resources for the interaction. This interaction is less visibly accessible, in particular to the teachers. The mediating resources include IM, Facebook, Skype and other similar services. These allow co-located students to add a channel of interaction to what can be heard and seen in the lecture hall. Such "back channels" allow participants to communicate around the content of the lecture as a collective activity. This extra layer allows for interaction in pairs as well as groups of students. As such it includes some and excludes others from part of the interaction. The mutual monitoring of the participants of the situation is thus affected. While some students have access to all the different layers of the interaction, others, including the teacher, are partly unaware of the different channels.

5.5 Extending the Concept of Middle Region

The four modes of interaction coexist in the studied setting. Hence, student and technology co-create a situation where interaction is layered, use patterns are mixed and parts of the situation are shared. At times, students even enter the situation just to stay out of it, as in the case of extrasituational interaction.

We argue that the modes of interaction extend the concept of middle region. It is an extension that focuses on the students' perceptual field, which is constantly and dynamically changed by inter-, trans-, extra- and intra-situational interaction. As a consequence, it is no longer clear who is part of a situation and what situation one is part of. Rather, it is an interchanging, dynamism where situations, through participants interaction, reach and withdraw into and from each other. Thus, the situation acquires multisituational characteristics. While the concept of middle region suggests a merger of situations and the associated norm systems. Multisituationality adds an interactive parttaking with different dispersed locations as well as the layeredness of the present location, as expressed above as intrasituationality. With the advent and use of mobile technologies the perceptual field becomes dynamic, which in turn leads to what we call multisituationality.

5.6 Implications for Practice

Our first choice of teaching method is no longer to gather 30 to 40 students with different agendas into one large room for 90 minutes. That is, if we schedule the students, we always ask ourselves, what do we gain by meeting face-to-face, what is the purpose and what is the relevant group size? Instead, we use a multisite Wordpress where we write, embed our Youtube videos and gather all the course related material into course blogs. Open to the world, of course. When we meet, we meet to discuss, work together or present what the students have done so far. Peer review and peer assessment are standard procedures. As part ot this, the student publish the assignments on their open blogs. We talk about this as maximized openness. The course material and assignments are open in a MOOC-like way. The result of the assignment is never sent to the teacher only, it is always peer-reviewed, and most often, published on the student's blog. An important part of this open approach is devotion and engagement, that is, the assignments are designed to inspire and be of interest, not only as an assessment, but to everybody interested in the subject matter. Since all the material is open to the world the engagement is not only a teacher-student-course engagement.

This is a direct result of multisituationality and the dynamic reach of the situation. Of course you can ask the students to close down their phones and laptops during lectures. But closing down is working against instead of inline multisituationality. Multisituationality is about the present location dynamically reaching in to other distant locations and vise versa. Instead of building a teaching bunker shielded from the world we

chose to openly distribute the learning situation and make it available and observable – monitored by others. It is a different monitoring compared to Goffman's original description. Multisituationality implies monitoring by distant as well as local others, it implies many simultaneous active norm systems. Working inline with multisituatonality implies that we dynamically stretch and reach out to the learners. The studied situation, the traditional classroom in general, is already distributed as a result of multisituationality. Thus, taking multisituationality in account during course design is central to meet the expectations of the networked individual.

6. CONCLUSION

This article analyzes an instantiation of Meyrowitz (1990) notion of middle region. Within this region we saw four modes of interaction: intrasituational interaction, transsituational interaction, intersituational interaction and extrasituational interaction that together establish the middle region. By extending the reach of a situation, we question Goffman's definition of a situation and add these modes of interaction and multisituationality to Meyrowitz (1990) notion of middle region. Additionally, the social situation does no longer determine what we do in a particular location. These students are much more opportunistic in their choice of actions and thus transform the definition of the situation. When it is not our senses that delimit a situation, when the students mix use patterns in between, the situation collapses since there is no longer a homogeneous norm in action but rather a heterogeneous blend of different agendas.

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