Lean-generated documentation in the Swedish manufacturing industry

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The textualisation of the modern workplace is a subject that concerns researchers within the field of communication and literacy starting twenty years ago and continuing today (inter alia: Hull 1997, Belfiore et al, 2004, Kleifgen 2013). Ethnographies have shown the amount and variety of texts that workers in small and large scale organizations deal with and discuss the new emerging discourses underpinning work structures and work roles. The modern workplace that is characterised by flat hierarchies, shared responsibilities, quality control practices and self-surveillance is discussed under many names, some of those being: new work order, new capitalism and knowledge economy. Literacy researchers have discussed the impact of new literacy demands on workers and have shown how workers' identities are constantly being reshaped through discursive practices (e.g. Karlsson & Nikolaidou 2013). Workplace literacy studies paint a vivid picture of workers who are placed in strategic posts and work within the framework of quality control systems and standardization practices (Jackson 2000). Ethnographies paint a picture of workers who are asked to produce and demonstrate quality in work under high time pressure and demanding circumstances and are asked to deal with extended paperwork alongside their main work tasks (e.g. Tusting 2010).

The scope of this paper is to focus on a large scale manufacturing company in Sweden and examine the effects that textualisation as a result of lean production has had on the Swedish workplace landscape. More specifically, I will show how lean production is translated into what Scheeres (2007) calls a “textualised workplace” and discuss examples of texts that serve the purposes of quality control and standardization practices. Additionally, I want to discuss the textualised workplace through the lens of ‘surveillance theory’ (Brockerhurst 2001) and show
how lean manufacture practices place workers under a constant state of observation and how texts serve as an ideal tool for involving workers in the surveillance process.

Lean manufacture and the textualisation of the Swedish workplace

Lean manufacture can be described as time and cost efficient production, a highly rationalised and complex system that aims for quality in production and customer value. Lean manufacture originated in the automotive industry of Japan in the beginning of the 1990s and versions of it appeared very early in the automotive industry of Sweden. Today, the concept of lean production in Sweden has undergone many changes and is considered the dominant approach for rationalization work in the manufacturing industry (e.g. Oudhuis & Tengblad 2013).

Lean production places standardization and documentation of work practices at the heart of the workplace organization. As a result, a large number of texts are introduced at the workplace. In Sweden, despite the prominent role of such quality control systems, the vast increase of texts and its implications have not been substantially researched and documented. What is of special interest is to examine the way these new texts change the established work landscape and the way this influences the workers’ attitudes to their work roles, relations to one another and possibilities of participating in central work practices. One study that set out to research the role of reading and writing in the Swedish industry is Eriksson Gustavsson’s doctoral thesis (2005). Using interviews with industry workers, Eriksson Gustavsson shows that reading and writing play an important role in their working lives, despite the fact that workers are often unaware of this. In a different study, Karlsson (2006) adopts an ethnographic perspective and examines the literacy practices of workers within professions that are not typically seen as literacy related, such as drivers, construction workers and carers. Nikolaidou & Karlsson (2012) report on an ethnographic study that took place in elder care facilities in Stockholm and discuss the impact of the highly textualised nature of the elderly care sector on the care workers and especially on those workers who have Swedish as a second language.

These and other similar studies show that texts play a dominant role in the rationalisation of the Swedish workplace. What is new with the present study discussed here is the focus on lean manufacturing in heavy
industry and the documentation practices that this system generates. My aim is to show that the application of lean systems and the production of high quality products is achieved by the use of a large number of texts that do not always serve as meaningful work tools for the workers. On the contrary, they often function as a means of surveying workers and urging them to identify with the company’s targets and values.

The study
In order to understand the way lean production is applied in the Swedish heavy industry, I have conducted a nine-month ethnographic study in a factory that manufactures construction equipment. The aim of the study has been to understand the communicative demands placed on production workers as a result of the introduction of a lean production system. A special focus was placed on the literacy practices (Street 1993) that were frequent and dominant in the factory, meaning all occasions where reading and writing played a central role in the completion of a task and the workers’ strategies and attitudes towards them.

Ethnographic methods of data collection offer research tools for studying literacy as a situated practice. Entering a workplace as a participant observer allowed me to collect data by being present in the workers’ life in the factory and participate in the social activities that shaped it. Additionally, by discussing with the workers about the literacy events in which they participated, the problems they encountered, the solutions they found and their attitudes towards the work they did, I was able to understand in depth the role of literacy in their daily tasks and the needs that arise as part of the highly textualised work demands. Finally, by collecting key texts found at the workplace, I was able to use them as a starting point in my interviews with the workers and use their insights in order to later continue with more detailed text analyses, in line with the methods described in the methodological field of linguistic ethnography (Rampton, 2007).

More specifically, data for this project was collected in three different departments at the production floor of the construction equipment factory, including 30 workers and two middle managers. I conducted planned qualitative interviews with 10 participants and I had unplanned informal discussions with all the participants, including temporary staff and staff that was made redundant during the study. The majority of the workers were men and had Swedish as a second language. The factory
had adopted a total quality system in the last four years and most workers were at the stage where they had become familiarised with all the practices that formed part of it.

**Lean manufacture-generated documentation practices in the construction equipment factory**

Lean manufacture-generated documentation will be examined in the frame of what today is called ‘surveillance theory’ (Brocklerhurst 2001). This term describes a number of studies that use Foucault’s ideas on the exertion of power, as he described them in his work ‘Discipline and Punish” (1977), and they show how the concept of surveillance, in the form of an all seeing-eye, is applied in organizations (e.g. McKinley & Starkey 1998). In his description of Bentham’s panopticon, Foucault discusses surveillance as an open and transparent way of observing and being observed and shows how visibility can become a trap (p. 200). The certainty of being observed at any given moment results in that the observed person assumes power by actually becoming “the principle of his own subjection” (p. 203). Forms of panoptic surveillance that have been discussed with a focus on the workplace are self-surveillance (Deetz 1998) and peer surveillance (Ezzamel & Willmott 1998). Iedema et al (2006) discuss practices of surveillance that take place by means of workplace interaction and examine the new roles workers are called to take in problem solving meetings. Similarly, Jackson (2000) shows how ISO quality certification processes encourage workers to exercise both self and peer surveillance through their documentation practices. These studies set out to theorise identity formation as a result of power and discipline in organizational settings and tell tales of conformity but more often they tell tales of resistance.

Lean manufacturing in the construction equipment factory has resulted in what can be described as a rich inventory of surveillance practices that take place by means of documentation and interactional practices. In the remaining of this paper, I will present examples of key texts from the production floor of this study and I will show how these texts are sometimes used in order to scrutinise workers’ practices and how they subsequently form their work identities. The four functions of documentation in the production floor of the equipment construction factory are: documentation of work activity, documentation of quality assurance, documentation of time wasters and documentation of errors.
In this article, I focus on the first three functions and I am dealing with documentation of errors in a separate forthcoming paper.

Documentation of work activity

A worker’s shift at the production floor of the equipment construction factory always starts in front of the whiteboard. This is where the floor staff is informed by the team leader on the daily, weekly and sometimes even monthly productivity targets. The whiteboard also provides information on discrepancies in the department and the measures that have been taken and, more importantly, it pictures performance charts in relation to various standards. The productivity targets in one of the departments in this study had been schematically pictured in many different ways, but recently they had agreed on a chart that, according to the management, was easy to read and effective (see Figure 1).

What is presented in Figure 1 is the daily productivity targets for a whole week and the system includes colour-coded numbers in order for the workers to be able to read them: the top number written in black colour represents the article number, whereas the blue number is the daily target of articles. If the target has been reached by the end of the day, the workers rewrite the target number in green colour, whereas the number remains blue if the target has not been reached, indicating in this way that they need to continue working with it.

The production workers used this table consequently and they never missed to change the colour of a number once they had completed a job. At the same time, they found the productivity targets to be unreasona-
ble. The following extract comes from my fieldnotes after having discussed the function of this table with two workers:

Nestor and Kali explained that the targets don’t represent the department’s reality. Nestor said that the management doesn’t take into consideration all the extra time they need before and after production. For example, they need extra time to prepare a machine, measure, correct mistakes, reprogram and even go to the toilet and take a coffee break. The management has only calculated how much time the machine needs to produce the items and this is what creates their standard. The human factor doesn’t count.

Similar opinions are expressed in interviews with most of the people in this study. Workers feel that time pressure is always a stressful factor and the fact that they need to document their performance in a table makes the process even more stressful, as they know in advance that the targets will be met with great difficulty. When I pointed to the fact that according to the table they usually reach most of their targets, the enigmatic answer I got was that this is achieved with great sacrifices.

An additional way of reporting work activity is through digital documentation. Each worker has to log in to the intranet system at the beginning of a shift and register the article number he/she is going to be working with. It is only by completing the digital documentation that a machine will start working. At the end of each shift, the workers need to log in to the intranet again and report the individual daily production outcome. A lot of the workers felt that this is a repetitive task, as they need to report the target outcome both in the intranet and on the whiteboard table.

**Documentation of time wasters**

Wasting time is considered to be a major problem in the construction factory and this is made evident by the many different reports that are filled in when wasting time and by the many charts that illustrate the total amount of time waste. Time wasters are reported in the form of units and each unit is counted as six minutes. Figure 2 shows a table that is found on the whiteboard and workers are asked to register time wasters each time they do not manage to reach their productivity targets. In the horizontal axe of the matrix there are possible reasons for time waste, for example: meeting, training and cleaning. The workers need to
fill in how many time units they wasted and for what reason. The following extract is from my fieldnotes, and describes a day when I followed Malik, a floor worker who had been at the same department in seven years:

Malik seems stressed and he explains to me that he hasn’t been able to produce as many articles today due to many different problems. He has only made seven pieces and he was on his way to document this. First he fills in the productivity target table and then goes on to fill in the “time wasters” matrix. He says it is very difficult to count the time units, as today he had many reasons for not reaching his target and he can only roughly calculate how much time he spent on each one of these. Malik seems annoyed and jokes by saying that what he is doing now (filling in the table) is also a time waster but the management doesn’t seem to care about that one.

Additionally, the workers need to fill in matrixes showing time wasters that relate to each specific machine. If one machine stops working during someone’s shift this has to be documented using a similar system of time units. The following extract from my fieldnotes comes from a day when the department had a blackout. I was then shadowing Wali, one of the department’s team leaders:

I am going back to Wali’s machine and see that he is still trying to repair it. He says that he’s tried all possible ways without results. At the end, he decides to reset all the settings and he manages to get the machine working properly. He says he has lost at least two hours and he needs to report them. He shows me the form that he has to fill in,
it is a form specifically referring to the machine he was working with. He needs to choose between 13 different reasons for “time waste” and he chooses the word “breakdown”. He shows graphically how much time he lost and in the comments he writes the word “blackout”.

Wali was one of those workers who had a positive attitude to documentation and contributed with ideas that he discussed with the production leader. In the interview I had with him the same day as the blackout event described above, I asked him if it irritated him having to report each single action and I used the blackout as an example. His answer was that this kind of reporting is necessary if they want to find a solution for the machines not to break down every time there is a blackout in the future.

The information on time wasters reported by the workers is later recontextualised in a summarising bar chart that shows the total time waste and the reasons that caused it. A similar report summarises the weekly production numbers and time wasters in form of statistics. Both reports can be found on the department’s whiteboard and are discussed in the departmental meeting that takes place in front of the whiteboard twice a day, at the beginning of each shift. Statistics on performance, including time wasters, are also presented in a screen placed in the entrance of the production floor that is aimed to inform guests on the activity in the factory.

Documentation of quality assurance

Quality assurance is understood as the lifeblood of lean manufacture (see Jackson 2000). Every single action and every object in the production floor has to repeatedly undergo a process of control in order to secure a high quality standard in the manufacturing process. Quality assurance requires strict standardization of all actions in each department, in order to eliminate the risk of discrepancies. For example, even though the machines are digitally programmed to manufacture parts with specific dimensions, the workers need to perform manual measurements of dimensions for every third item produced by each machine. In this way, there are double and sometimes triple controls for most items discharged from the department.

Documentation is an inherent part of quality assurance by means of written reports and archives. An example of the scrutinised processes of
control is the checklist for every cell in a department. All tools and all machines need to undergo a process of maintenance and in the checklist that is centrally posted in each cell the workers can find an inventory of all the maintenance activities, divided in week days and in shifts. Some examples of these activities are: ‘clean and control the electricity cabin’, ‘control the pump’ and ‘clean the filters’. Each completed action should be crossed out in the list and the idea is that the cross replaces the worker’s name, in line with the factory’s ‘no blame culture’. The idea is that the responsibility for maintenance is not individual but collective, but in an interview a worker pointed out that the management knows which worker works in each shift and it is therefore not difficult to find out who neglected the maintenance process or did not follow the standard procedure.

The whiteboard is a space where quality assurance takes a new form, that of a performance appraisal system. The use of performance appraisals is an increasingly dominant aspect of lean manufacture organizations with the aim to rationalise and justify decision-making, by making workers active in evaluating their own and often their colleagues’ productivity (Townley et al 2003). In the case of the construction equipment factory, one form of performance appraisal that is always visible is the departmental appraisal system on the whiteboard. As it can be seen in Figure 3, the system takes the form of two monthly calendars designed on a large capital Q (that stands for ‘Quality’). Again we have to do with a colour-code system where the workers of each department cross out with green colour every day without a discrepancy or disposal respectively and with black colour (or red in the second Q) each day that a discrepancy or a disposal has occurred. In the centre of the two Qs there is space for two digits, the maximum was record of days without any discrepancies or disposals in the department and the number of days without any discrepancies or disposals at the time being. The appraisal system is to be filled in daily and it is the workers’ responsibility to do so.
During my time in the factory, I was often there when the workers were dealing with discrepancies and disposals. Despite the strict quality assurance measures, mistakes did take place and in some cases large amounts of items had to be disposed. In these cases, I experienced an overarching feeling of disappointment and agony in the department and all the workers talked about was how much energy and time they had spent in vain. In one of these cases, I was present when the team leader crossed with red pen the calendar date in the Q chart. He told me that they had reached eight days without disposals and he was hoping to break their previous record, which was nine days, and therefore he was now disappointed to mark the calendar with red pen. Later at the same day, I had an interview with Mika, a production worker at the same department and asked him if he was also disappointed for not breaking the Q chart record. This is what Mika answered:

I try not to get stressed when I think of the Q chart (laughs). In the department we often joke about it but in reality it is a means of pressure for us. Wali (the team leader) wants us to see this as a competition but who are we competing against? When there are disposals there are usually some underlying reasons but this is not evident in the Q chart. It just shows that we made a mistake, but it
doesn’t say whether we are tired from working overtime, if we are understaffed, if the machine is broken and things like that. The only thing that it shows is that we made a mistake.

Performance appraisal systems are often used as a means of motivating workers, stressing them ‘in a positive way’, by forcing them to engage with the organization’s aims and having a constant focus on quality (Bicknell & Liefooghe 2010). The two examples above show that the performance appraisal system generates mixed feelings amongst the workers. The team leader seems to be more loyal to the institutional discourse inherent in the lean manufacture practices and embraces the spirit of challenge and competition in the Q chart. On the other hand, Mika’s comments (similar to the comments of many other workers in the department) show that some of the workers do not embark upon the idea of ‘positive stress’ and believe instead that appraisal is another strategy to keep them motivated and eventually to place the responsibility and the blame on them if things go wrong.

**Discussion**

The documentation practices in the construction equipment factory discussed here are typical examples of literacy events with which floor workers engage on a daily basis in order to document all their work activity. The documentation practices described here are not considered particularly difficult or demanding writing tasks. A lot of it comes down to crossing boxes and filling in charts. However, most of these practices generate difficult issues and dilemmas that workers have to deal with on a daily basis. Working with easy written tasks under difficult circumstances seems to be a pattern in textualised workplaces (e.g. Tusting 2010). The factory workers experience time pressure not only in the sense that they do not have the time to document but, more importantly, in that they have to reach productivity targets in very strict time limits and they have to account for time wasters. The dilemmas they experience are not related to their language or their writing skills. They are dilemmas related to the social landscape of their workplace with a direct connection to the literacy practices generated by lean production. They are also dilemmas that concern all production workers, irrespective of first language and knowledge background.
The data shows that there are conflicting attitudes amongst the workers regarding documentation practices such as the appraisal system and the time waster reports. Whereas most workers were doubting the management’s intentions with documentation, the team manager (also a production worker with a higher responsibility role) engaged in the managerial discourse of appraisal and productivity targets without protest and tried to convince everybody else for the value of documentation. In reality, all production workers abided with the rules even if these irritated or frustrated them most of the times. Foucault (1977) shows that surveillance systems succeed in generating discipline and conformity and it seems therefore inevitable that also in this workplace staff members accept and follow the rules, securing in this way their jobs and their established roles in them. The team manager’s case is a typical example of a ‘conformist self’ as his position of responsibility in the department leads him to embrace and encourage the implementation of surveillance techniques, such as continuous reporting of all activities. It has been argued that individuals tend to be satisfied with their positioning as observed and therefore valued objects and therefore give consent to the subordination of their own subjectivities (Collinson 2003). This could be the case with the team manager who seems to be preoccupied with his prestigious position in the department. He is probably identifying himself with the management and therefore promotes techniques that in reality place under surveillance himself and his nearest colleagues.

Power and discipline do not generate only conformist identities but also identities of resistance. I have discussed elsewhere (Nikolaidou 2014) examples of resistance in the production floor of the construction equipment factory, but admittedly these were not many. The very facts, however, that most of the workers talked about lean manufacture practices as repetitive and meaningless processes and that they were not loyal to the discourse of lean manufacture and the values it promotes shows that they were doing resistance, even if it was not directly communicated to the management. Iedema et al (2006: 1112) argue that nowadays workers are in a state of continuous doubt of the previously stable positions and roles to be found at the workplace and that they feel the need to refashion themselves in every single encounter in order to adjust to what they think the other person wants from them (they refer to this phenomenon as “observance”). The workplace in this study has adopted lean manufacture in the last four years and for many staff
members this means that during this time their workplace roles and routines have been completely transformed. It is now hard to know what the new roles mean and what the relationships between these roles should be. Under these new circumstances, doing resistance becomes increasingly difficult, as workers do not seem to know who they can trust and what the repercussions of their resistance could be.

The floor staff was not convinced that documentation of all their activities was a system designed to make their working lives easier and this can be seen by how often they talked about how stressed they were due to the documentation demands. I showed earlier how the workers felt they had done an unsatisfactory job when they were reporting unachieved productivity targets. When not reaching the targets this should be explained by time wasters and everything that was not included in the list of time wasters was not taken into consideration. I was often present in discussions where workers questioned the productivity target for the week or the month and wondered if they should work extra time in order to reach the targets. “I can work every other weekend, but they can’t make me work every weekend” says to me a floor worker and continues: “it is not my problem if they set unrealistic targets, I need to meet my family now and then”. Unrealistic productivity targets and repetitive and meaningless documentation demands were all a source of constant stress for the floor workers. They had to work with producing high quality products in restricted amounts of time and to document every step of this process. Studies of workplace stress show that high workplace demands raise the risk of negative psychological and physical outcomes and can result in poor work functioning (Karasek & Theorell 1990). This could explain the fact that, as I showed earlier, discrepancies and disposals were often phenomena in the production floor despite the strict measures of quality control and the standardised processes of the manufacture process.

To conclude, I have shown in this article that, similar to the narratives of workplace researchers in other industrialised places of the world, the textualised workplace is also a reality in the Swedish work landscape. Lean manufacture processes implemented at the level of large industries come with a rich inventory of texts and place new literacy demands on workers. These texts function often as a means of surveillance, as workers are asked to document every single action of their working day and take increased responsibility for possible problems and errors. Here as well we find cases of conformity, where workers have
accepted that surveillance is directly linked to productivity and engage therefore in literacy practices with a high degree of motivation. At the same time, we find cases of resistance, where workers question the literacy practices generated by lean manufacture and talk about unrealistic targets and texts that are there in order to ‘fool’ them into conformity. The workplace in this study is organised by the means of a highly complex communication system that connects people across space and time and organises their working lives in a highly regularised system; and all this is done by the mediation of texts and by the literacy practices within which the production workers engage, some of them voluntarily but most of them not.

References


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