

E-LEARNING FOR CHANGE IN A LARGE ORGANIZATION

—

Identifying Problems And Opportunities In The Implementation Of E-learning

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Abstract

Taking e-learning into use in the workplace, represents a major challenge for the adopter organization. In practice, many e-learning implementations do not achieve the expected outcomes. While the mainstream literature on workplace e-learning mainly recommends a standardized implementation process, where the same type of implementation approach is used in all parts of the company, this study suggests that at least large, multilevel and complex organizations need to adopt a differentiated implementation process that takes the various organizational units into account.

This research focuses on how e-learning can be used as a tool for change. Based on a case study of a large-scale implementation of enterprise-wide e-learning in the largest Norwegian telecommunications company, Telenor, the challenges arising in different work contexts during the different parts of the implementation are explored. In Telenor, e-learning was introduced as a strategic tool to support a massive relocation of more than 6000 employees to a new headquarter, and, in the long run, to build a learning organization. A further aim was to make learning more cost effective and more efficient.

To analyze the unfolding implementation process, a socio-cultural perspective is used as an umbrella for the research. This perspective offers a framework for viewing the implementation as a situated and dynamic practice, mediated by physical and intellectual artefacts. The analysis is inspired by Activity Theory, another practice-based approach, which gives the opportunity to view the implementation activities as dynamic processes and non-isolated units within a network of interacting activity systems. Selected aspects of this theory are applied as a conceptual framework in order to understand the problems encountered when implementing e-learning enterprise-wide as well as to enlighten the opportunities for development that emerged in different parts of the company over a period of four years. In addition I draw on the theory of development of work, grounded theory, theory of action, and theories of innovation and strategic staff development.

The research identifies the long term factors that contributed to the sustainability of e-learning in different parts of the organization, and recommends that future e-learning implementations focus on: treating e-learning as a complex artefact; establishing specific roles in the implementation process; and, challenges that emerge when e-learning is integrated with work.

Most importantly, throughout the dissertation the importance of understanding context is stressed as the key issue for large-scale implementations in heterogeneous organizations. By this I contribute to the workplace e-learning literature.

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Acronyms

CBT	Computer Based Training
CD-ROM	Compact Disk – Read Only Memory
CEO	Chief Executive Officer
CS	Customer Support
EC	Exploitation Coordinator
eRAF project	Project <i>enabling Ready Arena Fornebu</i>
HES	Health, Environment and Security
HRAS	Human Resources Activity System
HR	Human Resource
IAS	Infrastructure Activity System
IC	Introduction Coordinator
ICT	Information and Communication Technology
ISDN	Integrated Services Digital Networks
L@T	Learn@Telenor (the exploitation project)
LMS	Learning Management System
LT	Leader Training
MAS	Management Activity System
OL	Organizational Literature
PC	Personal Computer
PL	Project Leaders
POL	Policy Development
PROC	Process Development
PUB project	Project for Development and User Participation
OPSS	Online Performance Support Systems
TA	Training Administrator
TBS	Telenor Business Solutions
TM	Telenor Mobile
TN	Telenor Networks
TopM	Top Manager
TP	Telenor Plus
VLAN	Virtual Local Area Network
WAS	Work Activity System
WPL	Workplace Learning Literature
WWW	World Wide Web

CHAPTER 1

Introduction

In his book “*Moderne organisasjoner*”¹ Røvik introduces the term “ideas on a journey” (Røvik, 1998). These ideas, such as ‘business process reengineering’ and ‘new public management’ were, at a given point of time, regarded as the most optimal and efficient trends for future-oriented modern organizations. They were quickly spread to many organizations, interpreted by the organization’s top management and then materialized into “organizational recipes”. Later, the recipes were used as building blocks to reform the company.

At the end of the 1990s *e-learning* was such an idea on a journey. Perceived as “the support of learning using network technologies” (Collis & de Boer, 2002, p. 88), the e-learning idea spread rapidly into large business enterprises as well as into parts of academia. Especially within the field of in-house training, the new learning technology was quickly adopted. It was mostly used as a new approach to staff development, first and foremost in the form of online education (transfer of knowledge) and online training (development of skills) (van Dam, 2004), and often in combination with work. Nearly ten years after the concept first appeared, e-learning is still a frequently used term when referring to web-based training and learning in the workplace.

This idea of e-learning² also flowed into Telenor, the largest telecommunications company in Norway, and one of the largest mobile operators worldwide. Originally introduced in 2001, e-learning was a tool to assist the relocation of more than 6000 employees in the Oslo-area to a new headquarters at the old Oslo airport at Fornebu³. This situation represented a huge organizational challenge, first of all since the move implied many new ICT systems, a lot of new technological equipment, as well as new ways of working. By taking e-learning into use, the aim was to help the employees to be able to handle the new working environment and do

¹ In English ‘*Modern organizations*’

² Talking about e-learning in the corporate sense, the term ‘e-training’ is also used. ‘E-learning’ is, however, the most frequently applied term worldwide. This term, in Norwegian ‘e-læring’, was also used in Telenor (also see section 2.2.1).

³ Telenor also had offices spread around Norway, but these were not moving.

‘business as usual’ within a few days after arrival⁴. To prepare for this goal, an e-learning project with the mandate to create a default implementation plan that was to be carried out in all Telenor units at Fornebu, was launched. This plan included a set of rules and roles for the e-learning activity itself as well as seventeen multimedia-based modules. The modules, which were launched via a web-based learning platform and categorized in three groups, ‘ICT solutions’, ‘Physical workspace’ and ‘New ways of working’, were all designed as individual tutoring programmes without any thought of collaboration. However, the long term goal of the implementation effort was strategic, to support Telenor’s ambitions to become a learning organization, to contribute to a rapid sharing of knowledge, to increase the company’s competitiveness in the market, to develop an innovative work force, and to make the internal competence development more efficient and economical. There was also an intention that the same technology should later be distributed to the rest of the organization, and even to the commercial market.

According to Røvik (1998), ideas on journey are also in continuous change *within* an organization, and can be reinterpreted and reconstructed several times. This also happened to the e-learning in Telenor. On its way through the organization the original e-learning idea was transformed several times; first in the project group and second in each of Telenor’s four main units. Even further transformations took place in the exploitation phase, at company level, as well as at lower levels in the organization. Thus, the project that, according to Telenor, in 2001 was “the largest e-learning project in the Nordic region” (Telenor, 2002b, p. 4), represents a unique case for studying an *enterprise-wide* implementation of e-learning in a *large complex business organization, consisting of different types of work*. The goal of this research is to study how the original e-learning idea and its default implementation plan evolved and adapted from top to bottom in the Telenor organization. With this as a backdrop the following research problem is defined:

*What problems and opportunities arise when e-learning is
implemented enterprise-wide in a large organization?*

The implementation (the process of taking e-learning into use in the organization⁵) is viewed from a socio-cultural perspective (Säljö, 2000). This implies that interactions and forms of

⁴ This expression was mostly used in the interviews with the Telenor employees. On the Telenor intranet, however, was usually used the term “some few hours after relocation”.

⁵ The term ‘implementation’ is used differently in different communities. Here it is used in accordance with the understanding in Information Systems (IS) research and practice, namely to denote the process of introducing the technology in an organizational setting (Munkvold et al., 2003), and not, as in Developmental Work Research, to describe a phase in a developmental process (see Engeström, 1987). Chapter 2 goes more thoroughly into the term.

social practices are mediated by intellectual and physical artefacts and influenced by cultural circumstances, and that the implementation is viewed as a situated and dynamic practice. Furthermore, the human ability to act, reason and solve problems, is always regarded as relational to the context and the artefacts (material and immaterial) that are available, for instance, as in this case, to the e-learning modules, the infrastructure and support resources. Therefore, to learn and develop is to appropriate and master these tools/artefacts of learning and work within the cultural practice. In this case, the question is how the e-learning modules, the implementation plan, different types of oral and web-based content, procedures and routines, etc., are appropriated and mastered within the cultural context of Telenor. Relevant aspects of the socio-cultural perspective are further presented in chapter 3.

1.1 Positioning of the case and research questions

Identifying ways in which learning can be supported in and for work, has been a long-standing concern within organizational studies and in the literature on competence development (Antonacopoulou, 2006). The topic gained increased interest during the late 1990s, primarily due to the massive introduction of e-learning in the workplace. However, little is said in previous work about enterprise-wide implementations of e-learning and the problems that emerge when this type of learning is introduced in small or in large organizations. Even less is written about how this learning might contribute to competence development and change, and how different factors might facilitate the acceptance and use of e-learning in various working contexts in the short and long run.

The implementation of e-learning at Fornebu has given me, as a researcher, an opportunity to elaborate on some of these questions. The case deviated from the majority of workplace e-learning implementations at that time in the three following ways:

- E-learning was introduced enterprise-wide
- E-learning was mainly implemented to support relocation to new offices
- E-learning was explicitly used as a tool to support transformation of the organization

In this research the case is used as an example of an implementation of enterprise-wide e-learning in a large organization, in order to illuminate the challenges encountered when taking e-learning into use as a strategic tool for internal competence development and organizational change. Furthermore, by following the spread of e-learning from 2001 to 2005, problems

emerging from organizational tensions in the first part of the implementation, and opportunities arising during the next four years of the process, are identified.

In order to focus the research problem, four research questions are formulated:

1. *In what ways were the underlying ideas of e-learning reflected in the default implementation plan?*
2. *How was the default implementation plan changed at the local level?*
3. *Why did problems emerge in the adaptation at local level?*
4. *How did e-learning activities change over time at different levels in the organization?*

To address these questions, the research design is mainly driven by the characteristics of this specific case. The research method used is a single-case study (Yin, 1994, pp. 4-9), primarily because the implementation of e-learning at Fornebu was a once-in-a-time event and the default implementation plan was specified long before I was involved. As a researcher I had no opportunities for intervention⁶ or control, neither in the planning, nor in the implementations in the local units. To enhance the insights into the case under study, an *embedded design* (Yin, 1994, p. 41) was chosen. This design gives attention to subunit(s) of the case by incorporating several units of observation and analysis. Thus, all four Telenor units will be described. The same design, however, also provides an opportunity for a larger, holistic perspective of the case, by describing and analysing the Telenor organization as a whole. To be able to elaborate on the research problem and identify problems and opportunities during the implementation, use-situations of e-learning, and accounts of how and why people used this new learning technology, have been of vital importance. The overall aim is that the chosen research design, combined with the applied theory, will make a contribution to the growing e-learning field.

An activity-theoretical analysis has been carried out in order to understand the difficulties, frustrations, and obstacles encountered when implementing enterprise-wide e-learning as a tool for learning and organizational transformation in a complex organization⁷. By using third generation Activity Theory, specifically the notions *network of activity systems*, *disturbances*, *tensions* and *contradictions*, this study gives new insights into the implementation of large-scale e-learning projects. Also Hasu's (2001) concept of 'critical transitions' is applied in the

⁶ Except for the ethnographer's opportunity to intervene in interviews (see Silverman, 2001).

⁷ It should be noted right from the beginning that a full Activity Theory study was not carried out, but rather Activity Theory has been used as an analytical tool for understanding parts of the empirical data.

analysis, mainly to study the challenges that emerged when e-learning was implemented across multiple organizational levels.

In order to interpret the empirical findings, Activity Theory is complemented with relevant aspects of other theories related to practice and reality including Argyris and Schön's (1974) theory of action, Glaser and Strauss' (1967) grounded theory, and Victor and Boynton's (1998) theory on development of work. I will also draw on literature on diffusion of technological innovations, competence development and project management, and studies on implementation of workplace e-learning. By using this framework to analyse the data that was collected over more than four years by ethnographic observation combined with interviews and historical data, *my ambition is to provide new insights into the field of adoption and use of workplace e-learning technology, especially from a large-scale enterprise-wide perspective*, and thus contribute to the workplace e-learning literature and development work research (see Netteland et al., 2007).

1.2 The structure of the dissertation

The dissertation is organized as follows. Chapter 2 gives an introduction to workplace learning trends, first by describing some general aspects of workplace learning, then by going more thoroughly into one of them, workplace e-learning. The chapter also presents a six-stage model that will be used to refer to the implementation process as a whole. Chapter 3 reflects first on why and how the relevant parts of the chosen theories are combined into a conceptual framework, before it goes into detail for each of them.

Chapter 4 introduces Telenor as a research site, describes the challenges and discusses the ambitions associated with the Fornebu case. The organizational span in production and work is also presented. The chapter sets the stage for the later analytical chapters and establishes the basis for the methodological approach, which is further elaborated in chapter 5. The research design, the data collection and the analytical process are also introduced in the chapter.

The next three chapters account for the main parts of the analysis. A major aim of these chapters is to present the potential problems and opportunities that were identified and to establish a solid background for reflection on the discrepancies between Telenor's ambitions and the outcome of the implementation. Chapter 6 presents an analysis of how the e-learning idea was transformed from company level via project level to the line organization (the four

units). Chapter 7 focuses on the problems that emerged during the first part of the implementation. The aim here is not only to identify the most typical problems, but also the potential sources for these problems in the form of potential contradictions, and how they affected the transformation of the e-learning idea through its stages. Then, chapter 8 discusses how e-learning evolved in the Telenor organization over the next three to four years, and how the internal and external contexts influenced this development.

An evaluation of the study and a description of potential limitations of the work are given in chapter 9. The dissertation concludes with chapter 10, where a summary and conclusions together with possible implications of the study and areas of future research, are presented. The chapter further reflects on to what extent Telenor reached their ambition, to develop a learning organization.

Finally, it should be noted that the data material is translated from Norwegian to English when presented in this dissertation.

CHAPTER 2

Workplace learning trends

During the 1990s concepts like ‘workplace learning’, ‘work-related learning’, ‘corporate learning’, ‘learning at work’ and ‘learning in working life’ became popular slogans in the context both of vocationally oriented education and personnel development. Considerable engagement arose in this field – in practice, in theory and in politics. Interestingly, this happened despite the fact that ‘learning in working life’ for large parts of the working history has been a general, and maybe the most obvious, form of learning and qualification in and for work (Illeris et al., 2004). The aim of this chapter is to position my research within the large field of ‘workplace learning’⁸, comprising learning both in private and public organisations, first by discussing some issues that are of relevance to my case, and thereafter, by going more thoroughly into the particular trend that is the concern of this study, ‘workplace e-learning’.

Workplace learning is neither a unified nor a clearly defined concept. Rooted in adult education, the term has frequent links to formal education, and a clear focus on the individual learner (Elkjaer & Wahlgren, 2006). Although this type of learning is often related to the narrow vocational training paradigm ‘to make the employees fit for the job’, the approach also has a broad societal perspective. The learning is viewed from the employees’ angle, with an emphasis on general personal development (Illeris et al., 2004). The approach is also inspired by organization theory (e.g., Argyris & Schön, 1978, 1996) and the idea about organizational learning (see Illeris et al., 2004). In line with the growing interest in workplace learning from a knowledge society perspective, informal learning has increasingly been acknowledged as an important component of the concept (Elkjaer & Wahlgren, 2006). In this dissertation, workplace learning will be used as a generic term for learning and competence development in and for work.

⁸ Although the word corporate is the most frequently used term when speaking about (e-) learning in a large company or a business organization (e.g., Telenor, Cisco and IBM), this dissertation will apply the broader term workplace (e-) learning. This term, which includes learning at work both in private and public organizations, is also the most applied term within this field of research.

To place the Telenor case in a broader context, the chapter begins by introducing three case-relevant aspects of workplace learning (section 2.1): First, how it has been organized (section 2.1.1); second, how it has been categorized (section 2.1.2); and third, different perspectives on competence development (section 2.1.3). Next, section 2.2 gives attention to the trend of ‘workplace e-learning’. This trend spread in the last part of the 1990s, as a result of the emergence of the WWW, to private and public organizations in Norway as well as in the rest of the world. The section initially gives an overview of the use of educational technology and distance education in workplace settings (section 2.2.1). Thereafter, the specific phenomenon ‘workplace e-learning’ is more closely described (section 2.2.2). It was *this* learning approach that was chosen when Telenor, in 2001, decided to prepare its more than six thousand employees for the new working environment at the new headquarters at Fornebu.

E-learning is still the most frequently used term for on-line learning in the business sector. Section 2.3 discusses, therefore, some particular issues connected to the implementation of this type of learning. First, the section gives a rationale for why it has been implemented, as well as for what, where and how (section 2.3.1). Next, an overview of potential factors that, either negatively or positively, affect such implementations, is given (section 2.3.2). The references are selected from a review of more than forty acknowledged researchers in the workplace e-learning field. In order to study the implementation of e-learning in more detail, and to relate the findings to specific parts of this process, the section closes with a description of Cooper and Zmud’s (1990) six-stage model of the IS/IT implementation process (section 2.3.3). This model is used as a reference model in my research. Finally, section 2.4 summarizes the chapter. As a whole, this compound review of workplace learning aims to serve as one of several frameworks to understand Telenor’s approach to e-learning, and as a backdrop for the later discussion of my own findings.

2.1 Workplace learning

Looking at the field of workplace learning from a Telenor e-learning perspective, three aspects are of specific interest: 1) how learning in the workplace over time and in various enterprises has been *organized*; 2) how in different contexts it has been *categorized*; and, 3) why workplace learning has been given priority as a tool to *develop competence*. The three aspects are dealt with in the following subsections.

2.1.1 Organization

Workplace learning is nothing new. Long before any formal education system existed, work specific skills were handed over from one generation to the next (Nordhaug, 1993a). *Tradition* was the organizing factor of work: The learning needs were known in advance, and these laid the basis for the training of a person to be an adequate and competent practitioner. The industrial revolution and assembly-line production represented a break with this old rule. From then on, the work was organized according to the requirements of the *production technology* (Illeris et al., 2004; Nordhaug, 1993a). Because of a growing demand for specialized knowledge, more differentiated qualifications and an increasing social complexity, skill acquisition and programmes for education later moved from the workplace to off-site course activities and schools. Furthermore, a lot of companies established a new organizational unit, the Human Resources (HR) department, which was made responsible for the competence development of the staff.

This tendency continued during large parts of the twentieth century. At the expense of learning at work, traditional apprehension toward job-related learning at school increased, and learning was disconnected from the work situation (Illeris et al., 2004; Sandervang & Skalstad, 2001). This perspective on learning, as something *localized outside the workplace and separated from the work situation*, is symbolized in figure 2.1(left). However, from the late 1980s and at the beginning of the 1990s, a new school of learning and competence development appeared (figure 2.1 (right)). Due to emerging organizational needs for handling increased competition, a growing specialization, a continuous development of new technology and a number of rapid and little predictable changes, learning again returned to the workplace (Nordhaug, 1994). In large companies this trend started as early as in the 1960s, with in-house mass education to increase the workplace performance (Røvik, 1998). Based on the idea that learning was most effective when the learning context corresponded with the use context (Bjørkeng et al., 2003), this new approach proposed to integrate the learning process with the job-specific competence needs. The two most frequent models of this type, one of them course-based with job-relevant preparation and supplementary work tasks, the other one organized as continuous on-the-job-training, are depicted in figure 2.1 (right) (adapted from Sandervang & Skalstad, 2001).

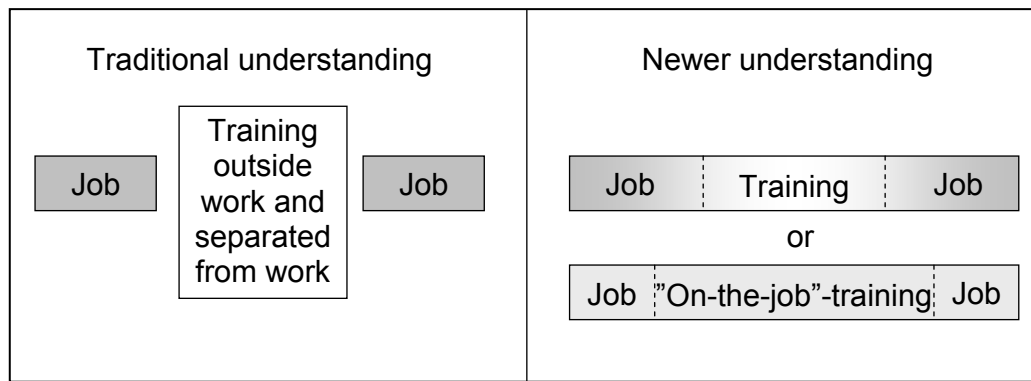


Figure 2.1: Traditional (left) and new (right) understanding of job-related learning

E-learning at Fornebu deviated from both these arrangements. Indeed, e-learning could take place outside the workplace, for example at home or by some of the customers, via an ISDN line. Some of the Telenor units even *recommended* this kind of external training, initially because of a planned lack of desks and PCs. But e-learning in accordance with the traditional understanding in figure 2.1, arranged at school, was never an option. Most of the units, however, adopted as a main principle that learning should be carried out at work. In the majority of these units, e-learning took place at the desk and was carried out during work hours, but neither in these units nor in the default implementation plan that was developed, was e-learning used for preparation, or integrated with supplementary work tasks. Neither was e-learning regarded as a continuous on-the-job activity, expected to be a regular part of the work day. E-learning was rather a ‘must’, and instead of being integrated and combined with work processes or other types of course activity (e.g., classroom courses), it represented for many of the workers something extraneous that was ‘added on’. For some of them, the learning became almost completely job-irrelevant. As a whole, the launched e-learning approach in many ways reflected the old traditional idea of work-related learning – something mentally separated from work. Thus, from the beginning, the e-learning approach at Fornebu represented a break with learning situations that Kristiansen et al. (2000) refer to as good examples of ‘on-the-job training’, where ICT based learning is integrated with other types of learning approaches, such as classroom courses and coaching in real work situations.

2.1.2 Categories

To be able to speak about and compare different types of workplace e-learning approaches, it is fruitful to have a set of explanatory concepts that makes it possible to identify and describe their attributes. A number of taxonomies exist, in the workplace learning literature (WPL) as well as in the management, human capital and organizational literature (OL) (Andersen & Hansen, 1999; Boud & Solomon, 2001; Dalin, 1999; Gottschalk, 2004; Malcolm et al., 2003; Sandervang & Skalstad, 2001). However, the taxonomies from the two traditions differ both in scope and focus, primarily in alignment with the underlying tradition on which they are grounded. Nevertheless, both traditions share a primary focus on the *individual* as the learner (Elkjaer & Wahlberg, 2006, p. 2). Since the aim of e-learning in Telenor was twofold, *training/education* (typical for WPL) as well as *development* (typical for OL), taxonomies from both traditions are presented in this section⁹.

With its roots in adult learning, WPL often makes a distinction between formal, non-formal and informal learning (Lahn, 2005). Other categories, such as guided learning (Billet, 2001) and incidental learning (Marsick & Watkins, 1990), are also used. Because the categories often slide into each other and can be combined in different ways, the distinction between the different categories is to some extent unclear. This is also the case with the three categories of formal, non-formal and informal learning. Based on a comprehensive review of the literature and empirical studies in this field, Malcolm et al. (2003) concluded that the literature shows a complete lack of agreement about the three concepts and the boundaries between them. Instead of using these concepts, they therefore suggest characterizing workplace learning according to four dimensions: the *process*; *location & setting*; *purpose*; and *content*. All four dimensions have formal and informal attributes.

In contrast to WPL, OL draws on theories of organizational learning and theories of management (Elkjaer & Wahlgren, 2006). Based on these theories, as well as on practice-based approaches, Miettinen and Virkkunen (2006) claim that learning at work, during the past two decades, has been conceptualized through paradigms like “organizational learning” (Argyris & Schön, 1978), “knowledge management” (Nonaka & Takeuchi, 1995) and participation in “communities of practice” (Lave & Wenger, 1991). What the three conceptions have in common is a view on workplace learning primarily as a collective

⁹ It should be noted that the presentation is far from exhaustive.

phenomenon (Miettinen & Virkkunen, 2006), or in Elkjaer and Wahlgren's words "as a development from the individual (manager) as a container and processor of information and knowledge by way of the individual as oriented towards personal development towards development of membership and professional identity" (Elkjaer & Wahlgren, 2006, p. 29).

Only a few taxonomies make an attempt to integrate the two traditions. One such taxonomy was developed by Dalin (1999) who, through his experiences in public and private corporations, has created a taxonomy consisting of the following four categories: *formal*; *informal*; *individual*; and, *organizational* learning (Dalin, 1999, p. 31ff). Another taxonomy is offered by Illeris et al. (2004, p. 139), who distinguish between: 1) the more targeted approaches aiming at certain types of learning by means of certain measures, and 2) the initiatives that strengthen the general opportunities for unplanned learning through a development of the workplace as a learning environment. While the first one is manifested at its most extreme by the educational activities in the WPL tradition, the second one is manifested through paradigms such as "the learning organization" (Argyris & Schön, 1978).

The incompatibility of the taxonomies makes it rather difficult to give an exact a priori categorization of the e-learning at Fornebu. Using Dalin's (1999) categories, the approach can best be described as both *formal* and *individual*. Formal, in that the learning process was "stimulated by planned and systematically implemented training efforts, for instance courses"¹⁰ (Dalin, 1999, p. 32), and individual, in that the individual employee, as a result of the e-learning activity, was expected to be able to "develop or change his competence, eventually also strengthen and change his own patterns"¹¹ (Dalin, 1999, p. 31). However, the learning process was in Dalin's terms also *organizational*, in that the *collective learning processes* were expected to modify current work patterns and/or develop new patterns. Using Malcolm et al.'s (2003) perspective, this description should be enhanced with a set of new attributes. The learning was organized outside the work process, and the content was rather basic, and described, to a large extent, practical procedures. Drawing on Dalin's (1999) learning terms and some of the learning dimensions in Malcolm et al.'s (2003) definition, I describe e-learning at Telenor by contrasting the following concepts:

¹⁰ Translated from Norwegian

¹¹ Translated from Norwegian

- *Formal* and planned learning – not informal or unplanned learning
- Learning *outside the work process* - not integrated with the work process
- *Individual* learning – not learning in collaboration with others
- *Collective* learning processes – not only individual development
- Rather *basic* learning – not problem solving

It should be noted that large organizations in Norway, over longer and shorter periods, have usually given priority to one *specific* category of workplace learning. While in the 1970s *collective* learning with a specific focus on developing *practical skills* was emphasised, the focus in the 1980s turned to individual learning mainly targeted to the *single employee* and with an emphasis on *general organizational and managerial knowledge*. The aim was to develop individual attitudes and to empower the single employee to take responsibility for the company's development and growth (see Røvik, 1998, p. 252). These trends, with a heavy focus on individual, and not collective, competence development, also hit Telenor. However, in parallel with a growing competition in the global economy in the late 1990s, the idea of 'the learning organization' invaded large organizations together with a renewed focus on organizational and collective learning. This also happened in Telenor and was, from my point of view, an important driver for why e-learning was defined as a tool to create knowledge workers and a learning organization. Nevertheless, I suggest that the strong focus on individual learning over a period of nearly twenty years probably was one of the reasons why an e-learning solution without any opportunity for communication and collaboration was preferred. I return to this aspect in chapter 10.

2.1.3 Competence development

Three perspectives have been used to explain why organizations give priority to competence development. The first one, which according to Ellström (2004) dominated large parts of the 19th century, was referred to as the *technology-functional perspective*. This perspective argued for individual learning as a means to increased productivity and profit, mostly in the form of adult education, either inside or outside the workplace (Ellström, 2004). An alternative, the *conflict-control perspective*, primarily regarded competence development as a political strategy. From this perspective, staff training was primarily dominated by control interests at management level (Offe, 1976). Finally, the newest, called the *neo-institutional perspective*, in contrast to the technology-functional perspective, emphasised competence development as

a non-rational process. The aim of the training was to support the need for a broader organizational legitimacy, international trends and modernity, and not to increase the development of the staff (Collins, 1979; DiMaggio & Powell, 1991). Ellström's (2004) review of relevant empirical research, illustrates that most studies agreed about the necessity of environmental factors (e.g., increased international competition and demographic changes) as a departure point for organizational competence development. This view on education as a tool for organizational adaptation was generally confirmed by Nordhaug (1994) in his study of how strategic opportunities and environmental determinants influenced staff education. But research shows that environmental factors are not sufficient in themselves (Hendry et al., 1988). Also, internal factors (e.g., incentives and top management support) are important drivers, especially in relation to their interplay with the environment. The understanding of the human being as an asset further laid the groundwork for the *human capital theory*, which has been used in financial contexts to explain decisions about investments in corporate education and training (Flamholtz, 1985; Sandervang & Skalstad, 2001). From the 1990's, this theory laid the foundation for the new field of 'human resource accounting', in which human resources, for the first time, were included in the balance sheet of a company (see Sandervang & Skalstad, 2001).

Whether human resource accounting lay behind the implementation of e-learning in Telenor or not, is unknown. An explicit and important driver, nevertheless, was the desire for more *efficient learning* and an *increased profit*, both features being characteristic of the technology-functional perspective. However, aspects of both the neo-functional perspective and the conflict-control perspective were also visible. Chapter 4 discusses these aspects further.

The value of staff education can be discussed and questioned not least from a neo-institutional perspective. Until recently, however, research on organizational effects of this type of investment has been rather limited. Three effects have been identified in Ellström and Nilsson's study (1997): *economic effects*; *symbolic effects*; and, *increased organizational learning*. The potential value has been examined more explicitly by Nordhaug and Gooderham (1996). Based on their own empirical data and a review of the literature, these authors documented a positive correlation between a firm's competence and its value creation. Some moderating factors, however, such as the business strategy, the business sector and the production competence were identified. Despite these empirical findings, *internal staff training seemed to be especially sensitive to periods with economic recession* (Nordhaug, 1993a). Nordhaug even claimed that training in these situations was often used as a balancing

item, and he identified that it was the most vulnerable units in a company, those with a specific need for development, that tended to avoid this expenditure. These units were caught in a vicious circle where limited financial input in learning in the first stage made them less adaptive in the next one (Johnsen, 1979; Nordhaug, 1993a; NoU, 1986). This finding is contradictory to Ellström and Nilssons' (1997) findings in their study of the competence development in seven small and medium sized companies. They concluded that external factors, and not least downturns, were important drivers for training initiatives. For instance, reduced influx of orders, increased demands for profit and growing customer demands for improved quality and delivery in the examined companies, contributed to an enhanced focus on staff competence. These findings might indicate an *asymmetric* or a *contextual* relationship between efforts in competence development and financial development or that this particular research field still is immature (Nordhaug, 2002). The above research represents an interesting background to study a potential connection between the sustainability of e-learning and an organization's financial status. As argued for in my case, the financial development in Telenor emerged as a critical factor, and was especially crucial in the long run (see chapter 8). The e-learning literature has, to a small degree, drawn on research in the field of *strategic personnel development*. Looking at e-learning from this perspective, I claim that many of the drivers and challenges that are of relevance for the initiation and survival of staff training should also be considered and taken into account in implementations of e-learning. Relevant parts of this research are therefore brought into this study in chapter 8, as a supplement to the workplace e-learning literature.

2.2 Workplace e-learning

Historically the corporate learning field has undergone substantial change from 1985, when PC based training was introduced, until today, with web-based technology. This evolution has broadened the use of educational technology in the workplace, not least in corporations seeking to develop their human capital. The history of technology supported learning, however, is more detailed and punctuated (see e.g. Cuban, 1986¹²), and stretches farther back than the introduction of PCs. For more than a hundred years has this kind of learning been in use in the workplace, in the form of educational technology, distance learning and distance

¹² Cuban (1986) reviews the attempts to adopt technology into American classrooms throughout the 20th century and up to 1984. His point is that educational technology, when introduced in accordance with the traditional classroom learning paradigm, is not able to utilize the opportunities for development in a modern company.

training. This section aims to give an overview of this field, first with a focus on educational technology and distance education, and thereafter on how the new learning technology has manifested itself as e-learning in the workplace. The term ‘workplace e-learning’ is used as a generic term that covers a wide range of techniques and methods. Inspired by Clarke’s (2004) definition of the term e-learning, it includes the use of technology as part of a conventional or traditional course in and for work, as well as an online course, initiated by the same motive, but where learners and tutors will never meet face-to-face.

2.2.1 Educational technology and distance education

The main principle of distance education, that learning shall be available in *places* and *times* that are convenient for the learner (Holmberg, 1995; Moore & Kearsley, 1996; Peters, 1993), has since the last part of the eighteenth century, to a large degree, influenced work related learning¹³. According to Garrison and Anderson (2003), four generations of distance education have appeared. The first and second generation primarily took part outside the workplace, while the third and fourth saw learning integrated with or ‘added on’ to work.

During the *first generation*, when learning was delivered through cheap and reliable mail services, and in the form of non-technical correspondence courses, the learning was principally based on a behaviouristic learning tradition. This is described by Peters (1983, 1993) as an industrialized form of instruction. Learning was reinforced via drill, tests and continuous evaluations to assess whether or not the required knowledge level had been reached (Peters, 1993; Schreiber, 1995). An element of cognitivist learning theory was embedded, in that the learning material was mostly structured according to a ‘guided didactic conversation’ (Holmberg, 1995). This cognitivist element was strengthened when the *second* generation of corporate distance education emerged at the beginning of the 1970s. This learning, which combined correspondence courses with other media (e.g., broadcast and television) and other forms of education (e.g., classroom courses), was still most frequently arranged outside the work place. Hu (1995) refers to this learning as a mixed-mode learning, organized as a combination of home-based and community-based learning, but often with a work based component included (Moore & Kearsley, 1996). With the continuing advances in telecommunication technology from the middle of the eighties, in the form of asynchronous and text based telecommunication systems (*third* generation), and the growing opportunities for interaction and collaboration via CD-ROM or the internet from the first part of the nineties

¹³ As pointed to by Ellis et al. (1991) these aspects are also relevant for CSCW.

(*fourth* generation), the possibility for social learning increased (Moore & Kearsley, 1996; Nipper, 1989; Taylor, 1995). This new technology has significantly affected corporate distance education, with a continual growth of integration of work and learning (Schreiber & Berge, 1998). It should be emphasised, however, that the previous learning schools also appear in corporate distance education.

Having followed the rapid evolvement of the WWW over a period of more than ten years, there is reason to mark the launching year of the Web, 1995, as a paradigmatic shift for educational technology. Instead of grouping CD-ROM and the Internet together in the fourth generation, as recommended by the authors above, I suggest reserving this generation for CD-ROM and Multimedia, and would rather add a fifth generation that includes the WWW and interaction services for distributed learning. A similar reflection has also been made by Taylor (2001). He proposes a fifth generation including the Web, as well as the use of intelligent functions and artificial intelligence.

An interesting distinction is introduced by Devlin (1993), who distinguishes between distance education and distance training. While distance education is student centred, distance training is mainly driven and controlled by the needs of the organization. From Devlin's (1993) study from the beginning of the 1990s, it appeared that training strategies and programmes in large organizations had principally been implemented *to improve company performance*. As all other types of organizational learning, distance training was evaluated in terms of its effectiveness, and was favoured first of all on the grounds of its cost, flexibility and accessibility, which, according to Devlin, were "all purely efficiency factors" (Devlin, 1993, p. 255). Precise performance measures and testing techniques were important characteristics, with a main focus on 'need to know', and not on 'nice to know'.

Although the e-learning solution at Fornebu was both web- and multimedia-based (fourth and fifth generation), the approach has many similarities with the first generation of distance education and an industrialized form of instruction (Peters, 1993). Furthermore, it matches the main characteristics of distance training, as it is described by Devlin (1993), with an increased focus on improved company performance, effectiveness, cost-efficiency, flexibility and accessibility. Most of the e-learning modules were also introduced by Telenor with a 'need to know' focus, or in Basalla's (1988) words, as "instruments enabling us to cope with the natural environment and maintain the necessity of life" (p. 2). Despite this, much of the e-learning content, from the point of view of the interviewees, represented a 'nice to know'

element. For many workers the learning was a *matter of convenience*, not a *matter of necessity*¹⁴. In large parts of the company, this aspect, as I argue in chapters 8 and 10, was decisive for whether the new learning approach survived, or not.

There is also room for arguing that the e-learning solution at Fornebu more correctly should have been referred to as *e-training*, not at least for the purposes of this dissertation. This concept exists in the corporate e-learning literature, but because the term rather seldom is used in this literature and Telenor itself referred to the new initiative as *e-learning* (see for instance Telenor, 2000) I choose to use this term rather than that of e-training. The research in distance education and distance training serves, however, as a useful background for the study of the two latest corporate learning trends; e-learning and *blended learning*. These are the subject of the next sections.

2.2.2 E-learning in the workplace

The growth of the internet from the middle of the 1990s radically broadened the use of educational technology in the workplace. Today we find different forms of educational technology and different terms describing these forms. Restricted to Internet technology, we meet the corporate learning concept as web-based training, web-based learning, web-based education, virtual education, internet-based training, computer mediated learning, computer mediated communication, web-based instruction, internet enabled learning, online learning, e-learning, blended learning and blended e-learning (see Clarke, 2004; Paulsen, 2001). The term learning environment is also used. The definitions are many, reflecting the location for learning, the focus and the theoretical basis. This section focuses on the concept *e-learning*, which emerged in the wake of the growing interest in e-commerce in the mid 1990s (Paulsen, 2001; Tumpel, 2003). At the end of the 1990s the term “invaded” investment companies and companies using corporate training. It is still the most frequently used term to refer to internet based workplace training and learning.

According to Alessi and Trollip (2001), the company wide use of web-based technology for learning purposes has, at minimum, two important benefits:

¹⁴ Traditional wisdom about the nature of technology has, according to Basalla (1988), customarily stressed the importance of necessity and utility. Basalla claims, however, that the made world contains a far greater variety of instruments than those required to meet fundamental human needs. He explains this diversity of things (e.g. technologies) in the real world as the result of technological evolution “because artifactual *continuity* exists; *novelty* is an integral part of the made word; and a *selection* process operates to choose novel artefacts for replication and addition to the stock of made things” (Basalla, 1988, p. 25).

- Learners can access the materials at their convenience (*educational accessibility*)¹⁵, and
- Learning has a potential for employee-employee interaction and communication (*social interaction*)¹⁶

The two dimensions have given rise to two essentially different approaches to corporate e-learning – *learning as a tool for instruction* and *learning as a tool for information and knowledge sharing*. Although both approaches were present among the countless definitions of corporate e-learning, a review of large parts of the corporate e-learning literature from 2000 to 2002 indicated that it was first of all a narrow view on learning that dominated the definitions. The focus was on individual learning, online delivery of content, opportunities for skill development, and, to some degree, also on information sharing (Netteland, 2003b)¹⁷. In other words, it was mostly the behaviouristic learning theory that lay behind the corporate e-learning implementations. Advanced, interactive multimedia based programs, however, opened up, to some extent, for the cognitive learning tradition, with opportunities both for reflection and critical thinking. Key aspects such as participation and collaboration, that are important parts of social learning theories, were to a large extent absent (Bonk, 2001; Collis & Moonen, 2001; Kristiansen et al., 2000). The same was true for motivating activities (Bonk, 2001), work relevant content (Woodall, 2003a) and relevance to the learner (Woodall, 2003b). This is confirmed by Dirkinck-Holmfeld (2004) and van Dam (2004). The focus has not changed; e-learning in the workplace is usually still restricted to *online education* (transfer of knowledge) and *online training* (development of skills), both without any form of collaboration (van Dam, 2004). As Rosenberg formulated it, corporate e-learning is limited to e-training or courseware online, mostly with a relatively static content (Rosenberg, 2006).

This lack of social learning forms was probably the reason why so called ‘blended learning’ (Kishore, 2002) evolved in many work organizations from 2001 (Netteland, 2003b). The first book within this field was written two years later by Thorne (2003). The main focus of the book was on how to combine e-learning with classic learning methods in order to get the advantages of both worlds, and a resulting synergetic learning effect. Although the aim behind

¹⁵ This type of learning is reflected in the terms ‘just-in-time learning’ (see Davenport & Glaser, 2002) and ‘learning on demand’ (see Fischer, 2001).

¹⁶ This type of learning, with a potential for web-based collaboration, interaction and sharing among users, has developed and given its name to the concept of Web 2.0. This term, which was coined in 2003 and is used to describe social software (e.g., social-networking sites, wikis and blogs) and online communities, describes in general web-based services managed by the participators.

¹⁷ It has to be emphasised that e-learning definitions in an educational context would have less focus on content. Here the emphasis would have been on dialogue, interaction and collaborative activities.

this new type of learning in Smith's words is to get "learning that works... *really* works" (Smith, 2001, p. 1), Bersin and Associates (2003) instead underline a financial motive. According to these authors, blended learning, at least in the companies, first of all was about optimizing resources, primarily from an economical viewpoint. This illustrates that the motivation for e-learning and blended learning in the business sector is much the same, namely, efficient learning.

Van Dam (2004) refers to the period of e-learning from the late 1990s up to 2003/2004 as *the first wave of e-learning*. This first wave was, however, expected to be replaced by *a second wave*, that included online performance support¹⁸, online information and knowledge resources, online collaboration tools, a stronger alignment of e-learning with the business, and an increased focus on deployment. Similar ideas have also been proposed by other researchers in the field. In addition, a growing use of meaningful assessments, integration of the total course resources, increased personalization and user relevance, and better access to just-in-time specialist material (Attwell, 2004a; Collis, 2003; Rosenberg, 2006; Solheim et al., 2005; Stephenson, 2003) to enhance individual and organizational performance, is anticipated. Returning to Telenor, in the autumn of 2005, it became evident that van Dam's prophecies had not come true. In fact, e-learning had contracted in three of four main units. Furthermore, in those units where e-learning still existed only a few of the second generation e-learning attributes, such as a tighter coupling to the business goals, and, to some degree, more user relevant modules, were integrated. Features, such as collaboration technology and increased personalization, were, however, still not implemented (see chapter 8 for further discussions). Neither was support for learning on demand.

¹⁸ The concept is used to describe technology-based systems that offer performance support. These systems, mostly referred to as online performance support systems (OPSS), help to increase productivity and efficiency (see e.g. Wasson & Akselsen, 1992).

2.3 Implementation of workplace e-learning

Implementations of workplace e-learning can succeed or fail. The result depends on many factors, for instance *why, for what purpose, where and how* e-learning has been implemented. These aspects are dealt with in section 2.3.1. Without regard to why and for what purpose, however, the implementation can be hampered or furthered by a lot of additional factors. Based on a review of parts of the corporate e-learning literature, section 2.3.2 therefore gives an overview of factors that can affect the implementation in a negative or positive direction. A weak point in much of this literature is that the implementation process is seen as *one* event. This means that the literature seldom specifies in which parts of the implementation process the different factors represent a barrier or a driver for success. To avoid this problem, and be able to relate my findings to specific parts of the process, Cooper and Zmud's (1990) IS implementation model is introduced as a reference model in section 2.3.3.

2.3.1 Why, what, where and how

According to Barron (2003) the patterns of adoption have varied across different industry sectors, corporations of different sizes, various line functions and horizontal job classifications. This section aims to give an overview of the research about *why, for what purpose* and *how* e-learning has been introduced in different work contexts, from the initial hype around the millennium until the present day.

So far the corporate e-learning literature has paid most attention to *why* e-learning has been adopted and less to *for what purpose* and *how*. Almost without exception the focus has been on organizational drivers, not on individual benefits. In addition to *cost savings* (which in the early part of this literature was identified as the main driver (Ash & Bacsich, 2002; Barron, 2003; Moses, 2001; Stephenson, 2003) driving forces such as *flexibility in time and space*, *adaptation to corporate needs* (Kristiansen et al., 2000), *need for just-in-time training* (Urda & Weggen, 2000), professional development, organizational knowledge, customer education (see Grant & Danziger, 2005) and *large training requirements* (Barron, 2002) have been mentioned. More practical considerations, such as distributed user groups and lack of physical training facilities, were also acknowledged (Grant & Danziger, 2005). Parts of the literature, however, rejected the existence of drivers, and claimed that quite a few companies never or seldom questioned whether and/or why e-learning should be adopted, but rather how, where, when and for what (Littig, 2002). A review of the latest published e-learning literature shows

that almost the same forces that were identified in the first period (e.g., cost reduction and flexibility) are also emphasised today. While some new drivers such as *increased value, competitive pressures, and enhancement of a firm's intellectual capital* (Barron, 2002; Moses, 2001) have appeared, *cost efficiency* seems nevertheless to still be one of the most frequently recognized factors (van Dam, 2004). Interestingly, however, the 'whys' have principally been viewed as non-contextual, independent of situational and cultural aspects, working context, the actual e-learning solution and the specific phase in the implementation.

Far more seldom than descriptions of why, are research based studies of *where*, not at least because most research was restricted to *specific trades or certain categories of companies* (e.g., SMEs). One of the earliest and broadest surveys of early adopters was made by Barron, who in 2002 found that early adopters could be found in *companies with large training costs* (Barron, 2002), as in certificate driven markets (e.g., financing and IT), regulation driven markets (e.g., energy) and other training intensive markets (e.g., sales representatives, customer-support staff and large consulting firms). The learning technology further spread to the most *highly competitive sectors*, such as high-tech, multinational organizations and large corporations. Studies targeted to early adopters in the corporate European and Norwegian markets pointed to some of the same user groups (e.g., sales and marketing staff), in addition to groups such as the office and management segment, technicians and professionals. Among all these users, e-learning has mainly been used for training in *new products, software, ICT, trade specific competence, sales and technology*, but also for *economy, management, languages and leader education* (Dirkinck-Holmfeld, 2004; Kristiansen et al., 2000). A recent study of public and private organizations in Norway confirms much of these early findings. E-learning is still mainly used for training in ICT (software and hardware), for newly hired employees, skilled trade training, product education, HES and economy- and business courses; less for project management, leader courses and languages. The same study documents that e-learning also has become a tool for corporate culture building and understanding of business goals (VoxAbelia, 2005). An example of this is the Norwegian LAP project, in which restricted, corporate e-learning solutions for collaboration were created (Mørch & Solheim, 2005). None of the reports, however, indicate that e-learning has been used to support company-wide organizational changes, standardization and quality improvement of the production, as was the case in Telenor. The fact that course topics and user groups deviate to some degree across the various geographical markets, strengthens my assumption that user groups as well as training topics are to some extent context, culture and/or situation specific.

An aim of this chapter has been to describe models for workplace e-learning implementation, ensuring a ‘successful’ implementation and/or economic revenue. Such models exist, but they are few (Hoppe & Breitner, 2004) and often very general in form, like Collis’ 4E-model (see Collis & Moonen, 2001) and Edmonds’ implementation model (see Edmonds, 2004). Theories and models ensuring a ‘successful’ implementation and/or economic revenue, however, are lacking. Rather than presenting comprehensive implementation models, which integrate critical steps, implementation tasks, learning activities and context related criteria for assessment and measurement, the workplace e-learning literature is characterized by general purpose guidelines, recipes, recommendations and lists of success factors and/or barriers (e.g., Clark & Mayer, 2003; Collis & Moonen, 2001; Dahl & Rolfsen, 2005; Munkvold et al., 2003; Rosenberg, 2001; Urdan & Weggen, 2000; Åberg & Wärvik, 2004). Suggested implementation strategies (e.g., Edmonds, 2004) are also seldom related to specific e-learning solutions, specific work organizations and/or to concrete implementation goals. This probably reflects the restricted empirical research in this field, which according to Atwell, mainly focuses on technology or product evaluation, not on “what works and what does not” (Attwell, 2004a, p. 54). The number of studies evaluating the combined effects of various implementation features, like mandatory or optional learning, local or enterprise wide implementations and short and long term adoption, are still rather limited. The fact that nearly fifty per cent of the companies never evaluate their e-learning projects, and the rest mainly gauge the effectiveness of the e-learning solution by measuring the number of learners or cost reductions (Barron, 2003; Grant & Danziger, 2005; VoxAbelia, 2005), shows the truth in Atwell’s words: “We are still at a stage of experimentation in e-learning” (Attwell, 2004a, p. 63).

2.3.2 Factors affecting implementation

Success factors and barriers in the implementation of an e-learning solution are mainly discussed from two essentially different points of departure in the workplace e-learning literature. The first type is a holistic system approach, which views the total implementation, from the initial planning phase into a sustainable e-learning solution, as an integrated part of the whole organization. According to this perspective, potential causes for failures and barriers are searched for along the whole implementation path, not only inside the e-learning solution, but also outside of it. An important aspect of this approach is that the failures and barriers are simultaneously assessed against internal organizational goals (van Dam, 2004). The other type of approach is far more restricted, both thematic and in scope. Because the

focus is principally limited to particular phases, activities, roles, aspects or resources, potential barriers and success factors are identified in accordance with those issues. Altogether, the two approaches offer a useful point of departure for further elaboration.

To compare the different studies seems unfair, however, because of the poor integration, as well as the different intentions and spans in focus. One alternative would be to present the best documented research, for instance the research with the broadest empirical basis or the one based on reviews of other studies. Because much of the e-learning literature does not make clear whether the identified barriers/success factors are based on empirical studies or not, I have chosen to include only those references which on their own apply terms like barriers, success factors or similar expressions. The selection is made between more than forty publications in the workplace e-learning field. Three tables are depicted. The two first ones (tables 2.1 and 2.2) describe potential barriers and success factors from a holistic system approach, while the third one gives an overview of critical factors from a non-holistic thematic approach (table 2.3). Rather than viewing the tables as a departure point for some sort of statistics, the aim is to summarize how important contributors in the e-learning literature have, until recently, thought about potential barriers or success factors, independently of both context and implementation approach. It should be noted that *this* dissertation, instead of searching for success factors in the implementation of e-learning, accepts the challenge of taking a general critical view on such a common implementation process. In accordance with this, both problems and opportunities are identified. As such, the implementation of e-learning in Telenor serves as a useful starting point for a critical study of workplace e-learning.

Table 2.1: Barriers in implementation of workplace e-learning - from a holistic system perspective

Simmons¹⁹ (2002)	Rosenberg (2001)	Clark and Mayer (2003)	Rosenberg (2006)
<p>1. Time employees have available for training /learning</p> <p>2. Cost versus value</p> <p>3. Difficulty in measuring results</p> <p>4. Quality of learning content</p> <p>5. Perceived difficulty of using such a system</p> <p>6. Technology infrastructure</p> <p>7. Internal resistance to using technology instead of face-to-face learning</p>	<p>The content wasn't any good</p> <p>The learning wasn't authentic</p> <p>Form over substance</p> <p>One size didn't fit all</p> <p>The technology</p> <p>E-learning was useless after initial use</p> <p>The learning wasn't reinforced</p> <p>No support</p> <p>Against the culture</p> <p>It was plain boring</p> <p>It was "showelware"</p>	<p>Transfer failure due to lack of job analysis</p> <p>Failure to accommodate learning processes</p> <p>High attrition rates</p>	<p>Technology without strategy</p> <p>Weak focus on business and performance requirements</p> <p>Minimal e-learning expertise</p> <p>No attention to the unique attributes of e-learning design</p> <p>Weak assessment</p> <p>No focus on workplace learning</p> <p>No governance</p> <p>Weak sponsorship</p> <p>Failure to manage change</p>

¹⁹ In prioritized order

Table 2.2: Success factors in implementation of workplace e-learning - from a holistic system perspective

Ely (1990, 1999)	Kristiansen²⁰ (2000)	Rosenberg (2001)	Collis and Moonen (2001)	Cross and Dublin (2002)	Jones and Laffey (2002)	Munkvold et al. (2003)	Cedefop (2003)	VanDam (2004)
<p>Dissatisfaction with the status quo</p> <p>Knowledge and skills</p> <p>Adequate resources</p> <p>Adequate time</p> <p>Rewards or incentives</p> <p>Participation</p> <p>Commitment</p> <p>Leadership</p>	<p>Conscious learning strategy</p> <p>Organizational preparedness</p> <p>Different kinds of learning technologies</p> <p>Technologically advanced companies</p> <p>Pedagogical products</p> <p>Ambitions ideas about future learning solutions and internal ability to act</p>	<p>Culture</p> <p>Champions</p> <p>Communication</p> <p>Change</p>	<p>Environmental factors and educational effectiveness</p> <p>Ease of use and Engagement</p>	<p>Culture readiness</p> <p>Technology readiness</p> <p>Capability</p> <p>Organizational readiness</p>	<p>Relative advantage of the e-learning system</p> <p>Top leadership commitment</p> <p>Extensive communication</p> <p>Reward structures or incentives</p> <p>A culture supporting and encouraging learning</p>	<p>Felt need or urgency for change</p> <p>Involve the right people</p> <p>Develop mission and communicate it</p> <p>Reward them</p> <p>Consider a blended approach</p> <p>Develop learning communities</p> <p>Training ad support</p> <p>Use evolutionary approach</p> <p>View target of change from a holistic perspective</p>	<p>Support the development of e-learning</p> <p>Bring together – learning and management</p> <p>Recognise the different contexts</p> <p>Support coherent progression for individual learners</p> <p>Recognize the tension between individual and organizational learning needs</p> <p>Provide strategies for accessing learning technologies and materials</p>	<p>A library of e-learning courses</p> <p>Online coaching and mentoring</p> <p>Online advisors</p> <p>An e-bookstore</p> <p>Discussion forums</p> <p>Online assessments</p> <p>Online pre- and post-tests</p> <p>Access to local and national career planning and information and credentialing</p>

²⁰ Translated from Norwegian

Table 2.3: Thematic critical factors and their necessary characteristics to make the workplace e-learning implementation into a success

<p>Content</p> <p>Valuable content and a blended learning solution (van Dam, 2004) Tight coupling between learning goals, content and daily tasks Easy to understand content and transfer it to work (Dahl & Rolfsen, 2005)</p>	<p>Commitment</p> <p>Gaining top Management support Gaining commitment from the IT department and the Training Department (van Dam, 2004)</p>	<p>Flexibility</p> <p>Build in flexibility to cultural issues (McGuire & Goldwasser, 2001) Flexibility in the e-learning progress (see Åberg & Wärvik, 2004) Flexibility of the program (Green, 2001)</p>
<p>Motivation</p> <p>Motivation will compensate for all inadequacies in learning material and associated support (Devlin, 1993) Motivation - before, during and after the course (Moshinskie, 2002) Motivation (for instance by including individual incentives, relevance of content and engaging content) reduces the need for negative incentives (van Dam, 2004) Motivation among participants (Åberg & Wärvik, 2004)</p>	<p>Planning & Strategy</p> <p>Develop and communicate a change strategy Clarify the redistribution of roles and responsibilities (Westera, 2004) Strategy is the key to success (Cross & Dublin, 2002) Create a centralized learning team (Edmonds, 2004) Start with a job that requires repeatable skills - Figure out the most pressing training issue - Identify the best subject matter experts in your organization (Schank, 2002)</p>	<p>Ownership & Stakeholders</p> <p>Involve super users (Ognedal & Dahl, 2005) Involve stakeholders early (McGuire & Goldwasser, 2001) Make senior managers own e-learning (Rosenberg, 2001) User involvement during development (Lahn, 2004)</p>
<p>End-User Support</p> <p>On-line e-learning support (personalized, user managed, just-in time, relevant to work) (Stephenson, 2003) Local support staff and local gardeners (Kanstrup, 2004) Super users as IT support, pedagogy and knowledge activists (Andresen & Digernes, 2005) Sparring and mentor arrangements (Illeris et al., 2004)</p>	<p>Sustainability</p> <p>Put long-term learner customer benefits above all else and make e-learning part of the very fabric of everyday work life (Cross & Dublin, 2002) Sound leadership will be needed at all organizational levels (Rosenberg, 2001) Open Source, encourage staff to share resources, develop and review strategies, integrate services, share practice throughout organization, evaluate e-learning practice, take pedagogies seriously (Attwell, 2004a)</p>	<p>Instructor-Training</p> <p>The tutor - incorporates many roles (Devlin, 1993) Coach training in e-learning and train them to take the lead role in the transition (Reed & Oeize, 2001) Reinvent your training organization (Rosenberg, 2001)</p>

When I started the literature review, the hope was to point to some variables that seemed to be of importance to all implementations of workplace e-learning, or at least to different stages of the implementation process. As illustrated in tables 2.1, 2.2 and 2.3, the literature gave little scientific basis for making such inferences. *One important conclusion is that there is no formula for the e-learning implementation process.* Indeed, some of the variables appear in more than one context, such as a ‘felt need for learning’, ‘time’, ‘leadership’ and ‘technology’, but no principles are represented in all studies. Despite this, and despite the fact that these concepts are difficult to operationalise, much of the workplace e-learning literature continues to recommend success factors and barriers. This might, of course, reflect a general attitude that most companies want to receive some simple advice. An overview of lessons learnt, together with a broad description of the business and its context, would probably have been more useful.

Furthermore, the e-learning literature only occasionally specifies in which parts of the implementation process the identified factor represents a potential barrier or success factor. As a consequence, it is rather difficult to know *when* this specific factor should be given attention. I suggest that instead of regarding the implementation process as *one long stage*, it should be viewed as a more fine-meshed model. By relating the critical factors to explicit phases in the implementation, it will be easier for the organization to prepare for this process. Cooper and Zmud’s (1990) six stage model for implementation of IT applications offers us such a model. This is described in the next section.

2.3.3 A reference model

Viewed from a technological diffusion perspective, IT implementations are defined as “an organizational effort directed toward diffusing appropriate information technology within a user community” (Cooper & Zmud, 1990, p. 124). With this definition as the departure point, and drawing on Lewin’s (1952) change model and Roger’s (1995) diffusion model, Cooper and Zmud developed a six-stage model. Table 2.4 summarizes and presents an adapted version of these stages. In this model, the term *adoption* is used *at the organizational level*, “to get organizational backing for implementation of the IT application” (Cooper & Zmud, 1990, p.124). The adoption by individual users, which is referred to as *acceptance*, first takes place after *adaptation* of the technology in the organization. Important activities of this stage are, for instance, to install and maintain the IT application, training in new procedures, and training in the IT application. The next stage, *routinization*, is also of interest for my study. At

this stage the use of the IT application is viewed as a normal activity (see table 2.3). With this table as departure, this research focuses on the implementation of e-learning from the stage of adaptation to infusion.

Table 2.4: Cooper and Zmud's (1990) six stage model for implementation of IT applications

	Process	Product
INITIATION	Active and/or passive scanning of organizational problems/opportunities and IT solutions are undertaken	A match is found between an IT solution and its application in the organization
ADOPTION	Rational and political negotiations ensue to get organizational backing for implementation of the IT application	A decision is reached to invest resources necessary to accommodate the implementation effort
ADAPTATION	The IT application is developed, installed, and maintained. Organizational procedures are revised and developed. Organizational members are trained both in the new procedures and in the IT application	The IT application is available for use in the organization
ACCEPTANCE	Organizational members are induced to commit to IT application usage	The IT application is employed in organizational work
ROUTINIZATION	Usage of the IT application is encouraged as a normal activity	The IT organization's governance systems are adjusted to account for the IT application; the IT application is no longer perceived as something out of the ordinary
INFUSION	Increased organizational effectiveness is obtained by using the IT application in a more comprehensive and integrated manner to support higher level aspects of organizational work	The IT application is used within the organization to its fullest potential

This six stage model, which I will use as a reference model for the Telenor implementation, has been applied by Munkvold et al. (2003) to study the implementation of collaboration technologies in industry. He suggests, however, that the implementation process, instead of being linear, should be interpreted as iterative, and with the different stages slightly overlapping. This aspect is further discussed in chapter 10.

2.4 Summary

This chapter aimed to give a backdrop for positioning my study. The Fornebu case is solidly positioned in the tradition of workplace learning and strategic competence development that developed during the 1980s and 90s. Formal learning was expected to take place within the workplace, not outside of it, and was added to the daily work tasks, but not blended with these into an integrated whole, as Sandervang and Skalstad (2001) argue for (see section 2.1.1). In

many ways the implementation might be regarded as typical for what van Dam (2004) (see section 2.2.2) refers to as the *first wave of e-learning*: online individual learning, without any form for collaboration, no opportunities for learning on demand, and with a relatively static content. The learning approach represented, to a large extent, a prolongation or extension of distance training, as it was described in section 2.2.1, with a strong focus on cost savings, efficiency, flexibility and accessibility. The main driver, however, was the physical move to the new headquarters, which undoubtedly represented a huge collective educational challenge and, the external pressure from competitors in the global market.

A weakness of the workplace learning literature is that the *role of context* has often been underestimated. This aspect is even more unfairly treated in the workplace e-learning literature. Another weakness in this literature is that implementations of e-learning in the workplace have mostly been restricted to limited parts of a company. Hence, the introduction of e-learning at Fornebu represents an exception and might be one of the few cases, maybe the first one, where a *large scale implementation of enterprise-wide e-learning* has been studied. Although the study is restricted to only one site, it is probably one of the most detailed studies ever done in this specific field. The fact that this process was followed over four years, also gives the opportunity to study *the sustainability* of this type of learning in a *large organizational setting*, and not least to study *the sustainability of e-learning in different work units within a company*, a field wherein little research has been done until now. By exploring problem areas and opportunities in the implementation of e-learning not only from the current e-learning tradition, but also inspired by activity theory, theories of the historical development of production and theories of innovation and strategic staff development, I hope to make a contribution to the e-learning literature in the above mentioned domains.

CHAPTER 3

Theoretical framework

The main goal of this research is to understand problems and opportunities arising, when e-learning is implemented in a large organization. This is approached by proposing four research questions and, as suggested in chapter 1, analysing them by applying a set of theories. The primary reason for such an eclectic approach is to account for the complexity of introducing and using e-learning in large organizations with different types of work. Another explanation, as argued for by Orłowski and Iacono (2001), is that ICT is an intricate artefact and tool that makes a long and often complicated introduction process necessary. The aim of this chapter is to present the relevant parts of the theories that are proposed. First, however, the chapter reflects on how and why the different theories can compliment each other.

Studying implementations of e-learning in large organizations is synonymous with studying social practices. Two practices are of specific interest in this study: the *implementation practice*, which involves all the members of the organization either as organizers or adopters; and, the *work practice*, which integrates e-learning and work. As an umbrella for the study as a whole a *socio-cultural perspective* (Säljö, 2000) is used. The main reason behind choosing this perspective is first and foremost its strong focus on human actions as situated in social practices (Säljö, 2000; Vygotsky, 1978; Wertsch, 1985, 1998). Another motive is the tool-perspective. Based on individual experiences, shared knowledge and more or less conscious efforts, the socio-cultural perspective views human activities, interaction, learning and development as mediated by tools and significant others, in a cultural context (Säljö, 2000). This means that learning is always rooted in a context of social interaction, and takes culture as an important premise for development. Together, these aspects are of great value for studying the two key processes in this research, the implementation process and the e-learning process. The socio-cultural perspective is presented in section 3.1.

Implementation of e-learning in the workplace is, in any case, a longitudinal process. It brings about new technologies and media, continual change, new practices and learning opportunities,

and represents as such an organizational challenge. When an implementation, as in Telenor, is additionally integrated with the employees' regular work, it represents an even greater challenge. In such cases, it really constitutes a potential germ for conflict (e.g., with the physical relocation and the current work practice). This conflict brings with it, however, an opportunity for change, for new ways of learning, and for new ways of working. It opens the way for innovation and development of collective competencies inherent in the different practices. In order to understand how e-learning developed in various work environments and was accepted by different people, and thus be able to identify the underlying causes of the problems in the implementation, learning and work activities, *third generation socio-cultural activity theory* (Engeström, 1987) is used as the *main analytical tool for the data analysis*. Activity theory, which is a practice-based approach, takes into account issues such as history, context, dynamics and antagonistic forces, and offers the researcher a set of tools of specific relevance for this analysis. First, it opens up for viewing the activities as part of a network of interacting activity systems, and gives the researcher an opportunity for uncovering the underlying causes of problems that have been identified. Second, it perceives learning and expertise as a collective, heterogeneous, and evolving phenomena, and organizations as distributed, decentered and emergent systems of practical knowledge (Nicolini et al., 2003), and third, it proposes that the researcher not only should take a 'system' view when observing the use of artefacts, but should also take a 'personal' view (Engeström, 1990). Section 3.2 gives a broad presentation of the activity-theoretical principles that have been chosen as specific analytical tools for this research.

Analysing work and learning as a culturally mediated practice, however, does not only require references to historical development in general, but also to the relationship between historical forms of production, organizational learning and introduction of technology, in particular. Since Activity Theory is not especially strong on the historical dimension and lacks a tool for describing the historical change (Pihlaja, 2005), *Victor and Boynton's (1998) Theory of Historical Development of Production*, which provides this kind of perspective, is used as a supplement. This theory has also been applied in earlier work integrated with Activity Theory, for instance by Ahonen (2005) and Engeström et al. in order "[to open] up the historical and practical landscape of objects of work" (Engeström et al., 2003, p. 153). The most relevant issues of this theory are introduced in section 3.3. But plans and scenarios do not easily translate into practice. Stepping into the realm of a large multilevel and multifaceted organization, the decisions that individuals take and the acts people carry out on behalf of an

organization often change from the intended object. Such changes also took place in Telenor. To supplement Engeström's view on actions as goal directed and conscious (Engeström, 1987; Leont'ev, 1978) another practice-oriented approach, namely *Argyris and Schön's* (1996) *Theory of Action*, is used as a resource. Their idea that people's actions are frequently guided by values other than the governing values that people advance, are of specific interest for this study. They underline the importance of observing humans in use-situations in order to uncover how people really act. I argue that Argyris and Schön's ideas can represent a useful supplement to the socio-cultural and culture-historical tradition in order to understand implementation processes in large work organizations. Relevant elements of this theory are described in section 3.4.

The magnitude of the case made it further necessary to employ a coding scheme from *Grounded Theory* (Strauss & Corbin, 1990) to identify the most typical problems emerging during this large-scale implementation of e-learning. This theory, which in Strauss' and Corbin's (1990) own words is *grounded in reality*, represents, as the previous perspectives do, a practice based approach and a continuous emphasis on process and change. The technique used in this study, open coding, is as the other coding processes of this theory linked to practice, aiming to build "rich, tightly woven, explanatory theory that closely approximates the reality it represents" (Strauss & Corbin, 1990, p. 57) . Section 3.5 gives a brief introduction to this type of coding scheme, which was used to develop and identify the categories of implementation problems. Similar combinations of Grounded Theory and culture-historical approaches have previously been used both in innovation and work development research (Helle, 2000; Hyysalo, 2004). However, as far as I know, they have not given any broader explanation for why these theories actually complement each other. Finally, section 3.5 summarizes the chapter.

3.1 The socio-cultural perspective

The socio-cultural perspective views learning and development as *mastery and appropriation of tools in a given society* (Säljö, 2000; Wertsch, 1985, 1998). This means that learning is viewed as a process in which a person adopts the tools available for use in a particular social environment, and through this process internalizes ways of thinking endemic to specific cultural practices (Grossman et al., 1999). Based on this perspective, technology is regarded

as an integrated element of developmental processes, and learning as an integral part of human activities within an organization. As a consequence, the approach provides a useful conceptual framework for studying how individuals and groups, as part of their social and cultural practices, acquire and utilize physical and cognitive resources for individual and collective development. According to Säljö (2000, p. 22ff), studies of learning should always give attention to three different, but interacting, aspects:

1. Development and use of intellectual (or psychological/linguistic) tools
2. Development and use of physical tools
3. Communication and the different ways people develop forms of collaboration in various collective activities

Taken together these three aspects reflect an assumption that learning processes need a *social-material* and *cognitive* grounding. First, it is a fundamental principle that the construction of *shared knowledge is created through a social engagement* (Berger and Luckmann, 1967; Engeström, 1987; Vygotsky, 1978). This means that collaboration is a *premise for* internalization. This social-cognitive span is seen as an integral element of all types of learning and development. For instance, in my case, collaboration should be regarded as a fundamental element in the implementation of a technological innovation. Through communication and interaction with other human beings people get access to existing tools, create new ones and make them into useful parts of their own practice. This opportunity for combining ‘concrete doing’ with ‘an explicit formulation of what we are doing’ is, according to Säljö (2000), an enormous resource both for knowledge building and development of practical skills. Second, *the individual acts by using material tools* (e.g., technology, responsibility charts and project plans). These tools can be directed to social or cognitive activities, as well as to the execution of concrete and object-oriented activities. It should be noted that ICT tools have both concrete (physical) and abstract (language) characteristics, and must as such be regarded both as intellectual and physical tools. Due to this, they can have a central role in supporting collaboration and interaction (Cole, 1996). This was, however, not properly taken advantage of when it came to e-learning in Telenor.

This perspective on learning and development outlined by the socio-cultural approach implies that the use of ICT can not be seen as separated from other human activities (e.g., work and learning). Nor can they be seen as separated from the culture *in which* they have been

developed, or *from the culture of those* who have developed them²¹. Thus, a new learning platform, or new e-learning modules, will not only support an action, but through its embedded characteristics it will also direct the actions and generate new activities. This depends on the degree to which the individuals learn to master or appropriate the mediating tools, and how they learn to apply them as a resource in their socio-cultural practices (Säljö, 2000). However, this emphasis of socio-cultural experiences to serve as a precondition for learning and development does not mean that the individuals mechanically reproduce shared experience. All individuals are active in social practices and contribute to shape and renew this practice (Hoogsteder et al., 1996). The individuals both give and take meaning. Together, the individuals, the social practices and the tools, form an indivisible unit in socio-cultural understanding (Säljö, 2000).

In addition, the socio-cultural perspective gives guidelines for the attributes (affordances and constraints) that characterise good learning processes. Processes such as social interaction and communication are both assessed to be of vital importance. From this view, human language represents a unique and incredibly rich artefact, both to create and communicate knowledge (Säljö, 2000). It is through communication that knowledge and competences are collaboratively developed. Social interaction, the critical element for establishing understanding and meaning among peers, has traditionally been manifested in schools through the one-sided teacher-learner relation. By decomposing the learning tasks and marking out the course, the teacher has assisted the learner with communicative scaffolds (Säljö, 2000). With this as a reference frame, the e-learning approach at Fornebu represented a great challenge. Although the modules were developed as scaffolding for handling the new working environment, they were designed as multimedia modules based on written language, delivered via the intranet, and without any integrated opportunities for collaboration and employee interaction. However, since much of the e-learning activity took place at work, communication and collaboration could take place during learning, outside the learning platform. According to the socio-cultural perspective, such an opportunity for participating in social practices is a fundamental pre-condition for learning; explicit educational efforts can never prepare for the diversity of interactive situations that are encountered (Säljö, 2000).

The increased competition in working life has, for the last decades, lead to a growing emphasis on the strategic importance of knowledge and learning. In order to fulfil their

²¹ For practical reason the development culture of ICT work will not be studied in this dissertation.

missions and thrive, all types of organizations increasingly depend on their capacity to mobilize and manage knowledge assets (Drucker, 1993; Nelson & Winter, 1982). To develop this capacity, strong political and economical interests suggest making education more relevant for work, and for transferring larger parts of training back to the workplace. The interest in intertwining learning and work is often combined with the use of ICT. Evolving technologies, increased social complexity, changes in work tasks and a growing need for division of labour make continuous learning necessary. Many aspects of this educational transformation can be explained by a socio-cultural perspective on learning (Säljö, 2000). New technologies enable more and more human knowledge to be built into artefacts and systems. The traditional physical work is replaced by abstract work tasks consisting of monitoring, administering and operating technical and social systems, which requires new knowledge and teaching. At the same time, manual work tasks are abstracted through the development of new information technology. This makes it necessary to master complex intellectual and physical tools in different work environments to solve advanced working tasks. The e-learning modules at Telenor are representative of this kind of development. The new technology is not only a *means* for learning, but also an *object* for learning.

3.2 Activity Theory

Cultural-historical activity theory (CHAT) has evolved through three generations of research. The first generation, centred around Vygotsky (1978) and Leont'ev's (1978) work, created the idea of mediation, commonly expressed as the triad of subject, object and mediating artefact (see figure 3.1).

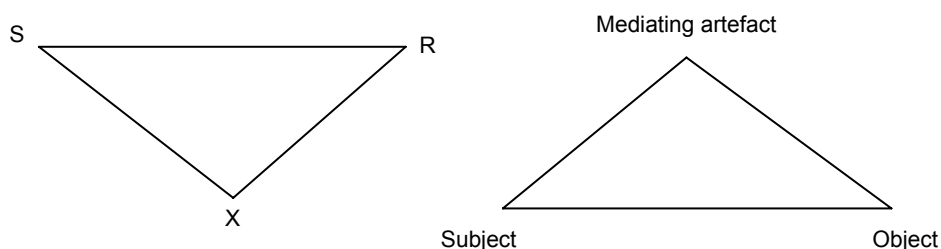


Figure 3.1: The first generation of Activity Theory: (left) Vygotsky's (1978) mediating triangle (S=stimulus, R= response, X=psychological tool), and (right) its common reformulation

A weakness of this first generation is, according to Engeström (1987, 2001), a focus on the individual as unit of analysis, and a lack of regard for the social and communicative aspect.

This was overcome by the *second generation*, which, largely inspired by Leont'ev's (1981) work and the term *division of labour*, brought about the differentiation between an individual action and a collective activity. Engeström (1991) refers to this model as an *activity system* (figure 3.2), comprising the individual practitioner, the colleagues and co-workers of the workplace community, the conceptual and material tools, and the shared objects as a unified dynamic whole. A further description of the activity system is given in section 3.2.2.

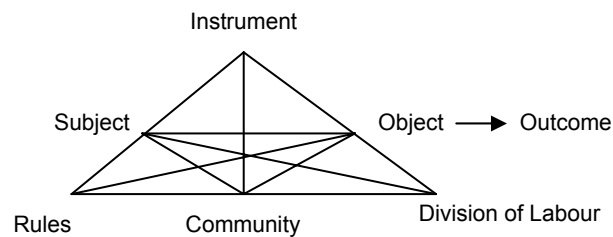


Figure 3.2: The second generation of Activity Theory (Engeström, 1987)

However, an activity system does not exist in a vacuum (Engeström, 1999b, 2001). Conceptual tools to understand communication, multiple voices, and networks of interacting activity systems are also required (Bakhtin, 1981, 1986; Wertsch, 1991). To satisfy these needs, the basic activity model in figure 3.2 was expanded to include *minimally two interacting activity systems*. This expansion opened the door to the formation of the next generation of activity theory, *the third generation* (figure 3.3) (Engeström, 2001). By drawing on third generation Activity Theory my study views implementation, learning and work activities as separate, but mutually interacting activity systems.

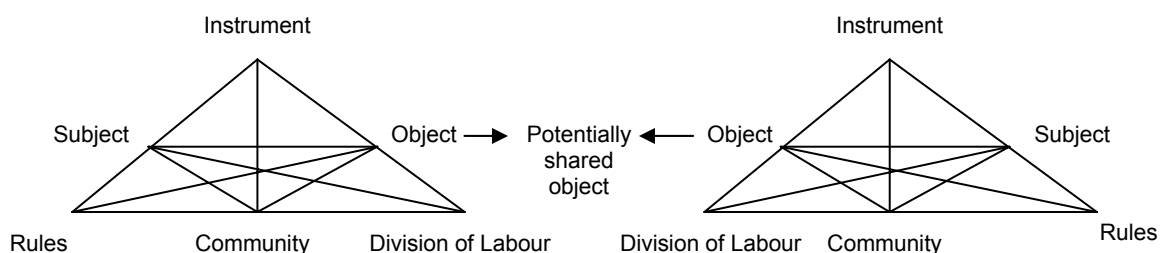


Figure 3.3: The third generation of Activity Theory (Engeström, 1987)

Activity Theory offers both a set of *perspectives* on human activity and a set of *concepts* describing this activity (Nardi and O'Day, 1999). Four such perspectives and concepts are especially useful for this research:

1. Artefacts and mediation
2. The structure of an activity
3. Contradictions, tensions and disturbances, and
4. History, development and expansive learning.

These are presented in the following sections.

3.2.1 Artefacts and mediation

Mediation by artefacts in Activity Theory, as in a socio-cultural approach, is a fundamental principle of this research. Humans do not act directly on the world; instead their actions are mediated by a number of physical and psychological tools (Engeström, 1987). These tools, either material (such as a hammer), less tangible (such as a plan), or abstract (as an idea), must be able to be shared for further manipulation and transformation by the participants of the activity (Kuutti, 1997). As mediators between an actor and the object of doing (see figure 3.1), artefacts are also created and transformed when they are used. During the development of the activity, they are always dependent on the context and cultural-historical resources. This means that most tools might mean different things to different people. By combining human abilities with the capacities of external tools into ‘functional organs’ (Leont'ev, 1981), new functions can be performed, or an existing object can be performed more efficiently (Kaptelinin, 1997a; Zinchenko, 1997).

Also the ICT artefact is often referred to as a tool, combining the physical and intellectual characteristics (e.g., a hammer and a language). Orlikowski and Iacono (2001) criticise this restricted view on tools. Based on a review of the full set of articles published in *Information Systems Research* from 1990-2000, they claim that the ICT artefact is under-theorized, taken for granted and tends to disappear from view. While eighty-eight per cent of the papers they studied had adopted a static view on the ICT artefact and conceptualized it as “relatively stable, discrete, independent, and fixed” (Orlikowski and Iacono, 2001, p. 121), only twelve per cent reflected a dynamic and changing view, referred to as an ‘ensemble view’ (Orlikowski & Iacono, 2001). It is this view, which engages with the social and embedded aspects of technology development and use that, according to Orlikowski and Iacono, should be given more attention in future research. Therefore they recommend theorizing about “specific technologies with distinctive cultural and computational capabilities, existing in various social, historical, and institutional contexts, understood in particular ways, and used

for certain activities” (Orlikowski & Iacono, 2001, p. 131). Given this context-specificity of ICT artefacts, they suggest that there is no single, one-size-fits-all conceptualization of technology that will work for all studies. IS researchers, as other researchers of the ICT artefact, should therefore take as their departure point, that the ICT artefact is not neutral or given, and neither is it fixed or independent. It should rather be viewed as dynamic and made up of a multiplicity of often fragile and fragmentary components, whose interconnections are often partial, and which require *bridging, integration, and articulation* in order for them to work together (Orlikowski & Iacono, 2001). This is also the point of departure for this dissertation, nevertheless, as for the sake of simplicity, the e-learning modules and the learning platform will be referred to herein as tools.

It should be noted that more efficient computational functions were one of the ambitions behind the introduction of e-learning at Fornebu. The aim was to integrate new ICT tools with natural human capabilities into a sort of functional organ (Kaptelinin, 1997b). These were meant to lead to higher accomplishments by the work force, both in learning and for performing work. To identify the optimal integration of ICT tools into the structure of human activity and uncover the needs that require the development of a new functional organ, however, is challenging (Kaptelinin, 1996b). An aim of this study is to understand how the available tools were used to mediate organizational implementation and human learning in the company, and to uncover how workers and training administrators managed to use the given tools to reach the objectives. A further aim is to study the peculiarity of the ICT artefact as an activity-theoretical tool (see Orlikowski & Iacono, 2001).

Of specific interest in this case are Wartofsky’s terms *primary, secondary* and *tertiary artefacts* (Wartofsky, 1979). While primary artefacts are used directly in production (e.g., like a hammer), secondary artefacts are mainly used as representations of actions related to this production (e.g., working routines). In Wartofsky’s words these are “used in the preservation and transmission of the acquired skills or modes of action or praxis by which this production is carried out” (Wartofsky, 1979, p. 202). *Tertiary artefacts* are not, as secondary artefacts are, related to a productive practice in a direct sense. In contrast, they aim to influence the practice by mediating changes in modes of perception, and thus in modes of action (Wartofsky, 1979). An example of a tertiary artefact is, for instance, a ‘company vision’. By presenting a vision, the aim is to change the way we act by changing the way we perceive the world. Based on Wartofsky’s perspective, the e-learning modules in Telenor can be regarded as more or less related to work practice or the productive practice. As a consequence, there

might be an opportunity that they are more or less easy to handle, in that they are balanced against the concern for practical relevance. This aspect might be relevant when trying to understand the problems that emerged in the implementation of e-learning in the four different Telenor units. Furthermore, looking at the e-learning modules in Telenor from this perspective, none of the modules can be regarded as primary artefacts. Instead, most of the modules could be classified as secondary artefacts, and a few of them, maybe, as tertiary artefacts. Interestingly, the default implementation plan (see chapter 4) proposed to implement all modules in the same way, regardless of whether the module was directed to training for performance or to training for reflection. To what extent this influenced the completion rates and implementation work is discussed later in this work (see chapter 7).

3.2.2 The structure of an activity

According to Kuutti (1997) an activity is a form of doing directed to an object. As a consequence, the activities are distinguished from each other according to their objects. With this as a starting point, the collective activity or the “*doing* of the activity in a rich social matrix of *people* and *artefacts*” (Kaptelinin & Nardi, 2006, p. 9), as it is depicted in figure 3.2, is taken as the basic unit of analysis. The perspective of the analysis is the agency of the subject, and the interaction between the subject and the object is mediated by physical or symbolic tools or artefacts (including ICT artefacts). At the bottom of the activity model are three less visible social mediators of activity; *rules*, which mediate the community-subject relationship and incorporate explicit and implicit norms, regulations, conventions and social relations within a community; *division of labour*, which mediates the community-object relationship and includes both the horizontal division of tasks between the actors and the vertical division of power and status; and, *community*, which mediates the subject-object relationship and comprises multiple individuals and/or groups who share the same general object of activity (Engeström, 1987). The nature of the activity can, however, change the object completely (Engeström, 1996), or, as Blackler puts it, the *object* itself is partly given and partly emergent (Blackler et al., 2003).

As a consequence of this principle the activities are viewed as systemic entities (Kuutti, 1997). This means that all elements within an activity system have a relationship to all other elements within the same activity system. Introducing new artefacts into an activity system will, from this perspective, necessarily influence the type of social and individual processes that emerge. Correspondingly, the existing social interaction within the community and the

intellectual processes of the individuals involved, affect how a new artefact will be used (Bellamy, 1997). Applied to the introduction of net based learning at work, there will be a need to discuss how the labour is divided, the role of the subject, and how the actors contributed to the overall activity.

3.2.3 Contradictions, tensions and disturbances

To understand the evolution of learning in an organization, and the historical changes of human activities, Engeström introduced the idea of *contradictions* (Engeström, 1987). This concept, which is indirectly described by the word *tension* (Engeström, 1987), is defined as “historically accumulating structural tensions within and between activity systems” (Engeström, 2001, p. 137). In Engeström’s terminology all tensions are persistent and describe the “essence” of the contradictions (Engeström, 1987). In the analysis of human activity, he distinguishes between four levels of contradictions (see figure 3.4):

1. *Primary* contradictions within each component of the activity system
2. *Secondary* contradictions, appearing between the elements of the activity system
3. *Tertiary* contradictions, appearing when representatives of a culture introduce the object /motive of a culturally more advanced form of central activity
4. *Quaternary* contradictions, appearing between the central activity and its neighbouring activities (Engeström, 1987)

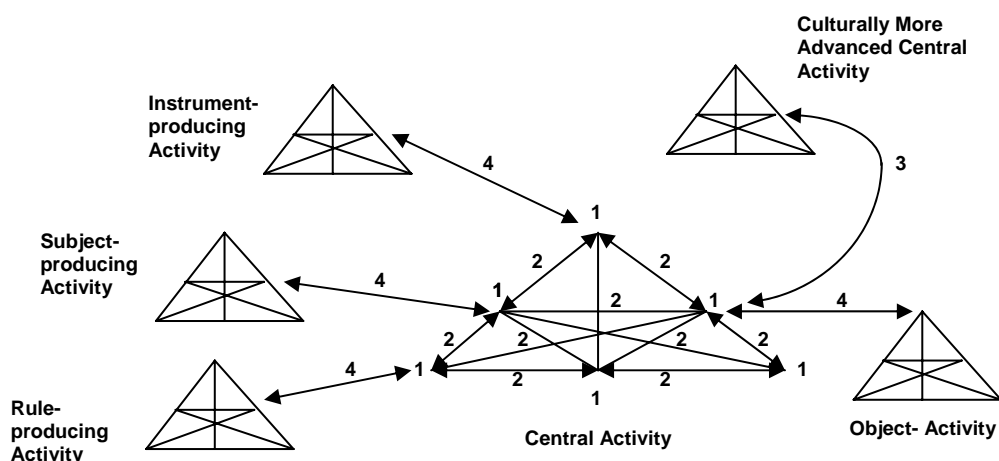


Figure 3.4: Four levels of contradictions in a network of human activity systems (Engeström, 1987)

From an activity-theoretical perspective, contradictions are not only regarded as sources of learning and development (Engeström, 1987, 2001) (see section 3.2.4), but also as the moving force behind so called *disturbances* (Engeström, 1993). These appear, at least in periods, in all work activity systems, and should be interpreted as manifestations of contradictions (Engeström, 1999a). Therefore, they represent an important starting point for the identification of long-term tensions within and between activity systems, and the underlying contradictions of these tensions. Characterized as deviations from the normal flow of work (see Engeström, 2000a; Helle, 2000), disturbances show up mainly as errors, problems, breakdowns, ruptures of communication, obstacles, etc. (Helle, 2000). Engeström and Mazzocco define the concept as:

“deviations from the normal scripted course of events in the work process, normal being defined by plans, explicit rules and algorithms, or tacitly assumed traditions. ... A disturbance may occur between people and their instruments or between two or more people. They appear in the form of an obstacle, difficulty, failure, disagreement or conflict. Identification of types of disturbances and ways of managing or containing them opens up a new layer of work for analysis - a layer of constant negotiation and problem solving from below” (Engeström and Mazzocco, 1994, p. 2).

In order to identify the underlying contradictions in and between activity systems, a broad historical study of the development process is required. Such a work, which often is referred to as a historical-genetic analysis (Davydov, 1990; Il'enkov, 1977), is both analytically and in time extremely demanding. Thus, this kind of analysis has not been carried out as part of this research. As a consequence, this study is not able to specify the contradictions; instead the disturbances under focus are referred to as tensions pointing only to *potential* contradictions.

3.2.4 History, development and expansive learning

An activity is not static or rigid, but continually changing and evolving over time. The same goes for all its components. Engeström (2001) refers to this dynamic as *historicity*. This means that a phenomenon can only be understood by being interpreted against previous theories and specific tools that have formed the activity (Kaptelinin, 1997a; Kuutti, 1997). Applied to the Fornebu case, this means that an implementation of e-learning should be analysed both against the specific history of the local organization and the interacting activities, as well as against the more general history of technology, finance, procedures and tools employed and accumulated in the local history. With the principle of historicity as a

backdrop, I claim that in order to gain access to the general history of an activity in a large organization, the previous phases of the activity have to be studied in the various local organizational settings. To characterize and categorize such historical types of activities, Engeström (1993) suggests that different conceptual frameworks can be used. The analysis in this study therefore draws on Victor and Boynton's (1998) model for classification of work (see section 3.3).

The activities do not only *maintain* previous history, for instance by embedding parts of older phases of activities as they develop (Kuutti, 1997). They can also *shape* history, e.g., through development and innovation. This kind of development can take place because the activities and their environment are both in continuous movement, or, in activity-theoretical terms, are internally and externally contradictory (Engeström, 2000b). When *contradictions* become evident and manifested as disturbances, people may start to collectively address underlying issues, question the existing standard practice, develop a shared vision, and through stepwise cycles create new learning or new forms of activity, or in Engeström's words "learn new forms of activity which are not yet there" (Engeström, 2001, p. 138). In contrast to the traditional subject-producing activity that takes place in schools, Engeström describes this new type of learning as an activity-producing activity or as *learning by expanding* (Engeström, 1987). The concept has also later been examined with the help of the expansive learning matrix developed by Engeström (2001).

According to Engeström (2003), traditional workplace learning views the development of competence and expertise as *vertical* processes. Characteristic of this view is a discourse of stages or levels of knowledge and skills. A *horizontal* dimension of workplace development and learning has, however, gradually been acknowledged (Engeström, 1999b; Spinuzzi, 2006), calling attention to dialogue and a discursive search for shared meanings in object-oriented activities. Such horizontal or sideways movement across activity systems opens up for inter-organizational, cross disciplinary learning, which is characteristic of the knowledge society²². As a consequence of this re-conceptualization of development, the concept of expansive learning has also changed. From initially having been related to large-scale transformations of a single activity system, spanning a period of several years, the term can

²² The basis for designating advanced modern society as a "knowledge society" is the transformation of existing societal structures by knowledge as a core resource for economic growth, employment and as a factor of production. Typical for a knowledge society is that the older measures of competitiveness, such as labour costs, are superseded by dimensions such as development, research and access to knowledge workers (see <http://www.cddc.vt.edu/knownet/what.html> date 1.8.07)

also be used to analyse smaller-scale innovative learning processes between various interacting activity systems (Engeström, 1999b, 2003).

An aim of the implementation of e-learning at Fornebu was to create competitive, creative and innovative workers, so called knowledge workers. The primary product was to be knowledge, e.g., information that is continually interpreted and circulated across organizational boundaries. To get full support of knowledge building, Engeström, in one of his articles, *recommends incorporating* both the vertical and the horizontal dimension of learning, or more generally, both the temporal-historical and the spatial-social dimension (Engeström, 1999b). Spinuzzi (2006) goes even further, and proposes that knowledge workers can only be created if support for both horizontal and vertical learning is given through *formal* as well as *informal* training and materials. Since an explicit goal in Telenor was to develop a knowledge organization (Telenor, 2000), I therefore suggest that the concepts of horizontal and vertical learning can be used as an analytical resource to examine whether the new e-learning tool over time managed to transform the current activity systems and lead to innovation. This type of analysis is included in chapter 8.

3.3 Theory of Development of Work

An important premise of Victor and Boynton's (1998) theory of historical development of work is that work is a historically changing phenomenon. Five historical types of work are defined by the authors: *craft*; *mass production*; *process enhancement*; *mass customization*, and *co-configuration*, each of them especially suitable to compete "effectively in a particular market at a particular time" (Victor & Boynton, 1998, p. 7). To manage these types of work, specific modes of learning are required. These are *tacit knowledge*, *articulated knowledge*, *practical knowledge*, *architectural knowledge* and *configuration knowledge*. The various types of work, and the corresponding types of learning, are further described later in this section. They are also depicted in figure 3.5.

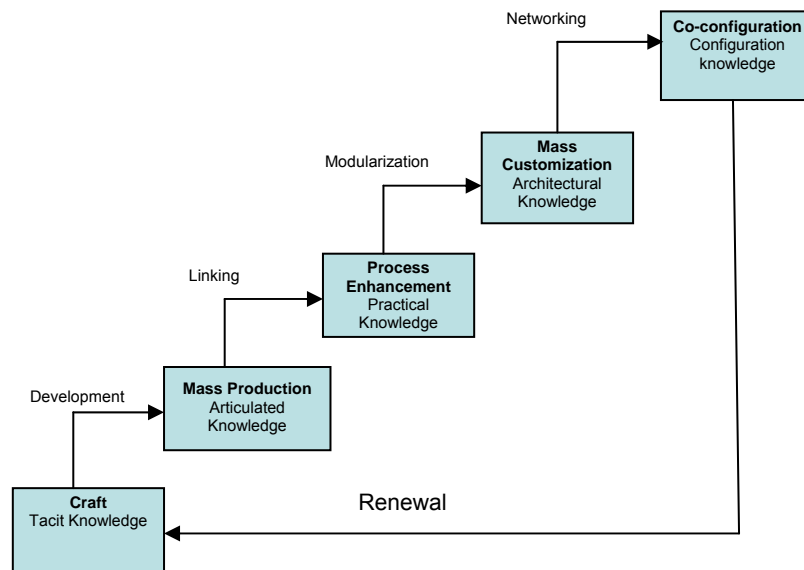


Figure 3.5: The transformations of work types along *the right path* (adapted from Victor and Boynton (1998))

According to Victor and Boynton (1998), the five historical types of work are related in a specific and predetermined way. This sequence is referred to as *the right path*, which means that one type of learning cannot be reached before the previous one has been reached. For instance, mass production cannot be reached before craft; process enhancement not before mass production; mass customization not before process enhancement; and, co-configuration not before mass customization. This progress is made possible because *additional learning* is always considered as a by-product of each type of work. This additional learning, required to pass from one level to next, represents a potential for transforming the present type of work along the right path. It also lays the foundation for the new type of work. As an example, craftsmen generate additional learning as a by-product of tacit learning. For instance, they know in detail, and can also describe, all the steps for how a product is made or a service is delivered²³. This knowledge can either be ignored by the company, or it can be identified and codified into articulated knowledge, distributed to all workers, and used as a basis for mass production. Such transformation activities along the right path are viewed by Victor and

²³ Craft workers mostly know more than they can tell. As people work, they get smarter, and skills, intuition and judgment improve. With time and repetition, this learning goes beyond intuition and becomes clear and simple in their minds. The tacit knowledge accumulates and can be articulated. Unlike tacit knowledge that resides in sensing, intuition, and skills; articulated knowledge is explicit, repeatable and can be described in steps and actions. When a master craftsperson, according to Victor and Boynton (1998), teaches an apprentice the basics of how to shoe a horse or operate a complex press, he or she is communicating articulated knowledge. If a company captures this articulated knowledge to produce new products and new processes, development has taken place.

Boynton as a *learning system* (e.g., development, linking, modularization, and networking) (see figure 3.5).

Thus, Victor and Boynton's theory not only gives insight into the historical transformation of work, but also into the historical transformation of learning in and for production (Pihlaja, 2005). As such, it gives the analyst an opportunity for identifying the type of learning that is required for creating value within the different types of work, and for identifying the type of learning that is necessary for transforming the current work into the next type of work along the 'right path'. From my point of view, this possibility for examining whether the new e-learning approach represented a break with previous learning can be a useful supplement to understand how the enterprise-wide implementation of e-learning was received in the different working environments of Telenor. I further suggest that Victor and Boynton's approach can serve as an analytical framework for classifying the journey of the e-learning idea during its many steps through the organization, from its launch at company level in the late 1990s, its introduction as a tool for relocation in the four main units in 2001-2002, and its hand over to the same units for further exploitation in 2002-2005. The next section gives a short description of the five ideal types of work.

3.3.1 Five historical types of work

Craftwork marks the starting point of the right path. The aim is to create value through high-priced *novel products* that make a strong, unique impression on customers (Victor & Boynton, 1998). This is possible by drawing on the personal know-how, or the so called *tacit knowledge*, developed by first hand experience through work. This knowledge, which rests in people's bodies, is mainly transferred to colleagues through team work and apprenticeship programmes, not through written procedures or documents. To take advantage of this knowledge, an effective craft capability has to align the organizational structure, the process flow, and the technology, with the specific requirements for applying this type of knowledge (Victor & Boynton, 1998). Therefore, the work organization must be fluid, adaptable, loosely coupled and organic, and managers and workers both have dual roles. The work flow is independent and decentralized to individuals, groups, or empowered communities of practice. Although the workers represent the firm's key resource, advanced technology and flexible information may play a vital role within this type of work to unleash the employees' talents and increase the firm's ability to structure the work and to manage the knowledge.

In *mass production*, value is instead achieved through predictable, standard, ‘no-surprise’, *low-price commodities* (Victor & Boynton, 1998). In contrast to craft work, standards reside in the company as *articulated knowledge* in the form of written procedures. To increase this knowledge and avoid the loss of precision or time, the workers are “assembly-line” workers, with access only to the knowledge required to perform his or her task. The organization is bureaucratic and hierarchical, and with a strong separation of workers and managers. Managers are thinkers, who make directives and are responsible for planning, while workers are task oriented and viewed as obedient doers (Victor & Boynton, 1998). Training takes place on the job, and is directed to company specific solutions. The integration is vertical and is reflected through a serial process flow, which is executed with centralized control and according to a given plan. In this type of work the technology either replaces or directly controls the work. In alignment with this view, the key benefit of information technology is regarded as cost-justified efficiency, knowledge reuse, and replication, to gain scale advantage.

The next stage, *process enhancement*, incorporates, as mass production, all the standard features, benefits, and prices of the standard product, but focuses in addition on creating products that the customers perceive as having superior *quality* (Victor & Boynton, 1998). Crucial for this type of work is therefore *practical knowledge*. Because every process must contribute to higher quality, the workers are equipped with tools and techniques to help them apply this knowledge. The aim is to create ‘a learning organization’. Work is organized as horizontal teams and integrated across the value chain. The workers are task oriented, while the managers act as coaches, who constantly encourage the workers to interact and observe, and to do and think. The organization prepares for a constant flow of information both within and across teams, and a systematic overlap of production- and research-related knowledge guarantees innovation. To support this aim, flexible information technology is integrated into the work environment. By making information available just-in-time, the information technology effectively increases process flexibility (Victor & Boynton, 1998).

The basic idea of *mass customization* is to efficiently make precisely what the customer wants, no less and no more. Value is created through *precision*, providing affordable, timely and tailored products and services (Victor & Boynton, 1998). This type of work is characterized by *architectural knowledge*, which makes it necessary for the company to know the structures of its work processes, how the processes are interconnected, and how they can be rebuilt in order to achieve new combinations or sequences (Victor & Boynton, 1998). All

resources (human, technological and process) have to be modularized and combined. To respond to customer or market demand, the organization has to be dynamic, based on instant, continuous, shifting working teams. The managers are traffic cops, who coordinate the independent workers engaged in hubs of a complex web of activities. According to Victor and Boynton (1998), this type of work is only in the early stages of development.

Co-configuration, which is the step beyond mass customization, is the latest step in Victor and Boynton's 'right path'. Within this type of capability, value is created by making *customer intelligent* products and services (Victor & Boynton, 1998). These are adapted to the customers continuously over time, as customer and worker learn about each other as well as about the product. This kind of knowledge about "how the product or service, in its essential elements or modules, must vary as the customers' needs and wants vary" (Victor & Boynton, 1998, p. 197), is referred to as *configuration knowledge*. To extend this knowledge, technological innovations are viewed as necessary tools. According to Victor and Boynton, this type of work will be the new competitive advantage for companies of the twenty-first century.

Table 3.1 gives an overview of the five work types incorporated in Victor and Boynton's 'right path'. Because only a few firms up to now have developed the fifth type of work, that is co-configuration, the authors have not yet specified in detail the four dimensions that distinguish this type of work from the others (the organization, data flow, knowledge and technology). The description of co-configuration in the table is therefore more imprecise than the description of the remaining types of work.

Table 3.1: An overview of the five work types (adapted from Victor and Boynton (1998))

Type of work	Craft	Mass production	Process enhancement	Mass customization	Co-configuration
Organization	Fluid, adaptable, loosely coupled, organic. Highly informal, collaborative professionals and craftsmen. Managers are not purely managers; workers are not purely workers.	Bureaucratic, functionally defined, hierarchical, vertical integration. Mechanistic, top down, separates doers and thinkers. Workers are doers; managers are thinkers.	Team-based, horizontal organization; value chain integration; knowledge overlap; bottom up communication. Combined doers and thinker roles. Managers act as coaches; workers are task oriented	Dynamic network, renewable, virtual integration, cohesive; networked on-demand processors, highly responsive. Manager as traffic cop; workers as hubs in complex web of activities.	Organic, growing system; various kinds of alliances (such as producer-user relations); complex and adaptive network structures.
Process flow	Independent work, decentralized to specialized individuals and groups.	Serial, linear; executed to plan; centralized control, information specialized.	Intensive and reciprocal within teams; constant microtransformation.	Modularized linkages integrated for customer/product; unique value chains.	Absolute commit to the relationship between the company, the product, and the customer; integrate the intelligence in the product into the ongoing development.
Knowledge	Tacit knowledge resides within the craftsman and is transferred through on-the-job training.	Articulated knowledge resides within the firm. Transferred through training.	Constant flow of practical knowledge from employee to firm as process change is introduced.	Architectural knowledge to support dynamic networks and flexible combinations.	Dialogical configuration knowledge about how the product and service must vary according to the customers' needs and wants.
Information technology	Development and distribution of customized systems.	Automation of manual processes to achieve cost-justified efficiency enhancement; vertical information control	Design of cross-functional information and communication systems that support microtransformations.	Information of constantly changing network information processing and communication requirements; networking efficiency.	Use of technological innovations, but the right balance between technology and human experience is required.

3.4 Theory of Action

According to Argyris (1999), actors participating in managing people always design the consequences they intend to implement. Furthermore, the same actors assume that: if their employees learn the principles of the new initiative; if they understand them fully; if they wish to use them; and if they are permitted to use them, then they will go ahead and use them (Argyris, 1999). After having observed people in real-world organizations, Argyris and Schön (1974, 1978), however, claim that this is not always the case. Organizational learning does not necessarily occur as it was intended. From their point of view, organizational learning is namely produced through the behaviour of individuals acting as agents of the organization (Argyris, 1999). Hence, the behaviour cannot be fully designed from above. The authors indeed acknowledge that the organizations can create conditions for what individuals frame as a problem, design as a solution, and produce as an action to solve the problem. But, they underline heavily that an individual's behaviour is always constrained by the individual's mind, values and beliefs (Argyris, 1999). Argyris and Schön refer to these *maps* in people's heads, which they claim have the same structure as propositions in any scientific theory, as *theories of action* (Argyris & Schön, 1974, 1978).

A premise of these theories is the following: few people are aware that the maps that they use to take action are not necessarily the theories they explicitly espouse. Even fewer are aware of the maps or theories that they *do* use (Argyris, 1980). As Argyris and Schön suggest, this discrepancy is not merely a difference between what people say and what they do. The authors therefore argue for a distinction between *two different theories of action*, between the meanings created when people espouse their views, and the meanings created when they act them out (Argyris, 1999). Based on this finding, two theories of action are specified:

- The espoused theory
- The theory-in-use

Espoused theories are those that people *report* as theories that inform their actions, that is, theories that describe the way people *say* they behave. These can, for instance, be reported in policy documents, but also accounted for in interviews. Theories-in-use instead are described as those theories of action inferred from how people *actually* behave, for instance by analysing and identifying recurrent patterns through video tapes, audio tapes or other

instruments that focus directly on observable behaviour. To study potential discrepancies, the authors claim that the recurrent patterns of the ‘theories-in-use’ and ‘espoused theories’ have to be observed and identified in practice (Argyris, 1999).

This distinction between two theories of action can be useful to describe how the e-learning idea at Telenor changed from the first time it was espoused in policy documents at company level. The idea was modified *at least* three times: at first by a steering committee of the e-learning project; then by an e-learning project group; and finally, by the local Training Administrators who were responsible for the local implementations. These groups of actors, all with their own values, their own beliefs and their own maps, can be studied as representatives for theories-in-use. All of them *received*, from the level above, *a written instruction* which they accepted, and, which they reported had guided their actions. The written instructions represented as such, a manifestation of their espoused theory (e.g., the e-learning idea formulated in policy documents served as an espoused theory for the steering committee; the mandate of the e-learning project served as an espoused theory for the e-learning project group; and, the default implementation plan served as an espoused theory for those responsible for the local implementations). On their own, the same groups of actors next *produced* a set of *physical artefacts*. These can be interpreted as a manifestation of their theory-in-use (e.g., the steering committee formulated a mandate for the e-learning project group; the e-learning project group defined an implementation plan for those responsible for the local implementation; and, those responsible for the local implementation produced an adapted implementation plan for his or her unit). By classifying the theories of action in the different groups of actors in accordance with Victor and Boynton’s historical types of work (see section 3.3), the aim is to uncover potential discrepancies between espoused theories and theories-in-use, and identify the modifications of the e-learning idea in this part of the journey through the organization (see chapter 6). However, it should be noted that potential discrepancies in this work are not searched for in people’s heads, as argued for by Argyris and Schön (see Argyris, 1999), but rather in environmental structures as focused on by Engeström (1987).

3.5 Grounded Theory

The Grounded Theory approach is a qualitative research *method* developed by Glaser and Strauss (1967) during the 1960s. With fieldwork as a starting point, it uses a systematic set of procedures and processes to develop an inductively derived grounded theory about a phenomenon (Strauss & Corbin, 1990). To achieve this presupposes a *theoretical sensitivity*, defined as an ability to recognize what is important in data and to give it meaning (Strauss & Corbin, 1990). In this work, it is initially two basic procedures for *coding* that are relevant: the *making of comparisons*; and *the asking of questions*. These are both used in the three major types of coding applied in grounded theory, *open coding*, *axial coding* and *selective coding*.

Grounded Theory can be used as a step-by-step approach to conduct research – from formulation of the initial research questions, through various systems of coding and analysis, to the process of writing or speaking on the research topic (Strauss & Corbin, 1990). In this work, however, only a restricted part of the theory is applied, that is *open coding*. By using this process as a method for analysing the data collected during the first year at Fornebu, the aim is to identify the most typical categories of problems emerging during the stage of adaptation (Cooper & Zmud, 1990)²⁴. I claim that this type of coding represents a useful supplement to an activity-theoretical analysis, when the data material is large and spans a number of interacting activity systems. From my point of view the process can be utilized as a first step in the course of *identifying categories of phenomena* that can be further analysed by Activity Theory. This is done in my work, where the categories that, from my point of view, were the most novel and interesting were later analysed by using the third generation activity theory (chapter 7).

According to Strauss and Corbin, *open coding* is “the part of analysis that pertains specifically to the naming and categorizing of phenomena through close examination of data” (Strauss & Corbin, 1990, p. 62). By using this technique, the data is broken down into discrete parts, or so called *concepts*, which are the basic units of analysis in grounded theory. These parts are then closely examined and compared for similarities and differences. Questions are also asked about the phenomenon that is reflected in the data. By using these procedures, the concepts are given precision and specificity. The coding takes place in three steps: 1) conceptual labels are placed on discrete happenings, events, and other instances of phenomena; 2) categories are

²⁴ Recall chapter 2 which introduces Cooper and Zmud’s model as a reference model for the implementation.

discovered in terms of properties and dimensions by grouping the concepts around a phenomenon; and, 3) the categories are named. The coding process can be approached in different ways, of which Strauss and Corbin (1990) describe three: coding of phrases or single words after a line-by-line analysis; coding of sentence or paragraph; or coding of the entire document, observation, or interview. However, regardless of approach, the authors recommend generating categories early, for instance, with a line-by-line analysis of the first interview or observation. These initial categories should be the basis of the further theoretical sampling, and indicate what should be focused on in the next interview or observational site (Strauss & Corbin, 1990).

3.6 Summary

This chapter reviews the central aspects and the theoretical framework that are used in my analysis. While the socio-cultural perspective is used as a basic approach for the study as a whole, Activity Theory is mainly applied to structure the analysis. To assist this analysis, the three theories, Victor and Boynton's Theory of Development of Work, Strauss and Corbin's Grounded Theory and Argyris and Schön's Theory of Action, are used as methodological resources. By arguing for looking at the different theories as practice-based approaches that take the reality as the departure point for the analysis, the chapter also reflects on how and why the five approaches can be combined.

As far as I know, Activity Theory, which is the main theoretical inspiration of this study, has seldom been used as a resource to study enterprise-wide implementations in large organizations. Instead, the theory has mostly been used to analyse implementations in more restricted parts of a company. One explanation is that this task is rather demanding. A complete activity-theoretical study of a large, multi-levelled, complex organization would have required a broad discussion of the history and context of the different units, as well as an analysis of a large number of interacting activity systems. With the Telenor case as a backdrop, I suggest that the combination of perspectives and theories applied in this study can be a fruitful contribution to the cultural-historical Activity Theory, and can be a useful theoretical framework for this kind of large-scale implementation research.

CHAPTER 4

E-learning at Telenor

To meet the competition in the Norwegian and international telecom market in the late 1990s, Telenor, as the largest telecommunication company in Norway, decided to raise a new and visionary headquarters at Fornebu, in Oslo. The aim of the building project was at least three-fold: to co-locate the more than 6000 Telenor employees at 35-40 different offices in the Oslo area; to create the most advanced work environment in the Nordic region; and, to create an innovative and competitive organization (Telenor, 2002b). According to Telenor, the move, which took place in four waves from 2001 to 2002, represented the largest industry relocation in Scandinavia around the millennium.

To prepare the employees for the advanced work environment and augment the internal competence development, e-learning was selected as a strategic tool. An underlying goal, however, was that the same technology, together with other strategic tools, would, in the long run, also contribute to the transformation of the company into a learning organization (Telenor, 2000). To begin with, the implementation of e-learning was restricted only to the new headquarters at Fornebu²⁵. Nevertheless, behind the decision was an expectation, maybe also an intention, that the new learning technology would also be distributed to the rest of the organization and to the commercial market. The aim of this chapter is to present this case, referred to as ‘the Telenor case’. The focus in the dissertation is placed on the organization of the e-learning implementation, the development of a default implementation plan, and the further adjustments of this plan on its way through the organization. The data is primarily collected via interviews, internal policy documents and annual reports, Telenor’s intranet, Telenor’s house journal and the company’s external web sites.

To understand why the new form of learning was introduced and the specific implementation approach was chosen, it is, in accordance with Ahonen (2005), of vital importance to understand the history of the actual enterprise and its current challenges. Section 4.1 introduces the

²⁵ There are Telenor-offices in many other Norwegian cities, such as Harstad, Tromsø and Bergen.

Telenor organization, the production and current learning traditions before the introduction of e-learning. The ambitions related to the new headquarters and the most important drivers for the introduction of e-learning are then presented (section 4.2). Next, a description of the central issues of the e-learning approach (section 4.3), including the agreed default implementation plan and the adherent rules, roles, division of labour etc., is given. The later modifications of this plan in the four main units are the subject of section 4.4. The further development of e-learning through the next three years is, however, saved for chapter 8. Finally, section 4.5 summarizes the chapter.

4.1 The Telenor organization

Telenor's history goes back to 1855 when the first Norwegian telegraph line was opened in the name of the Norwegian Telegraph Administration. The enterprise survived as a state monopoly in the Norwegian market up to 1994 when it was transformed to a public corporation. One year later the name changed to Telenor, and in December 2000, the company was partly privatised and listed on the stock exchange. There were at least two driving forces for this transformation. First, a growing international competition, and second, a corresponding competition in the Norwegian telecom market after deregulation in the 1990s, with free competition for all telecom services from 1998²⁶.

Today Telenor is a leading provider of communications services and one of the largest mobile operators worldwide. At the time of moving, it consisted of four large units, named business areas (TBS, TM, TP and TN), and some smaller companies, referred to as 'Other units'. Figure 4.1 shows the Telenor organization at the point of relocation. Both across and within the units there was a large span in production – from mass production of automatic message counting, via products related to data, telecom and mobile technology, to advanced integrated solutions and services directed to the most demanding customers in the Norwegian industry market. A brief presentation of the four main units is given in chapter 6.

²⁶ http://www.telenor.com/about/who_we_are/our_history/chronology/ date 1.1.2007

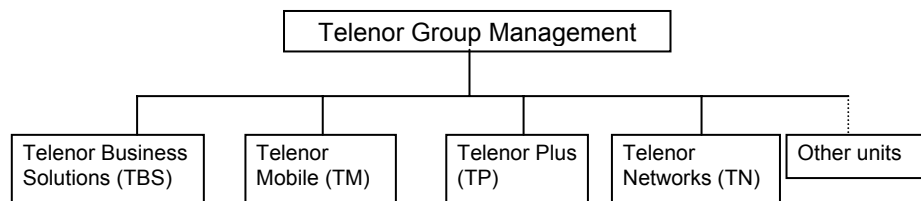


Figure 4.1: The Telenor organization 2001/2002

The learning in Telenor, as in other large Norwegian state monopoly organizations, has for years been characterized by centralized departmental training combined with training-on-the-job and external courses (see section 2.1.2). The training traditions in the different parts of the company have varied. Even ICT based learning has been in use since 1996, when this type of learning was introduced in the two call centre units. However, because the responsibility for competence development around the millennium was held by the single business area, and the contact between local and central level was weak, the new enterprise-wide e-learning initiative did not draw on the local experiences in this field. Nevertheless, towards the end of the 1990s an increasing focus on knowledge transfer, collaboration technology and activities related to creation and innovation came into being, partly due to growing international competition, and partly due to the ongoing merger negotiations with the Swedish telecom company Telia (Welle-Strand & Tjeldvoll, 2002). This merger, which would have resulted in a new company with nearly 50,000 employees, was expected to elicit a huge need for knowledge sharing, knowledge transfer, learning and culture building²⁷. The negotiations with Telia indirectly became an important driver for why e-learning and the development of a common learning platform was incorporated in Telenor's strategy (Telenor, 2000), and, became a strategic element in the Fornebu project. This project, which was responsible for the building of the new headquarters, is described in the next section.

4.2 Fornebu - the new headquarters

The expectations for the new headquarters at Fornebu were huge, not least because it was planned to be localized in a high-tech knowledge cluster at the old airport outside Oslo:

²⁷ There was an agreement to merge with Telia AB. This merger was voluntarily dissolved two months after the merger agreement was signed.

”Telenor's new headquarter at Fornebu is set to become the group's prime location for innovative developments, based on inter-personal communications. Behind Telenor's investment at Fornebu is the vision of *‘The Nordic region's foremost workplace for new ideas’ - a centre for the information age*. The new development will offer great opportunities to work in different ways, to communicate better, and to stimulate product development and creativity” (Telenor, 1999, p. 111) (my italics).

To carry out the vision of creating the leading innovative workplace in the Nordic region and in Northern Europe (both terms were in use)²⁸, the project focused on three areas:

- People and organization
- Technology and IT
- Workplace design

The following narrative, which was published on Telenor’s intranet in order to put the employees in the right mode for moving, describes a ‘future working day at Fornebu’:

“You arrive at the Fornebu building in the morning and drop down beside the employees you want to sit nearby for that day; that may be your project co-fellows or a group of colleagues with whom you are going to collaborate. If you have a portable PC, you log in via a cable or a wireless card. If not, you use one of the stationary PCs placed around, available for common use.

The login is rapid and will automatically give you access to your systems and data as well as to the nearest printer. Those who utilize the ePortal –solution, will get a user interface tailored to you, and your needs, during the working day. You will get access to your work documents within the eDoc system. Your meeting calendar in Outlook will be available for the switchboard service so that people can get information about your absences. In the eBygg system you can book a meeting room, and through this system you can also order food for meetings and inform the reception about your guests. The reception can prepare name tags before the guests show up. And, if you are unsure how to use some of the solutions, you can log into the relevant learning programs in the eLearning system [LMS].

The meeting rooms are installed with permanent equipment for audio and video presentations and video conference, with the possibility for a rapid shift between PCs when more actors are participating in the presentations at that meeting. If something fails in your electronic work day, you register this on the web, where you can later observe the status of the error correction. If you need new applications, you can order those on the web, and you can follow the delivery process in the same way” (translated from Norwegian).²⁹

²⁸ www.telenor.no/fornebu date 1.1.2003

²⁹ <http://infotorg2.telenor.no/infotorg/fornebu/eready/data.shtml> date 28.8.2002

Two projects were launched to realize these expectations, the PUB project³⁰ and the eRAF project³¹, both of them inspired to use the new headquarters as *a catalyst* for increased cross-organizational learning in Telenor as a whole. But, while the purpose of PUB was to develop *new ways of working* that would support the vision of Telenor as a knowledge organization and an innovative workplace³², the aim of eRAF was to establish a standardized technology and equip the new headquarters with a common infrastructure and common ICT solutions, in alignment with the same vision³³. The main goals of this latter project, to which the e-learning projects described in the next section belonged, were in brief:

- *A customer oriented* Telenor
- *An effective* Telenor
- *A learning* Telenor
- *A mobile* Telenor
- *A global* Telenor
- *An attractive* Telenor³⁴

In short, the Telenor Fornebu project was not merely an impressive *building project*. It was also an extensive *change project* as 6-7000 employees from more than 35 different offices in the Oslo area were moved to the new headquarters at Fornebu. This change, from a traditional organization based on a hierarchic structure, to a knowledge organization based on project work, management based coaching and self directed employees, represented an extensive *organizational development*. This was also underlined in the project description – it was a *strategic* as well as a *change project*, or maybe a *strategic change project*, driven primarily by the introduction to the stock market. In a continually competing and shifting environment, development of *individual* as well as *organizational* competence was seen as an absolutely necessary means of survival³⁵.

Furthermore, the project was a *cost-reduction project*. This aspect was also explicitly reflected in one of Telenor's strategic human resource documents (Telenor, 2000) written in July 2000. A conservative estimate stipulated the relocation would contribute to company earnings with at least 2 billion Norwegian Kroner a year³⁶. Through e-learning and more effective work processes the income would be secured, and value created. In many ways the

³⁰ Project for development and user participation" (in Norwegian; Prosjekt for Utvikling og Brukermedvirking)

³¹ Project enabling - Ready Arena Fornebu

³² <http://infored.telenor.no/infotorg/fornebu/Brukermedvirking/PUB.htm> date 19.09.2002

³³ <http://infotorg2.telenor.no/infotorg/fornebu/eready/mandat.shtml> date 16.9.2002

³⁴ http://www.telenor.no/pressecenter/aapen_linje/2000_07/reportasjer_e-ready.shtml - translated from Norwegian

³⁵ www.telenor.no/fornebu date 1.2.2002

³⁶ http://www.telenor.no/pressecenter/aapen_linje/2000_07/reportasjer_e-ready.shtml - translated from Norwegian

project reflected both *the technology functional (rational - instrumental) tradition*, where an organization's legitimacy is attached to its ability of being *efficient* (see Røvik, 1998) as well as the symbolic perspective, represented by the *neo-institutional theory* (see Røvik, 1998). From my point of view, many of the project initiatives can, or should be interpreted as *symbols, reflecting the current institutionalised ideas in similar companies at the same time* (e.g., a paper-less work place). This aspect is also emphasised by the strategy document where Telenor is referred to as a *technological showcase* (Telenor, 2000). Through symbols such as advanced, profitable technology and e-learning, Telenor searched for a new legitimacy. Figure 4.2 gives two snapshots of the new workplace.



Figure 4.2: Opportunities for mobile working at the new workplace



Figure 4.3: Open floor plan solution at the new headquarters

4.3 Central issues of the e-learning approach

Telenor's e-learning project was planned and introduced as the largest e-learning project in Scandinavia. The first part of the implementation, which is the subject of this section, took place in four phases from November 2001 to August 2002, in parallel with the physical move of the four business areas. For the organization the changes from the old to the new locations represented *an enormous educational challenge*, due to a lot of new technology, new leader and work principles, and a relatively new working environment. The most striking changes are summarized in figure 4.3:

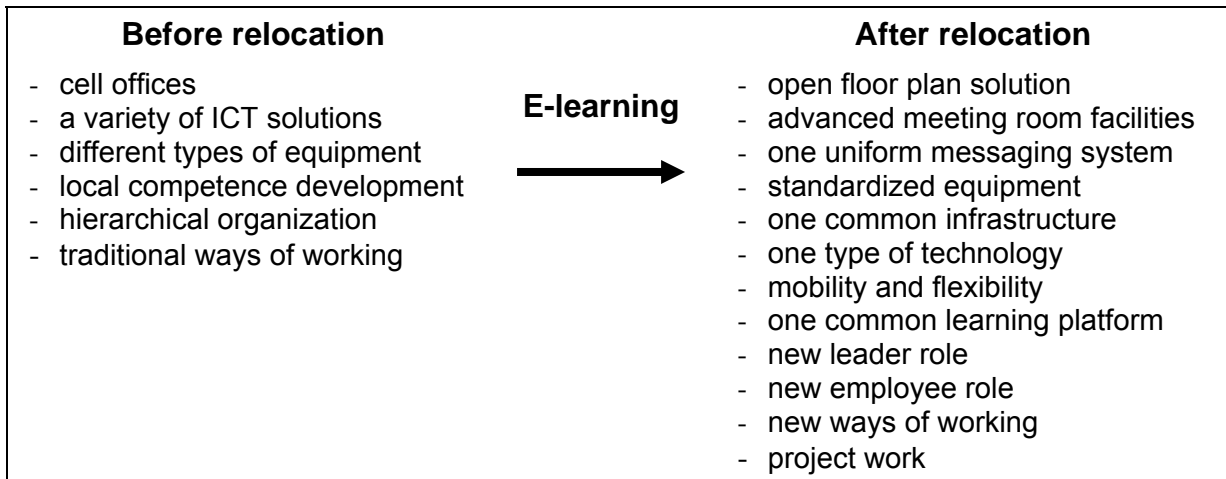


Figure 4.4: The working environment before and after relocation

The four relocations, however, not only presented an educational challenge, they required a *huge organizational and technological effort*. A multi-level hierarchical project organization was therefore launched under the technology-oriented project eRAF. Under *eRAF Løsning*, one of the four sub-projects at the first level³⁷, two e-learning related sub-projects were launched. They were *eRAF Opplæring*, which was responsible for the e-learning modules (the content), and, *eRAF eLearning*, responsible for the learning management system/learning platform (LMS). The two projects are referred to in this dissertation as ‘the Content project’ and ‘the LMS project’, respectively. Both were owned by the company’s top management and were managed by a group consisting of the CEO and the directors of the different business areas. After the first unit move, the two projects were merged and became the project *eRAF Læring*. Since the e-learning activity, according to the implementation plan, should be handed over to the respective business areas (the line organization³⁸) and integrated with the daily business tasks about one month after relocation, the project Learn@Telenor was introduced to support this transition. The *planned* implementation of e-learning is depicted in figure 4.5. It should be noted that the project Learn@Telenor existed half a year longer than planned. It should be noticed that a separate infrastructure project was also launched as a sub-project under eRAF Løsning. This project, which was responsible for preparing the infrastructure at the new headquarters, is referred to in this dissertation as ‘the Infrastructure project’.

³⁷ Four different projects existed at the first level under the eRAF project: eRAF Drift (in English - Operation); eRAF Implementasjon (in English - Implementation); eRAF Fellesløsning (in English - Application); and, eRAF Støtte (in English - Support).

³⁸ The term is used to describe the organizational structure of activities contributing directly to the organization’s output (see <http://www.wordweonline.com/en/LINEORGANIZATION> date 01.02.07).

Goal	Responsible	01.12 2000	01.03 2001	01.01 2002	01.10 2002	01.01 2003	31.12 2005	
Develop: - A shared Infrastructure - Common ICT solutions - Common PC/VLAN-policy	eRAF Felles- løsning	----->						
Select and implement an LMS Develop and implement LMS- reports for follow up	eRAF eLæring (LMS)	----->						
Implement: - an LMS - e-learning modules - reports for follow up - e-learning rules	eRAF Læring					----->		
Develop and implement: - e-learning modules - e-learning rules	eRAF Opplæring (Content)	----->						
Exploit from project- to line- organization: - new e-learning modules	Learn@ Telenor					----->		
Develop and implement: - business specific e-learning modules	Business area	-----> / /						

Figure 4.5: Goals and responsibilities in the implementation process

While the mandate of the LMS project was to select and implement a company-wide learning portal with opportunities for *administration, control and support* of all the types of learning processes for the whole of Telenor (more than 20 000 employees), the main aim of the content-project was “*to give the right learning to the right people at the right time and in the right way*”³⁹ (Telenor, 2002b, p. 21) in line with the vision of creating the most innovative workplace in the Nordic region. The training (or learning) was meant to enable the employees to rapidly master the basic functionality of the new working environment, or, as formulated on the Telenor intranet, to do “Business as usual” within some hours of relocation⁴⁰. This learning was to be delivered as personalized web-based e-learning via a company-wide LMS and supplemented by paper based and digital guides. The content project was also responsible for decisions concerning the learning material and implementation rules.

To *prepare for* these challenges, twelve Fornebu-specific and five Microsoft Office related e-learning modules were produced (based on a survey carried out in the beginning of 2001), an LMS was purchased, a central help desk was established, web and paper based training

³⁹ Translated from Norwegian.

⁴⁰ This expression was used on the Telenor intranet 2001, 2002. In interviews, however, the expression “a few days after relocation” was mostly used.

resources were developed, seven e-learning coordinators (so-called Training Administrators or TAs) were appointed - in each of the four business areas as well as in each of three smaller Telenor companies - and a default implementation plan was designed. A tabular presentation of the default implementation plan, as developed by the content project, is given in table 4.1. The implementation itself, however, was a job for the business area. Merely one *link* existed between the project groups and the local level, the Training Administrators (TAs). The TAs were given rather a broad responsibility: coordination and implementation of learning; support and follow up of employees; production of learning statistics; and, responsibility for informing the management about local completion rates. Despite this, it was still the top manager (TopM) who had the main responsibility for the local implementation (Netteland, 2003a). Together, the TA and the Top Manager are referred to as the local implementation team.

Table 4.1: The default implementation plan

	Components	In Detail
ACTORS	Top manager (TopM) Training Administrator (TA) Help desk Super users /Sweepers	Follow up & control Coordination & support & follow up & report production Centralized technology support – available at Fornebu Infrastructural support the first week at Fornebu
ARTEFACTS	Information meetings Local planning LMS platform LMS reports 12 Fornebu specific e-modules 5 e-modules about MS products E-learning infrastructure Digital learning material Paper based guides	Information meetings at different locations 1 week before 1 month before moving Centralized management Predefined reports 8 ICT-applications, 2 Physical workplace, 2 New ways of working MS Word, MS Excel, MS Outlook, MS PPT and Netmeeting eRAF-PC, network access, line capacity – available at Fornebu Micro guides & FAQs Blitz guides, leaflets
RULES & DIVISION OF LABOUR	Individual e-learning Individual logging Compulsory learning Completed modules Allocated training time Reward Control Follow-up Coordination of learning activities Report production Support	E-learning at desk or elsewhere Opportunities only for individual logging of learning results 3 specific modules before moving - 5 afterwards 80-100% of the module had to be completed to be approved Recommended - estimated time for e-learning specified Recommended - no money set aside Top manager(TopM) responsibility Top manager and TA responsibility TA TA produces – delivers the report to the TopM TA, Help desk, Super users / Sweepers

The twelve e-learning modules were developed through instructional design and were all launched as *individual tutoring programmes*, expected to be carried out without collaboration. The programmes were *multimedia based*, including audio, video, animation and graphics. Interaction with the user was offered through different *built-in tests* and work tasks. Expected completion time for each programme was from 20 to 45 minutes. The modules were all indexed, so that the user could access a particular sequence of the module directly, or return to this sequence at a later time. The users were free to take a break, log off the e-learning module and log in later, without losing credits. Although eight of the programmes were compulsory and the others optional, the modules were all marketed as an opportunity for flexible and mobile learning, with respect to navigation, time, as well as space (Netteland, 2003a). Figures 4.6 and 4.7 give screenshots of the two e-learning modules PC I and PC II. While the first describes how you (among other things) can take care of your personal files and transfer them to Fornebu, the second informs learners about the new PCs and laptops at Fornebu, and how the network can be accessed via cable, a wireless card or from home.


<h2>PC – Preparation for relocation</h2>	
Description	Topics
<p>The e-Learning program gives an introduction to the PC solutions at Fornebu, in addition to an introduction to how to take care of the most important personal files when moving to Fornebu.</p> <p>Files that have to be secured, are files connected to outlook (.pst og .pab), your favourites connected to Internet Explorer, and other personal files stored locally on your hard disk.</p>	<ul style="list-style-type: none"> ■ PC models ■ Personal PC ■ Portable PC ■ Securing of personal data ■ Securing of Outlook files ■ Securing of Favourites ■ Securing of other personal files ■ Securing – printable procedure ■ About the Relocation day
	

Figure 4.6: Screenshot of e-learning module PC I

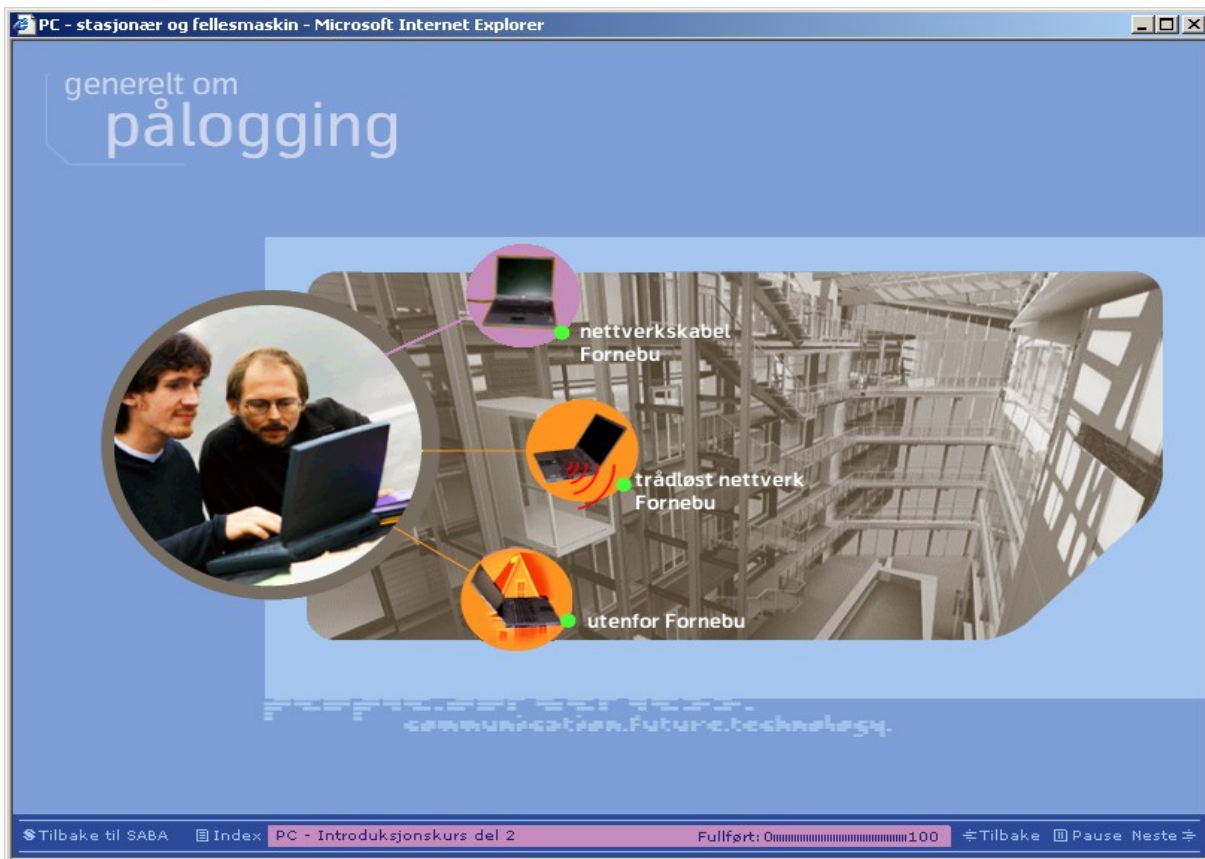


Figure 4.7: Screenshot of e-learning module PC II – How to log into the network

To understand the underlying aim of the twelve e-learning programs, table 4.2 gives a brief description of each of them, as they were presented to the Telenor employees on the Intranet in the autumn of 2001. In 2002 this intranet description was supplemented with a more precise and comprehensive description of each course, including goals and expected completion time for each course. It should be noted that five additional modules were developed to support the most applied Microsoft products.

Table 4.2: Compulsory (blue) and optional (white) e-learning modules⁴¹

Name	Description
Saba LMS	Gives the employee a fundamental introduction to Telenor's new learning platform. Shows how to find, order, carry out and get an overview over his own learning activities
PC I -introduction to relocation	The module will inform about the new PC functionality, motivate the employee to use this functionality and show how to apply the client in customary user situations
Docu Live	Document management and document storing at Fornebu. The module follows a document from editing to archiving
PC II - the moving day	Four different modules: -PC- introduction course for the employees at Fornebu –part 1 -PC- personal portable PC – introduction course for employees at Fornebu – part2 -PC- personal stationary PC – introduction course for employees at Fornebu – part 2 -PC- common PC- introduction course for employees at Fornebu – part 2
ePortal ⁴²	This module gives an introduction on how to create your own work space, including pictures, links and favourites. The module also illustrates how to retrieve relevant documents, sort incoming and outgoing post and search for information
eBuilding	This module gives an introduction to booking of meeting rooms and additional services, like meal ordering and invitation of internal and external meeting participants, with embedded invoicing of these services
Telephony	Introduces the advanced functionality of the various new telephone solutions at Fornebu, like IP-telephony, stationary telephones, VIP networks, job number, mobile networks
AV-equipment	Gives the employee an introduction on how to use the audio-visual equipment in the meeting rooms, like video, PC, DVD, sound and whiteboard
Multifunction machine (MPD)	Print, copying and scanning via the new multifunction machine at Fornebu
PDA-IPAQ	Practical training in the use of the handheld PC - IPAQ
PDA-Palm	Practical training in the use of the handheld PC - Palm
Self management	Introduction to professional concepts and practical methods that might help you to handle the challenges at your new workplace, e.g. more independent working
HES	Health, environment and security in Telenor (e.g. HES-systematics, ergonomy and sick absence)
Vision	Describes potential dilemmas that might arise during your work day at Fornebu
MS Word, MS Excel, MS Outlook, MS Power Point, MS Netmeeting	How to use the most frequently applied Microsoft products

⁴¹ <http://infotorg2.telenor.no> date 1.11.2001 (translated from Norwegian)

⁴² The module ePortal was never developed

The training was made available via an LMS interface and was organised according to a *marketplace metaphor*. This was symbolized with a shopping basket in ‘the learning catalogue’ where all the available courses were listed and the user could order courses and training exercises. Figure 4.8 shows a screenshot from the *personalized web-interface*, in the form of the learning catalogue.

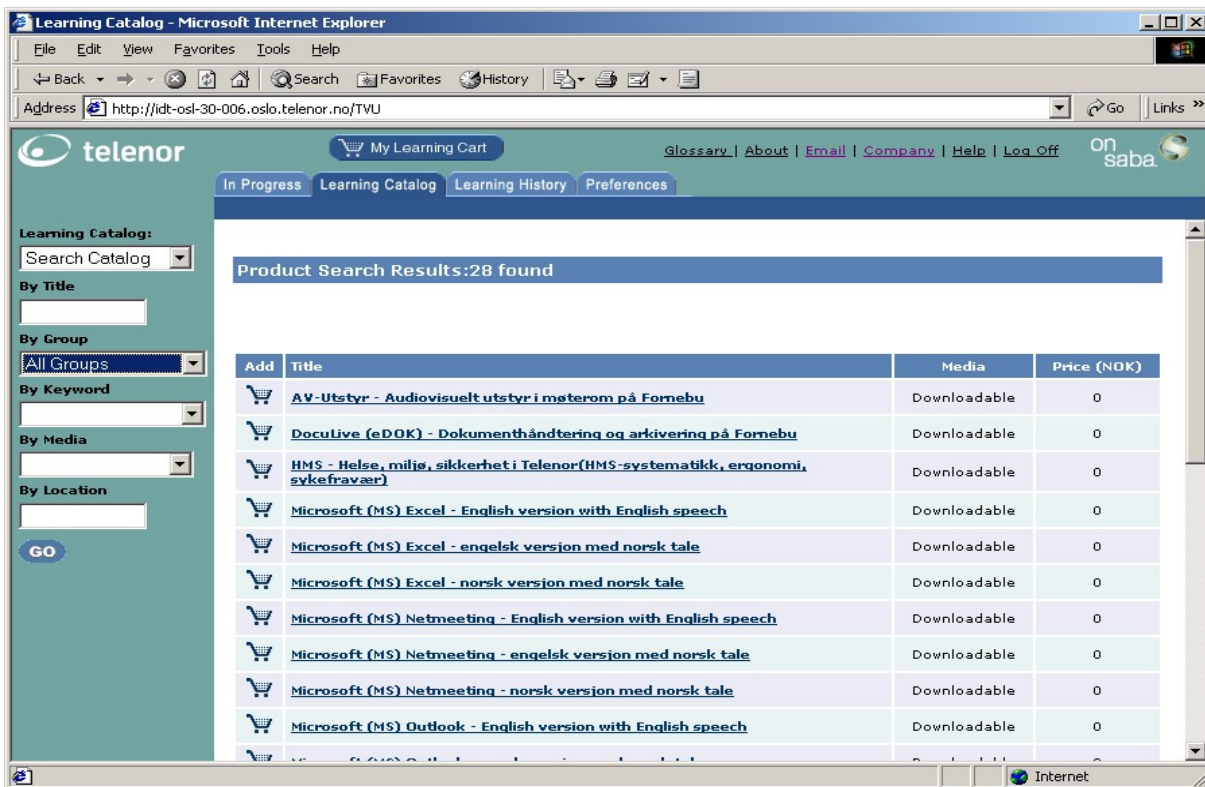


Figure 4.8: Screenshot from the learning catalogue view

When a course was chosen, it was moved to the ‘In Progress’ view, and once a course was completed and approved, it was moved into the ‘Learning History’ view. Employee data, combined with data about the completion rate, were available for the training administrators through predefined reports, *one* aggregated at unit level, *the others* identifying employees and additional completion rates at unit or manager level. Figure 4.8 shows a screenshot of the most frequently used report (Guribye, 2005).

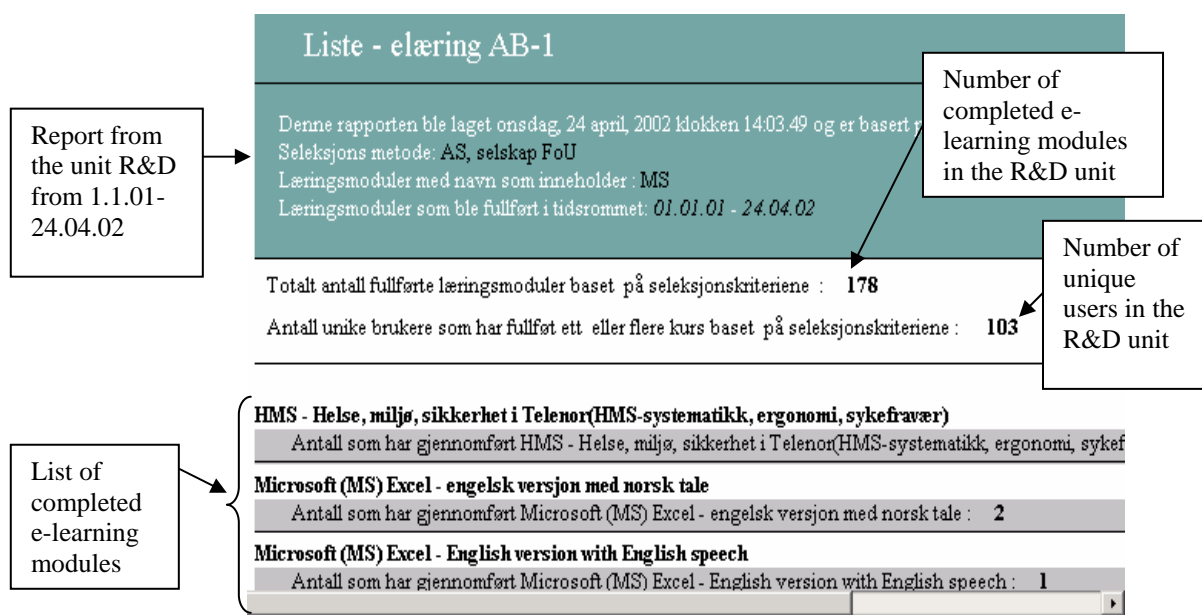


Figure 4.9: Screenshot of the most frequently used learning statistics report

4.4 Modifications of the default plan at local level

Already during the first local implementation in Telenor, unplanned deviations from the default implementation plan appeared. Further changes were made during the three following relocations, some planned and some unplanned. These changes are illustrated in table 4.3. The table is based on the same analytical categories that were used to describe the default plan in table 4.2, but supplemented by the new components that were introduced in the different units (marked in blue). The signs ‘+’ and ‘-’ indicate correspondence or a break with the default or planned plan while brackets around the signs indicates *some* correspondence/break. The symbol ‘*’ marks that the component decision has been decentralized to a lower level unit.

Table 4.3: Planned and unplanned modifications of the default implementation plan in the four main units

	COMPONENTS	TBS		TM		TP		TN	
		Plan	During	Plan	During	Plan	During	Plan	During
ACTORS	Top manager (TopM)	+	-	+	-	+	+	+	+
	Training Administrator (TA)	+	+	+	+	+	+	+	+
	Floor Manager (FM)	-	-	-	-	+	+	+	+
	Help desk	+	+	+	+	+	+	+	+
	Super users /Sweepers	+	+	+	+	+	+	+	+
	Local TAs		-		-	+	+	+	+
	Local super users		-		+	-	-	-	-
	Lower Management		-		-	+	+	+	+
	Local Help desk		-		+	-	-	-	-
	Project coordinator		-		+	+	+	+	+
ARTEFACTS	Information meetings	+	+	+	+	+	+	+	+
	Local planning	+	+	+	+	5mths	+	6mths	+
	LMS platform	+	+	+	+	+	+	+	+
	LMS reports	+	+	+	+	5	+	5	+
	12 Fornebu specific e-modules	+	+	+	+	+	+	+	+
	E-learning infrastructure	+	+	+	+	Before	+	Before	+
	Digital learning material	+	+	+	+	+	+	+	+
	Paper based guide	+	+	+	+	+	+	+	+
	Targeted information meetings					+	+	+	+
	Leader meetings					+	+	+	+
Workshops					+	+	+	+	
RULES & PRINCIPLES	Individual training	+	+	+	+	+	+	+	+
	Individual logging	+	+	+	+	+	+	+	+
	Compulsory learning ⁴³	+	3+5	2+4	+	2+0*	+	3+5	+
	Completed modules	+	+	+	+	+	+	+	+
	Allocated training time	-	-	-	-	-*	*	-*	*
	Reward	-	+	-	-	+	*	+	+
	Control	+	-	+	-	+	*	+	+
	Follow-up	+	(+)	+	+	+	*	+	+
	Coordination of learning activities	+	+	+	+	+	*	+	+
	Report production	+	+	+	-	+	*	+	+
Support	+	+	+	+	+	*	+	+	
RULES & PRINCIPLES	Deadlines					+	+	+	+
	Workshop training					+	+	+	+

⁴³ This row specifies the number of compulsory modules *before* and *after* relocation. For instance, as in TBS, the number of compulsory modules before moving was 3, afterwards 5.

As indicated in the table, there were changes already from the first (TBS) to the second move (TM), for instance, with respect to the number of compulsory modules. The most extensive distinction, however, is visible between the two first (TBS and TM) to the two second moves (TP and TN). These modifications, which were mainly initiated by the TAs, *not only represented a structural change, but also a qualitative change in the different services and relations*. From the third move:

- The e-learning information became much more *targeted to specific user groups*
- Information was given through *regular meetings* (e.g., in regular leader meetings) and not as before in separate information meetings about e-learning
- The *local planning phase* was enhanced – from one to nearly six months
- The *responsibility of the floor managers*⁴⁴ was *broadened* to include the encouragement and support of the e-learning activity at sub-unit level
- *All levels of management*, and not only the top manager, were *involved*
- A member of eRAF Læring was pointed out as *project coordinator*, responsible for one particular business area. This person had the job of assisting the central TAs and also took part in some of the leader meetings and workshops
- All levels of management were actively *followed up*, either by the TAs or the newly appointed *project coordinator*
- The TA's role was more *proactive* and was supplemented with *local TAs in the sub-units*, eleven in TP and five in TN
- The *pedagogical approach* was enhanced by *workshops* targeted to specific user groups. The workshops differed, from being used for concrete e-learning activity, to discussion of a module that had been completed in advance, to presentation of new modules expected to be carried out afterwards

The third and fourth moves, however, were far from identical. While the decisions in the third move were, to a large extent, decentralized to lower levels, the e-learning approach in TN was centralized, but with local support and leader engagement.

⁴⁴ The floor managers had been engaged as secretaries for the top and middle management before relocation. After the move, this type of work was going to disappear. Therefore, the floor managers were given the responsibility for the relocation and general end-user support at sub-unit level in the business areas.

Altogether, the many planned and unplanned modifications not only influenced the *conditions* for e-learning at local level, but most probably also *the number of problems* that arose in the e-learning activity as well as the *outcome* of the training. The most urgent problems emerging in this part of the implementation are discussed in chapter 7. A description of the resulting learning outcomes is more difficult to give, mainly because there were no opportunities for measuring this outcome more precisely. Figure 4.8 below illustrates the large span in e-learning across the four main units. The statistics are based on completed LMS modules four weeks after relocation. The modules are also numbered, from left to right, and are included for explanatory purposes. Compulsory modules in the respective business areas are marked with numbers in the box on the right. Dependent on whether the TBS- and TN-employees were equipped with a stationary or portable PC, they could choose between module 4 or 5.

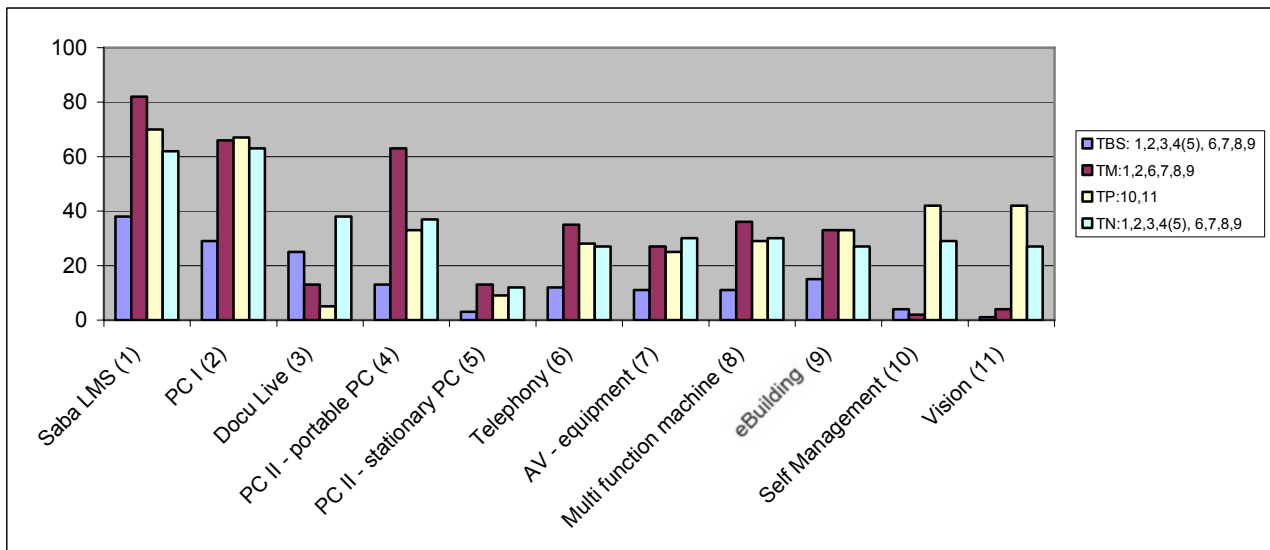


Figure 4.10: Percentage completion rates 4 weeks after moving - compulsory modules specified on the right

4.5 Summary

This chapter has introduced the large-scale implementation of e-learning at Fornebu, Telenor's new headquarters. The history is sketched back to when the e-learning idea first emerged, in 1999, and the implementation is followed until four weeks after the last business area had relocated to Fornebu in August 2002. A main aim of this chapter has been to communicate the strong internal desire for an organizational change and a need for trans-

forming the company into a knowledge organization. This was probably one of the most important drivers for why e-learning was introduced, not only as a tool for efficient training, but as a strategic tool for change, and as a catalyst for increased knowledge sharing in the company as a whole. As pointed out in this chapter, there were also other reasons, such as cost-reduction (see section 4.2).

The chapter, however, illustrates a strong divide between the ambitions with the new e-learning tool that were formulated in the top management group (e.g., to develop an innovative workplace) and the various realizations of this idea (e.g., eRAFs focus on common standardized ICT solutions and a default implementation plan). In addition, the default implementation plan reflects a strong divide between the different organizational levels in the implementation process. How these aspects influenced the different phases of the implementation process will be elaborated on in chapters 6, 7 and 8. One thing is certain – e-learning in Telenor fits Røvik's (1998) concept 'ideas on a journey'; it was used to build a 'future-oriented and modern' image of a rather 'old-fashioned' company; it was materialized into an organizational recipe in the form of a default implementation plan; it was used as a building block to reform the company; and, it was both reinterpreted and reconstructed on its journey through the organization.

CHAPTER 5

Research design

The enterprise-wide implementation of e-learning in Telenor represented a huge change process, for the employees as well as for the company. First, the new learning technology would lead to changes in training. Second, it would lead to changes in work. And third, in the long run, it would lead to massive changes in the organization as a whole.

With this implementation as a backdrop, the following research problem was defined:

What problems and opportunities arise when e-learning is implemented enterprise-wide in a large organization?

To study the implementation and use of e-learning as part of an institutional practice in Telenor requires access to the various participants' accounts and interpretations of the activities under study. Moreover, it is necessary to have access to the four units' e-learning performance in the form of electronic traces of the ICT-mediated learning practice, and to understand how e-learning was promoted. In addition, the researcher needs to have the opportunity to try out the e-learning modules and the different ways of using the LMS, and become familiar with the culture and the everyday life situations in the different parts of the organization. However, studying these types of processes in a large business organization is not solely a question of access and participation. It is also a question of being able to understand dissimilarities in the four units – as different working environments and different learning contexts – and, to identify the unexpected elements that emerge as the study progresses. To be able to uncover the interplay of relations between people, technology, activities and meanings, *ethnography is used to scaffold this data collection process*. The goal is not a 'thick' ethnographic description in accordance with Geertz (1973), but rather to grasp connections and phenomenon in the activities under study that otherwise might have been hidden. This perspective makes it possible to look at the Telenor organization as a multifaceted society, with different sets of work standards, business practices and horizontal

and vertical relationships. With its long traditions of studying people in various forms of social processes, its principle of openness and sensitivity, and its large repertoire of data collection methods, *ethnography* represents a useful approach for this kind of research (Baszanger & Dodier, 1997; Hsu, 2001; Burgess, 1982, 1985; Strauss & Corbin, 1990). In accordance with a broad agreement within this discipline, that “even the tiniest geographical places have cultures rather than one single culture” (Wittel, 1999, p. 1), this approach makes it further possible to look at Telenor as a workplace consisting not only of one, but of many cultures. It should be re-emphasised that Activity Theory did not play an essential role during the process of data collection; rather it is used as an analytical tool.

To elaborate on the research problem, the implementation of e-learning in Telenor is studied as an embedded case-study (see section 1.1). Instead of following the recommendations in the case literature and selecting the ‘most similar’ or ‘most dissimilar’ units in order to get the optimal opportunity for generalization (Andersen, 1997, p. 107, p. 117; Yin, 1994 p. 46), I chose to describe all four Telenor units. As such, the aim was to enhance the insights into the Telenor organization *both as a whole* and as *four different cultures*, each culture represented by each of its four business areas. First, because I wanted to study how a large company, as one organizational unit, managed to cope with an implementation of e-learning over multiple organizational levels, in different work environments, and over a long period of time, and with the goal of achieving a lasting change. Second, because I wanted to get the largest possible plurality and diversity of work environments in order to uncover how different environmental factors, such as type of work, culture, learning tradition and personal characteristics, could interplay in and influence the local implementation process. The study is *theoretically motivated* (Andersen, 1997) and mainly designed to *develop concepts* and *conceptual models* (p. 30)⁴⁵. The overall aim is that the chosen research design, combined with the applied theory, will make a contribution to the growing e-learning field.

Section 5.1 presents central elements of the research design that was chosen to address this research problem. Particular attention is given to some practical problems that were encountered when studying the *processes of change* in the organizational setting. Section 5.2 summarizes the chapter.

⁴⁵ Glaser and Strauss (1967) mainly use the term ‘theory generation’.

5.1 The Telenor case

This section gives an overview of the research process. The first sub-section (section 5.1.1) briefly presents the research site and the participants; who I had access to, what and when. Section 5.1.2 gives a description of the main types of data and how these were collected. Finally, section 5.1.3 shows how the selected parts of the theories presented in chapter 3 were applied and combined to discuss the four research questions:

1. *In what ways were the underlying ideas of e-learning reflected in the default implementation plan?*
2. *How was the default implementation plan changed at the local level?*
3. *Why did problems emerge in the adaptation at local level?*
4. *How did e-learning activities change over time at different levels in the organization?*

5.1.1 Site and participants

As described earlier, the implementation of e-learning in Telenor took place in accordance with the four physical moves to the new headquarters at Fornebu. I was invited by Telenor to study this implementation in TBS, the first of the four units that moved, as part of a research group. This happened in November 2001. Then, some months later, I decided to use the implementation as a case for my dissertation.

The implementation was followed over four years, and the last data was gathered in the autumn of 2005. During this period of research I had access to the coordinator for competence and management in the Telenor group (also the corporate project owner of the e-learning projects), the coordinator for competence and development in Telenor, the project coordinator of Telenor Corporate University, the leaders of the e-learning projects (eRAF Læring, eRAF Opplæring, eRAF eLearning and Learn@Telenor), project participants, the TAs in all four units, local TAs, middle managers in some of the units, the Floor manager coordinator, employees in all four units, super users, the technical staff responsible for the LMS, development staff of e-learning modules, project owners of e-learning modules, training coordinators and those responsible for production of SAP⁴⁶-data. Implementation data, learning statistics, use-data about e-learning as well data about the company and the four

⁴⁶ 'SAP data' means data delivered by the SAP application. This application, which was used as a company-wide comprehensive software solution in Telenor, stored data about people, sales, logistic, accounting, units, responsibilities, etc.

main units were collected with the aim to give the broadest possible overview of the implementation as a whole. Table 5.1 and 5.2 specify when I was in contact with the different people and when the different types of data were gathered.

5.1.2 Data collection

The data collection started in November 2001. Observational data has only been collected during the first and the last move. Interview data, historical data, data from the Learning Management system (LMS) and data from the enterprise resource system (SAP) was, however, gathered from all four moves: from the four units; from the corporate Human Resources Management; and, from the two project groups responsible for the e-learning implementation. Most of the interviews were also followed up by telephones, e-mail, and informal discussions. Interview data from the same units has also been collected after moving, up to 2004/2005, in addition to observational data from all e-learning modules, LMS data, annual report data, project descriptions and strategy documents. A description of the applied data collection techniques is given below, first of those techniques used *in the four main units* (table 5.1), thereafter of those techniques used in other parts of the organization (table 5.2). The sign ‘x’ indicates that the actual type of data (e.g., historical data and LMS-reports) was collected from the main unit specified in the column head.

Table 5.1: Data collecting techniques used in the four main units

	TBS	TM	TP	TN	Years
# months the unit was followed	41	30	31	32	2001-05
Interviews (audio recorded and transcribed) ⁴⁷	4	8	5	13	2001-05
Telephone, informal discussions, e-mails	x	x	x	x	2001-05
LMS-reports (participating observer)	x	x	x	x	2001-05
E-learning modules (participating observer)	x	x	x	x	2001-05
SAP-data	x	x	x	x	2001-02 ⁴⁸
Historical data on the intranet	x	x	x	x	1999-04
Annual reports	x	x	x	x	1998-05
Field notes ⁴⁹	x			x	2001-02
Meetings (observer)				3	2002

⁴⁷ The number of unique interviewees in the four main units (TBS, TM, TP and TN) was 4, 7, 3 and 10, respectively.

⁴⁸ The reports were produced in 2003.

⁴⁹ The field notes in TBS are either videotaped or audiotaped, while the field notes in TN are only audiotaped.

Table 5.2: Data collecting techniques used in other parts of the organization

	Number	Years
Interviews with the Corporate Human Resources Management (audio recorded and transcribed) ⁵⁰	6	2002-05
Interviews with the E-learning project groups (audio recorded and transcribed) ⁵¹	11	2001-04
Telephone, informal discussions, e-mails with the Corporate HR management and the E-learning project groups	x	2001-05
LMS-reports at company level (participating observer)	x	2001-03
E-learning modules at company level (participating observer)	x	2001-03
Historical data on the intranet - about the company	x	1999-04
Annual reports - about the company	x	1998-05
Strategy documents – at company level	x	2000-01
Guidelines from the E-learning projects	x	2001-03
Meetings with the E-learning project groups (participating observer)	3	2001-02
Meetings with the Corporate Human Resources Management (to collect SAP data)	2	2003

There are many practical problems with the data collection when conducting a longitudinal study of change within a business company. These include problems related to data quality, lack of coherent data, degree of involvement, issues of time and site selection, problems of complexity and simplicity (Pettigrew, 1995), and problems related to the issue of access (Gummesson, 2000; Pettigrew, 1995). I coped with these problems by using a triangulated methodology during the data gathering process (Pettigrew, 1995), by switching between ‘doing closeness’ and ‘doing distance’ (Emerson & Pollner, 2001), by an active use of ‘gatekeepers’ (Wittel, 1999), and, as far as it was possible, by trying to follow the events as well as “the underlying logic that gives events meaning and significance” (Pettigrew, 1995, p. 100). For instance, during the five visits, I had continuous end-user access to the intranet, the LMS and all the e-learning modules. After some time I also got access to the administrative view of the LMS (see table 5.1 and 5.2). With this as a starting point, data was collected in accordance with the ethnographic research tradition, making use of a variety of techniques. Although the study mainly draws on qualitative data, quantitative data has also been used (LMS data and SAP data).

⁵⁰ Unique interviewees: 4

⁵¹ Unique interviewees: 5

Interviews

The 47 semi-structured interviews (on average 80 minutes) accounts for the main body of data. Spread over 33 individuals and based on interview guides (see Appendix A); these were conducted between 2001 and 2005, most of them as individual face-to-face interviews and six of them as group interviews. All units were represented with their Training Administrator and employees; some units also with their local training administrators, floor managers, multimedia developers, super users and middle managers. Interviews were also conducted with the corporate Human Resources management, the leaders of the e-learning projects and the two project coordinators that were appointed for the last two moves. To ensure that developmental aspects were brought to light, the key actors were interviewed from two to four times. The majority of these interviews had points that later were clarified by a telephone call or an e-mail. All interviews were audio-taped and transcribed. Some of them were also reviewed by the interviewees.

Irrespective of unit, much the same interview guide was used for people holding the same roles. The interviews focused on different aspects of the implementation process, the interviewees' role in the process, how e-learning was used in daily work, how it was measured and encouraged, what type of problems he/she had encountered, etc. The questions were mainly developed with departure in the knowledge I had acquired about the case from documents, reports, dialogues and the intranet, but also more general knowledge about implementations of Information Systems influenced the interview guides, as well as the theoretical framework after this was determined. The questions, however, were adjusted according to local adaptations of the default model and topics raised by the interviewees (see examples of interview guides for different roles in Appendix A). In this way knowledge was constructed by collaboration between the interviewer and the interviewee (Holstein & Gubrium, 1995). It should be noted that the resulting data material has to be viewed as *accounts* and not as descriptions of facts. Some of the interviews allowed the interviewees to give feedback about observations made by the researcher; these interviews have to be looked at as 'researcher provoked data' (Silverman, 2001). In the beginning, access to key actors and people of interest was established through contacts made in the pilot study. The number of *gatekeepers*, famous characters from ethnography (Wittel, 1999), gradually increased, and represented an important resource for my study. These opened doors and introduced me to the different communities. Access to top leaders at the main unit and company level was unfortunately impossible to achieve. Thus, their point of view has been drawn from accounts

from other interviewees, or from interviews published on the intranet. The issue of access is further discussed in section 4.6.

Document collection

The document collection includes print-outs from *the Telenor intranet*, some more ‘official’ (e.g., information about the different units, the implementation activities, the Fornebu project, business plans and screenshots from the e-learning modules) and some more ‘informal’ (e.g., the house journal), print-outs from *the company’s external web sites* (e.g., annual reports and descriptions about history and operations), *e-mails with attached documents* (e.g., project descriptions, mandates, confidential strategies and the internal report), *written documents* (e.g., internal memos of meetings and conversations), *learning statistics* (different types of LMS reports and logs) and *digital SAP-data* (unit statistics). The document collection from 2004-2005 is restricted to internal LMS statistics (see Appendix B for more information), Telenor’s external web sites, links to Telenor’s official archives and annual reports. These documents were, in accordance with Hammersley and Atkinson (1995), used as written accounts in ethnography, primarily to describe certain practices. However, because the texts are produced in a certain context, in a specific situation and for a specific purpose, this was taken into account in the data analysis.

Observation

Participating and non-participating observations of meetings were pursued during the first and fourth relocation. All meetings were audio-taped; some of them were also transcribed. Notes, written down during or shortly after more informal interaction situations with interviewees and other Telenor employees, have later been used as complementary data.

During the first move I also participated as an observer in learning situations at employee level. Notes were made and most of the situations video-taped. From 2001 to 2003 I further participated as an observer by using all the LMS based e-learning modules as well as some modules developed outside the learning platform. I also had the opportunity to study the different LMS interfaces in various stages of the learning process as an ordinary end user. From 2002 I was given permission to produce aggregated LMS logs. In this way I became familiar with the modules and the integration between the modules, the LMS and the

technological infrastructure. Participation in online activities has been recommended as a productive approach for research on internet related phenomena (Hine, 2000; Kendall, 1999).

5.1.3 Data analysis

To reconstruct why e-learning was chosen as a strategic tool, how it was implemented, experienced and used, and how it was furthered after the initial phase, makes it necessary for the researcher to transform the collected data into meaning. The ambition is to link data, “what we construe to be observations of some particular reality [...] with theory, our proposals for understanding reality in general” (Frake, 1997, p. 33). In this case study the interpretation was based on the methods described in chapter 3, with a socio-cultural perspective as a common grounding for the study as a whole. Since the selection of the theoretical perspectives for data collection and data analysis at first was made at the turn of 2002/2003, only some few months before the data analysis started, this might have influenced the premises for the analysis. This aspect is further discussed in chapter 9.

The data analysis of this large and complex case represented a huge challenge. First, since the interviewees provided partial perspectives, different interpretations and biased accounts (Miettinen, 1993); second, because the observations were restricted and incoherent; and, third because most of the historical documents were incomplete, rhetoric and characterised by the internal jargon. Continuous data triangulation (Yin, 1994) and source criticism (Denzin, 1989; Renvall, 1983 quoted by Hyysalo, 2004, p. 59) were therefore necessary ingredients during the process of analysis. Therefore, before the analysis started, data sources (interview data, historical data and data from the web) were manually compared to get an initial understanding of the e-learning related events in the pre-relocation phase and the background for why e-learning was chosen as a strategic tool. It should be noted, however, that just as theory and data analysis were intertwined, so too were data analysis and writing. In accordance with Denzin and Lincoln (2000, p. 17), who refers to the writing process as a ‘method of inquiry’, the data analysis was pursued as long as the writing continued.

To answer research question 1, *in what ways were the underlying ideas of e-learning reflected in the default implementation plan*, the data analysis draws on Hasu’s (2001) term of ‘critical transitions’. Two critical transitions (T1 and T2) were identified, classified, and compared, by subsequently applying elements from theories of development of work (Victor & Boynton, 1998) and Argyris and Schön’s theory of action (Argyris & Schön, 1974, 1978). First, the

transformation of the e-learning idea into a project mandate (T1), and next, the transformation of this mandate into the default implementation plan (T2) were examined. Important sources for this discussion were first and foremost written and web-based document data, participatory observations of the e-learning modules and the LMS, and interview data about the e-learning rules. Section 6.1 and section 6.2 elaborate on this research question.

To answer research question 2, *how was the default implementation plan changed at the local level*, data sources (interview data, document data and data from the web) describing the different implementation plans were read, re-read and compared, and supplementary data was gathered. The different elements of the default and local implementation plans were thereafter identified, before they were classified according to Victor and Boynton's (1998) historical types of work. Next they were compared, again inspired by Hasu's (2001) concept of 'critical transitions'. As a researcher I moved from observation to analysis, to conceptual refining and reframing, to seek new forms of data (Emerson, 2001) and with the aim of making a bricolage (Denzin & Lincoln, 2000, p. 3). Also here, Argyris and Schön's (1974, 1978) theory of action was applied to deal with the discrepancies in the data material (e.g., to explain discrepancies between what the interviewees said they did, and what they actually did). Section 6.3 examines this research question.

To identify the problems in the adaptation phase and herewith contribute to answering research question 3, *why did problems emerge in the adaptation at local level*, I first draw on the Grounded Theory procedure of 'open coding' (Strauss & Corbin, 1990). After the interviews and observation data had been reviewed, manually coded, questioned, compared and categorized in terms of their content, the six most frequent categories of problems within and across the four units were identified⁵². The four categories which, from my point of view, were the most novel and interesting were further analysed. From an Activity Theory perspective these categories represent types of disturbances. By using third generation Activity Theory (Engeström, 1987), the underlying tensions of these disturbances were identified and potential

⁵² After the first move to Fornebu, interviews and observations were analyzed line-by-line. Labels were placed on happenings and events, pointing to problems in the implementation or in the use of e-learning. The data was thereafter questioned and compared, and a set of preliminary categories of problems was developed. These categories were further explored through interviews and observations in the three next moves. However, because the units differed and the implementation plans to some extent were modified at local level, the following interviews and observations also opened up for new instances and categories of implementation problems. Having finished this type of analysis of the moving data, I made a more detailed analysis of the various paragraphs and sentences. By coding around the various concepts and categories, comparing them, and developing them in terms of properties (e.g., frequency, duration, extent and intensity) and dimensional range, the categories were given precision and specificity.

contradictions uncovered. These results were next compared with relevant research within the field on corporate e-learning, theories of strategic staff development, theories of change management and theories of implementations of technological innovations. This analysis takes place in chapter 7.

The analysis of data related to the long-term development of e-learning started at the beginning of 2005. To enlighten research question 4, *how did e-learning activities change over time at different levels in the organization*, it was necessary to draw on knowledge of the recent e-learning history as well as historical data on previous and contemporary conditions in the company, the business and the international markets. Data was collected from the Telenor intranet, Telenor annual reports, the LMS and interviews. The goal was to make a “pieced-together set of representations that are fitted to the specifics of a complex situation” (Denzin & Lincoln, 2000, p. 3). To interpret the data, Activity Theory was to a large extent applied, or more specifically, aspects of the theory of Learning by Expanding (see chapter 5). Again, it proved to be necessary to also draw on research about e-learning, theories of strategic staff development, theories of change management and theories of implementations of technological innovations. Chapter 8 presents this analysis.

5.2 Summary

In summary, this research utilizes a practice-based approach for analysis. The implementation, as a whole, is viewed from a socio-cultural perspective. For the data collection an ethnographic approach is used, while third generation Activity Theory is applied to structure the main parts of the data analysis. In addition, the data analysis draws on elements from other theories, not as basic theories per se, but as techniques to collect data and to assist the activity-theoretical inspired analysis. An overview of the resources used as theories and/or methods to enlighten this research is given in table 5.3. Chapter 3 gave a more thorough description of *why* and *how* the theories were combined.

Table 5.3: Methods used for data analysis and data collection

	Theoretical resources	Methodological resources
Underlying perspective	Socio-cultural perspective (Säljö, 2000)	
Data collection	Ethnography	
Data analysis		
To clarify research question 1	Activity Theory (Hasu, 2001)	1) Elements from Victor and Boynton's (1998) Theory of Development of Work 2) Argyris and Schön's (1974, 1978) Theory of Action
To clarify research question 2	Activity Theory (Hasu, 2001)	1) Elements from Victor and Boynton's (1998) Theory of Development of Work 2) Argyris and Schön's (1974, 1978) Theory of Action
To clarify research question 3	Activity Theory (Engeström, 1987)	1) Open coding procedure from Grounded Theory (Strauss & Corbin, 1990)
To clarify research question 4	Activity Theory (Engeström, 1987)	Learning by Expansion (Engeström, 1987)

CHAPTER 6

Critical transitions from company level to main unit level

One aim of Telenor's strategy was to build "a learning and effective Telenor"⁵³. As one of four strategies to accomplish this goal, infrastructures for e-learning and systems for learning and competence management were established. As described in chapter 4, however, the e-learning activity varied noticeably both across and within the four main units, as did the e-learning completion rates. Using these rates as a criterion for measuring the success when looking at the organization as a whole, there is room for questioning whether the e-learning initiatives were able to contribute to the overall goal, or not.

To study the implementation and adoption of new technology, Hasu (2001) argues for viewing such processes in terms of *critical transitions*. Based on this view, each transition, for instance from one project to the next, represents a critical issue for the continuity of the process. Applied to the Fornebu case, the implementation of e-learning can be characterized as a sequence of critical transition steps, from when the initial idea of using this technology was launched at company level, to, more than one year later, when the local e-learning activity was carried out by the end users. Four different representations of the e-learning idea emerged: the idea of e-learning as it was presented in the company strategy; the idea of e-learning as it was formulated in the e-learning project mandate; the idea of e-learning as it was manifested in the default implementation plan (e.g., in documents, an LMS and in e-learning modules); and, the idea of e-learning as it was made evident in the implementation plans in the four main units. Four organizational levels were involved: the company level; the eRAF project⁵⁴ level; the e-learning project⁵⁵ level; and, the main unit level (also referred to

⁵³ http://www.telenor.no/pressesenter/aapen_linje/2000_07/reportasjer_e-ready.shtml date 01.03.2003

⁵⁴ The eRAF project was one of two projects responsible for the moving to Fornebu (see chapter 4). The e-learning project was a sub-project of eRAF.

⁵⁵ The term 'e-learning project' includes in this chapter the two e-learning projects eRAF Oppl ring (Content project) and eRAF eLearning (LMS project) (see chapter 4 and section 6.1).

as the local level in this dissertation). Three steps describe the transitions between these levels:

- 1) From the underlying e-learning *idea* in the company strategy to its manifestation in the e-learning *project mandate*
- 2) From the *mandate* of the e-learning project to its manifestation in the *default implementation plan*, and
- 3) From the *default implementation plan* to the *local implementation plans*

Figure 6.1 gives an overview of the four levels, and the three specified critical transitions. With reference to Cooper and Zmud’s (1990) model for implementation of IT applications (see section 2.3.3), the three transitions cover the adaptation stage and the lower part of the acceptance stage. In this part of the implementation process, e-learning was made available for use in all parts of the company. The employees were also encouraged to carry out the modules and use them as an introduction to the new workplace and as a form of assistance in their daily work.

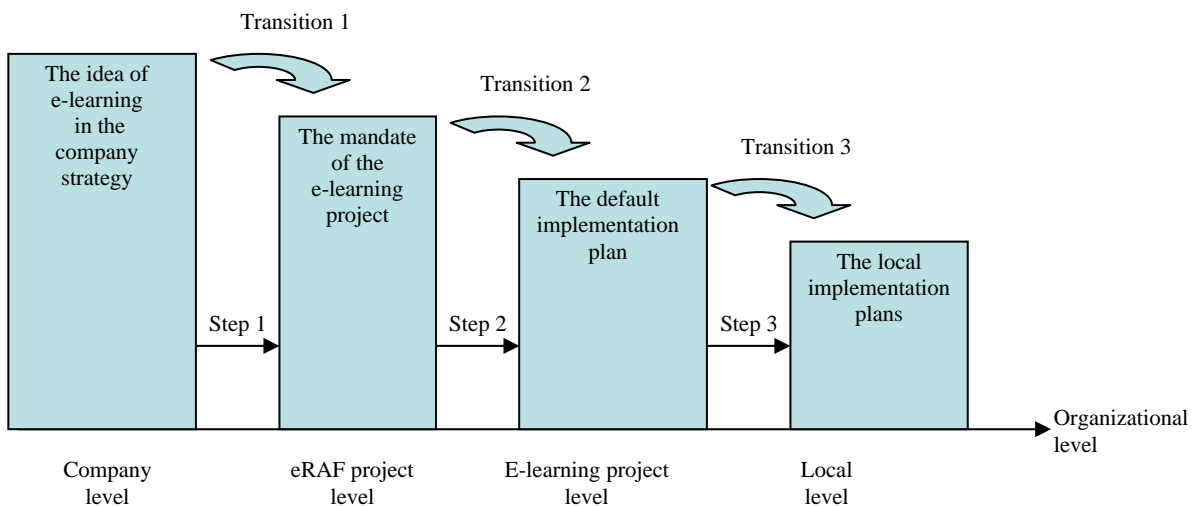


Figure 6.1: The critical transitions of e-learning from company level to local level

From an activity-theoretical perspective the transitions involve a broader developmental transformation from one historically constructed activity to another, and thus a change in the object of activity (Hasu, 2001). In order to understand why e-learning, during the first year at Fornebu, was used as a tool to handle the move and to build “a learning and effective

organization” only in *some* organizational contexts, the three critical transitions (steps) have to be separately analysed. This chapter presents *an analysis of these transitions*. The analyses draw on aspects from Activity Theory, Argyris and Schön’ Theory of Action and Victor and Boynton’s Theory of Work Development as described in chapter 3. How the various frameworks have been used, is explained in the different sections.

The chapter is organized as follows. Section 6.1 rehearses the first transition and examines how the overall idea of e-learning was changed from the initial strategy document to the mandate of the e-learning project. Section 6.2 elaborates on the incongruity between this mandate and the tools placed at the organization’s disposal for its accomplishment (the default implementation plan). Section 6.3 presents an analysis of how the default implementation plan was further modified in the four main units. Together, this analysis serves as a useful backdrop for the later discussion (see chapter 10) on why the original ambitions for e-learning in Telenor were only partially achieved. Section 6.4 gives a brief summary of the chapter.

6.1 Transition 1: Choosing a project mandate

Telenor’s introduction to the stock market at the end of 2000 forced the organization to rethink both its strategy and policies. The result was a new strategy, the “Strategy for People and Organization” (Telenor, 2000), with the aim of developing a company *technologically and organizationally* at the cutting edge. To manage this challenge and secure future income, an increased focus was placed on Telenor’s existing competence and the further development of this competence (Telenor, 2000). As one way of accomplishing this change, and with the new headquarters as a catalyst, e-learning was chosen as a strategic initiative. Two e-learning projects were established, eRAF Opplæring (the Content project) and eRAF eLearning (the LMS project) (see section 4.3), both sub-projects of the eRAF project. Together, the two projects were accountable for all e-learning related activities in the moving phase⁵⁶. For simplicity, they are described with the term ‘e-learning project’ in this chapter.

From an activity-theoretical perspective, and using Hasu’s (2001) concept of ‘critical transitions’, the transition of the overall e-learning idea in the company strategy into a project mandate, involved not only a shift, but also a change in the object of the e-learning activity.

⁵⁶ eRAF Porteføljekatalog – Fornebu, version 1.7.02.

This change in object is the subject of this section. Since the mandate of the eRAF eLearning project was impossible to get access to⁵⁷, however, focus in this section is on the mandate of eRAF Oppl ring. Victor and Boynton's developmental model of work (see chapter 3) is used to classify the different objects.

6.1.1 E-learning in the company strategy

In the 2000 strategy document (Telenor, 2000) Telenor presents itself as a *knowledge company*. To realize this ambition and be able to build future knowledge production processes, the following issues were identified as critical:

- Development of learning cultures (where employees continually learn and develop individually, through each other and through external relations)
- Innovative workers
- Flexibility
- Connecting knowledge and business processes
- Continuously renewing knowledge

Of particular interest in this section is the company's focus on *the employees' and the organization's ability to learn and develop faster and more efficiently than their competitors*. This goal was supported by four specific strategies, one of those being the establishment of infrastructures for *e-learning and systems for learning and management* (Telenor, 2000); as increased efficiency was a demand for all future work processes, and this criterion also lay behind the introduction of e-learning. The new learning technology was intended to be profitable and efficient, at the same time as it also being a tool for the planned change. Work and learning were two sides of the same coin.

According to Victor and Boynton (1998), these features are typical for *process enhancement organizations*. In such organizations, employees are expected to switch between *standardized production* and *creative, innovative process enhancement*. The aim is to increase the product

⁵⁷ Whether an exact mandate of eRAF eLearning was given to the eLearning project, is still, for me, unclear. Despite repeated contact and two interviews with the project leader, it was for me as a researcher, never possible to get hold of such a mandate. Welle-Strand and Tjeldvoll (2002) refers, however, to a confidential Telenor document, "Knowledge", from 2001, describing the future learning platform (LMS) as an opportunity for employee collaboration, delivery of training tasks, and for the training coordinators to admit external learning content. My empirical data gives no room for saying that these aspects were also mirrored in a potential mandate.

quality and address problems as they arise (Victor & Boynton, 1998). This integration requires a broad understanding and a shared vision of a well-functioning production process. This calls for well-educated employees with a deep and overlapping know-how, working in a context of an open and constant organizational flow of information. No barriers to knowledge and communication should exist. To prepare for this type of production, e-learning must offer training in a broad field of competence.

6.1.2 E-learning project mandate

The introduction of e-learning at Fornebu was a large-scale initiative. Learning modules would be delivered to a population of more than 6000 employees, organized according to four physical moves. With this as a starting point the eRAF project formulated the following mandate for the e-learning project: “*to give the right learning to the right people at the right time and in the right way*” (Telenor, 2001). This slogan immediately calls attention to a *mass customized production* perspective, characterized by a strong adherence to personalized products and services, just-in-time delivery of information, efficient and flexible learning and adaptive responsiveness to shifting customer needs. In such contexts Victor and Boynton (1998) recommend that the learning offerings should have a general purpose, be defined in smaller units and be decoupled from existing products or service requirements.

6.1.3 Discrepancy in Transition 1

There is a discrepancy between the overall aim of the new learning technology, as described in the strategy plan, and the overall aim, as defined in the actual project mandate. Using Argyris and Schön’s (1996) words, there is a built-in inconsistency between the *espoused* theories at company level, and the *espoused* theories at eRAF project level. While the overall e-learning strategy can be characterized by *process enhancement*, the mandate of the e-learning project can be characterized by *mass customization*.

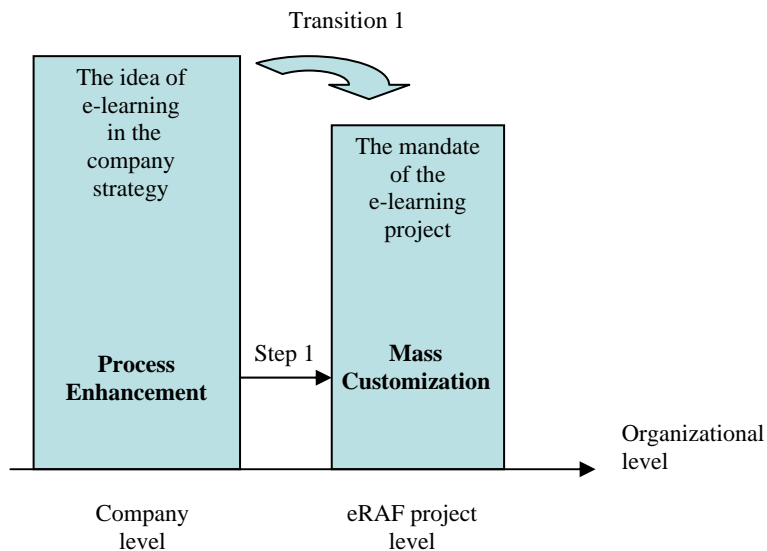


Figure 6.2: Transition 1: From Process Enhancement to Mass Customization

This shift happened despite the top managers of Telenor’s four main units being members of the steering committee of the eRAF project and its sub-projects. There may be many explanations for this deviation, such as that the overall competence strategy developed by the company Human Resource staff was not anchored at top manager level in the business areas, or, that the top manager abdicated from their role in the steering committee of the eRAF project. Since I did not succeed in getting access to the top managers, this question is impossible to answer. In any case, to identify how these diverging theories were manifested in the actual e-learning approach, Argyris (1999) recommends a closer exploration of the theory-in-use. This is done in the following two sections. First, by exploring the underlying theories of the three main components of the implementation plan (the LMS, the rules and the e-learning modules) and comparing them with the espoused theories identified above (6.2). Next, by examining the local implementation plans and comparing them with the default one (6.3).

6.2 Transition 2: Choosing an implementation plan

The now classic Theory of Action developed by Argyris and Schön (1974) asserts that the maps people use to take action are not the theories they explicitly espouse. This distinction, not merely between what people say (theory) and what they do (action), but rather between two different theories of action, is referred to with the two concepts *espoused theory* and *theory-in-use* (Argyris et al., 1985, p. 82) (see chapter 3). In organizational settings this

distinction is mostly visible between the *values expressed in formal strategy and supported by formal policies* and the *values underlying the actual practice*. This section will use the Theory of Action to highlight the inconsistencies between the theories underlying the written mandate of the e-learning project (espoused theories), and the theories underlying the default implementation plan (here referred to as theories-in-use)⁵⁸. Since the mandate already has been discussed and characterized in section 6.1, the main focus in this section is to identify and classify the default implementation plan (section 6.2.1) and compare it with the original mandate (section 6.2.2).

6.2.1 The default implementation plan

Together, the two projects eRAF Oppl ring and eRAF eLearning (in this chapter referred to as the e-learning project), developed a default implementation plan (see section 4.3). Three aspects of this plan, the LMS, the implementation rules, and the e-learning modules, will be considered in this section.

LMS

The LMS at Fornebu was installed as a common e-learning platform for the whole company. It was a *centralized platform*, prepared for vertical information flow, reuse of courses and with an underlying ambition to reduce the number of course material suppliers and the expenditures, associated with training. By introducing this platform, the aim was that the same learning could be delivered to the whole organization without any local variations in learning quality. Furthermore, the intention was that learning could be measured by throughput in a predictable, stable and consistent way. From Telenor's point of view, this large-scale approach also represented an opportunity to lower costs. The new technology automated the learning process, and when programmed with the right instructions, it could deliver courses and provide access to the employees, produce learning statistics for the managers, and various reports for different organizational levels. By *productifying* the training needs (Devlin, 1993, p. 225) performance was expected to be improved. The idea of productification was further underlined by the LMS interface. This was organized according to a marketplace metaphor and with the use of a shopping cart as a central artefact (fig. 6.3).

⁵⁸ It should be noted that the written project mandate represents the espoused theory both of the eRAF project and the e-learning project. It is this espoused theory that, in the examination of Transition 2, is used as the departure point for the comparison with the default implementation plan. This plan is here interpreted as the e-learning project's theory-in-use.

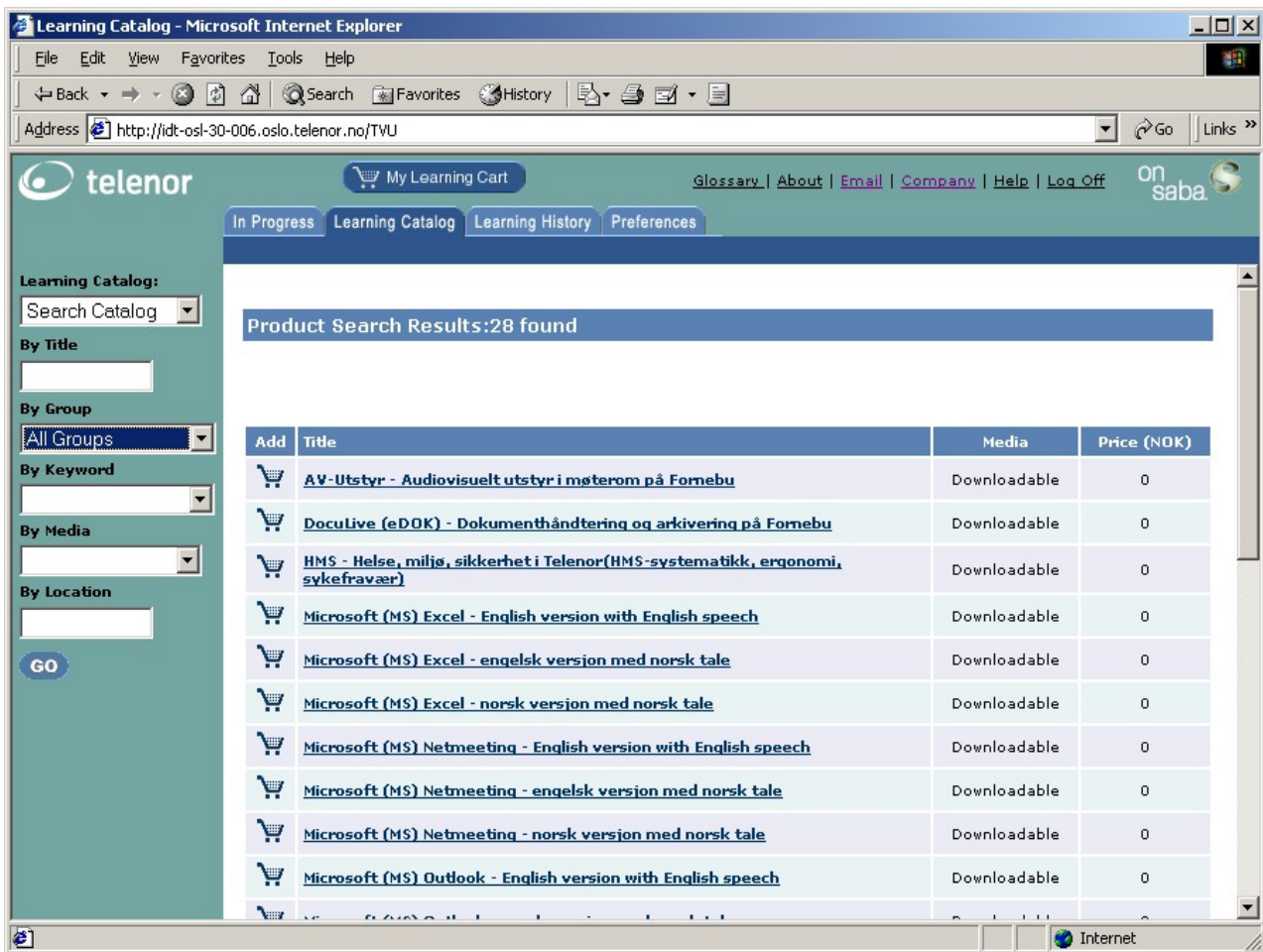


Figure 6.3: Screenshot from the LMS - courses could be ordered via a shopping cart

Together these issues align with the logic of *mass production*, as described by Victor and Boynton (1998). The focus is on scale, low production costs per capita, standardization, centralization, vertical information control and efficient processes. In adherence to this type of logic, the LMS was introduced as a measurement system, which opened up both control and inspection of the employees' learning activities (Victor & Boynton, 1998). Automatic capturing of group-learning activity was naturally impossible. This rationality of *managerial control at an individual level*, observed by Guribye (2005), seemed to be an important aspect of the installed LMS. A side effect for management was the opportunity for detailed planning of human resource activities, which is yet another characteristic of this approach. The fact that an available Saba module for informal collaboration and knowledge sharing was not purchased, despite its support of the theories associated with the overall project objective, reinforces the same idea. The main argument for this decision, according to the project leader, was that the organization as a whole was not prepared for this type of technology.

Although the LMS mainly reflected theories of mass production, it should not be forgotten that some features of the system also satisfied the espoused theories expressed in the written mandate and policies. For instance, the web-based LMS was accessible from different locations, both inside Fornebu as well as outside Telenor (e.g., from home offices and from customer locations). This made e-learning *flexible with respect to place and partly also to time*. Given internet access and a satisfying network, e-learning-on-demand and just-in-time-delivery was a reality. This is in accordance with learning supporting *mass customization*. Furthermore, the fact that all courses were free, despite built-in opportunities for payment and restricted access, represented yet another break with the mass production idea. With *open information access* both to compulsory and optional modules, all workers were provided with the possibility to carry out the modules in line with their interest, skills, work tasks and knowledge. This is, in contrast to the characteristic just mentioned, rather in alignment with *the espoused strategy of transforming Telenor into a learning organization*. Altogether, however, it was the characteristics of mass production learning that dominated the LMS.

Implementation rules

Most of the formulated rules were planned for *standardized implementation*: 1) all employees and leaders were expected to carry out eight compulsory modules, three before and five after relocation; 2) exact training time was estimated; 3) the top manager and one appointed key actor (the TA) in each business area were defined as the implementation team; 4) implementation tasks and division of labour were predefined; 5) a hierarchical and centralized control was defined; 6) the training and logging was individual; 7) between 80-100% of an e-learning module had to be completed in order for the module to be passed; 8) a centralized helpdesk was established after moving for technical questions; 9) distributed super users were to be available during the first week at Fornebu; 10) and, floor managers were to give technical support.

In sum, these rules reflect the key ideas of *mass production* or in Victor and Boynton's words "*what gets measured gets done*" (Victor & Boynton, 1998, p. 54). By making training compulsory, and by providing a controlled and standardized training available to all parts of the organization, the aim was to reduce local variation and thus to minimize drop-out rates. The impression of *mass production* was further increased in that only the Fornebu specific modules were made compulsory (e.g., the Multifunction machine) at the sacrifice of the more general modules (e.g., Self management). There was also a strong hierarchic division of

labour between the internal key actors (the TA, the top manager and the help desk). The rules in this field, which indicated a *vertical and linear process flow* typical for mass production, however, were not very precise. This is in contrast to the detailed specifications of tasks, authority and control characteristics for this type of work. For instance, the rules speak about control as a ‘leader responsibility’ in general terms without specifying the exact level of management expected to carry out this responsibility.

Four different aspects, however, show a break with mass production. First, all employees were expected to complete *the same eight modules*. This indicates a focus on knowledge overlap, typical for process enhancement. Second, the formulated rules opened up e-learning *outside Telenor*, in contrast to mass production, where training always takes place at work. Third, the employees were free to carry out the modules at *any time* they wanted and *at their own pace*. They also had the opportunity for accomplishing *as many optional modules as they wanted*. This encouragement of knowledge redundancy, independence, flexibility, mobility and self management, in alignment with process enhancement and mass customization, reflected to a large degree the espoused theories expressed in mandates and policies. These types of rules, however, were not dominant.

E-learning modules

All the e-learning modules were designed as multimedia tutorial-like applications with a menu-driven interface and step-by-step navigation. Individual progress was visually represented in the form of a progress bar, which, as Guribye (2005) also underlined, accentuated the quantitative dimension of what had been completed. Learning was prepared for replication and had to be repeated until the tests were approved. The *precise performance measures*, visualization of progress, testing techniques and the use of financial reward, call, as many of the previously mentioned facilities do, the attention to *mass production*. In accordance with this tradition, the modules represented a sort of *reuse* of the best way to structure new routines and operate the new technical equipment. The company expected the learners to be “*task-oriented doers, good at following instructions*”, as described by Victor and Boynton (1998, p. 59). Opportunities for on-line questions and help functionality were not embedded in the modules.

Deviations from mass production were also visible here, for instance via *the built-in flexibility for navigation* in all the modules. The learner could go back and forth, skip parts of the

module, make breaks, have lunch and return to the same module without losing credits. Moreover, the *built-in index menu* opened up just-in-time learning, whether the modules had been completed or not. Both these aspects supported Telenor's ambition to become a more flexible organization, and offered an opportunity for learning in alignment with the espoused theory in the mandate directed to mass customization. It should be mentioned that it was these features that were underlined, when key actors in the implementation argued for this e-learning solution as an opportunity for individual freedom and a flexible and mobile organization. The implementation rules, however, placed tight restrictions on this flexibility.

6.2.2 Discrepancy in Transition 2

There was a discrepancy between Telenor's *espoused theories* of action underlying the mandate of the e-learning project, and the *theories-in-use*, underlying the default implementation plan. While the espoused theory was characterized by ideas of *mass customization* (to offer flexible learning in time), the theory-in-use was to a large extent marked by ideas typical for *mass production*⁵⁹ (see figure 6.4).

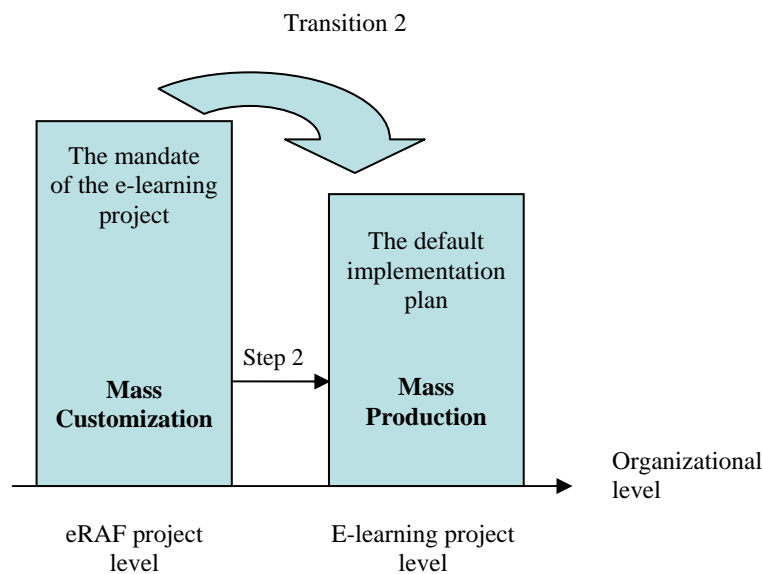


Figure 6.4: Transition 2: From Mass Customization to Mass Production

This discrepancy can be explained in different ways. First, the leaders of the e-learning projects were not sufficiently informed about the company-given objectives of transforming

⁵⁹ It should be noted that some features of mass customization and process enhancement were embedded in the latter one. These, however, were not dominating.

Telenor into a process enhancement or mass customization organization. However, the empirical data does not support this interpretation. Both the leader of the platform project and the leader of the content project seem to have been well informed and well aware of these ideas. The origin for the identified incongruities should therefore be sought elsewhere. Two sources are of specific interest. For instance, the empirical data shows that the leader of the platform⁶⁰ project, responsible for choosing an LMS, was of the opinion that the organization was not “mature” enough for a more advanced learning system. He therefore *deliberately* selected an LMS that represented a break with the formulated principles. Furthermore, and again according to the empirical data, the leader responsible for the content project really believed that she *had* implemented an e-learning solution in accordance with the overall principles. According to Argyris and Schön (1974), dealing with these dilemmas requires corrective actions, either to correct specific behaviour associated with theory-in-use, or to adjust one’s theory-in-use. This was never done, however, either by the steering committee or within the eRAF project.

Of course Telenor could have decided to use an alternative e-learning approach. The company could, for instance, have bought an LMS which supported collaboration and reflection, and used this new tool to make the desired organizational change visible to all employees. E-learning could also have been implemented in a way that forced the employees to take an active or proactive role in their adaptation of the new technology and the new learning content. Using Victor and Boynton’s (1998) arguments for a correspondence between the learning and work system as a point of departure, there is room for questioning whether the implemented e-learning system might be a better tool for units close to mass production, than for those characterized by other types of work. As presented in chapter 3, there was namely a large span in production between the different units. Based on the empirical data it is not possible to say whether this was the reason why the default implementation plan was consciously changed in some of the local implementation processes. This change is the subject of the next section (section 6.3). The aspect is also further discussed in chapter 8.

⁶⁰ The LMS project.

6.3 Transition 3: Modifications at local level

The third critical transition took place when the LMS and the default implementation plan were handed over from the e-learning project to the four main units. A lot of modifications were made, some of them planned and initiated by the TA, others were unplanned and took place during the local implementation (see table 3.2). This is, according to Ciborra et al. (2001), not unusual. As they claim, information infrastructures tend to drift. In this section it is the planned modifications that are of interest because, from my point of view, it is primarily those that can be interpreted as conscious adaptations to the local work environment.

Because the default implementation plan has already been classified in section 6.2, this section begins with a classification of the four local plans (section 6.3.1). Since neither the LMS nor the e-learning modules changed in this process, this section mainly gives attention to modifications of the implementation rules. Again, Victor and Boynton (1998) are taken as departure point for the classification and discussion. Section 6.3.2, thereafter, summarizes and discusses the discrepancy between the default implementation plan (the espoused theory) and the four local plans (theories-in-use).

6.3.1 The local implementation plans

The first local implementation took place in TBS. This unit had a large span in production, *from co-customization to process enhancement*. Rather early on, the TA suggested changing the default plan, for instance to reduce the number of compulsory modules. However, according to her, the proposals were not accepted by the e-learning project team. Thus it was the *mass production*-like default plan that was implemented in this unit.

The next-moving unit was TM, a unit that over time had been characterized by a stable working environment and a production in accordance with *mass customization*. Already from the start the TA decided to modify the plan: only the most practical modules (five) were made compulsory; the individual employee was responsible for his learning; TA support would only be given on request; technicians responsible for support were distributed across the unit; and the information meetings were targeted to specific user groups. Although some of the features point to mass production and process enhancement, when looking at the plan as a whole, the issues of *mass customization* tended to dominate: the TA had the role as a coordinator (she even referred to herself as ‘an administrator’); the employees were accountable for

continuously improving their competence; collegial support was an important element; and, IT-expertise was widely dispersed through the organization (Victor & Boynton, 1998).

The third relocated unit, TP, is differentiated from the three other units in that it consisted of eleven independent companies. With this as a backdrop, the TA defined the following internal goal: e-learning should be a tool for transforming the business area into a *learning organization*. Therefore, four modules were made compulsory, and among others, the two soft- skill modules were also made compulsory. The other decisions, such as coordination of activities, division of labour, information, control tasks and support tasks, however, were decentralized. The TA was a coordinator and a coach. His job was to train and support the local TA staff as well as to arrange and participate at leader workshops. Together, the modified plan points to the *process enhancement* model, as described by Victor and Boynton (1998).

The final local implementation took place in the *mass production* like unit, TN. This main unit, referred to as ‘the factory’⁶¹ in Telenor by the TA, was at that point just about to transform into a process organization. For the e-learning, a centralized and standardized approach was chosen, with the TA in charge. She planned, made directives and was responsible for the entire implementation, just in accordance with the mass production plan. However, she also expanded the implementation team with local TAs, Floor Managers and so called ‘first-line leaders’ (lower management); she distributed tasks such as support, follow up, control and report production; she developed a centralized but differentiated information strategy; and, she recommended the completion of the two optional soft skills modules to develop broader skills. It should be emphasised, that although some of the issues draw attention to process enhancement, all the tasks were carried out according to the rules given by the TA. In sum, the local implementation plan was characterized by issues of *mass production* with some very strong elements of process enhancement.

6.3.2 Discrepancy in Transition 3

From project level to local level the *default mass production plan* was changed in three of four units. This happened despite none of the TAs claiming that they wanted to make a break with this plan. In contrast, all the TAs had made it clear that they were well aware of the mandate, “*to give the right learning to the right people at the right time and in the right way*”.

⁶¹ This term was used to explain that the unit was mainly a producer of automatic message counting.

This indicates inconsistencies between two different theories of action, between what people say will orient their actions and what theories actually lead people's actions (Argyris et al., 1985).

In detail, four different plans were implemented in the Telenor organization (see figure 6.5): in TBS the mass production-like plan was maintained; in TM the plan moved in the direction of mass customization; in TP in the direction of process enhancement; and, in TN towards a plan characterized as a mix of mass production and process enhancement (but with mass production dominating). Looking at the implementation of e-learning as a sort of production, section 6.3 illustrates that in those units where the TA was proactive (in TM, TP, TN), the planned changes were for the most part in alignment with the existing unit's production system. However, a one-to-one relationship did not exist. This issue is taken up again in chapter 8, but in that case, related to the exploitation phase.

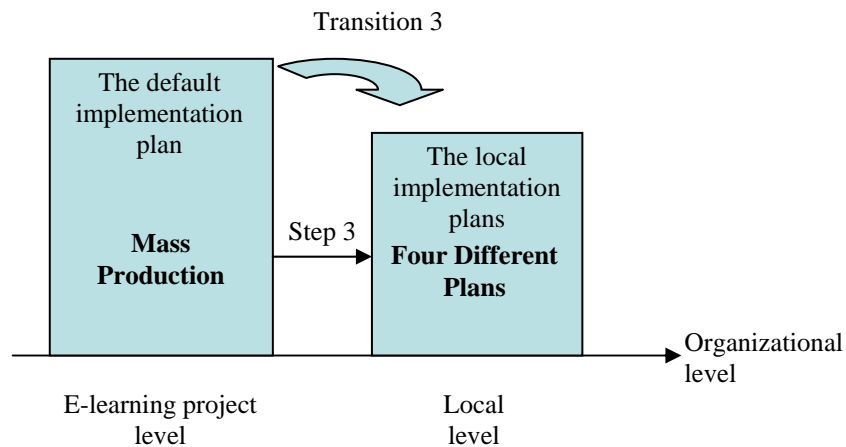


Figure 6.5: Transition 3: From Mass Production to Four Different Plans

In accordance with Ciborra et al. (2001), and with the four local implementation processes as a backdrop, I suggest that implementations of e-learning (or of an e-learning infrastructure) also tended to drift. There are probably many explanations for why this happened. What section 6.3 makes clear, however, is that the four TAs played their roles very differently, and this was decisive for the outcome (the resulting local implementation plan). To what extent the changes contributed to reduce the scope and number of problems in the implementation, will be discussed in chapter 7.

6.4 Summary

This chapter has described how the organization's *original idea* about e-learning, characterized by issues of process enhancement, changed first via a *mandate* marked by mass customization, and, then, via a *default implementation plan* marked by mass production, ending up as *four different local plans* spanning from mass production to mass customization. The chapter has further illuminated discrepancies between what the key actors within the e-learning project group and the four main units *say* they do and what they actually *do*. Using Argyris and Schön's terminology, the chapter makes visible discrepancies between:

1. *The espoused theories* in Telenor's overall strategy and in the mandate of the e-learning project (step 1),
2. *The espoused theory* and *the theories-in-use* when going from the written mandate to the default implementation plan (step 2) and when going from the default plan to the four local plans (step 3), and
3. *The espoused theory* and *the theories-in-use* both within the e-learning project and within the local level(s).

In addition, the chapter illustrates how the ideas about 'e-learning' and 'a learning organization' are used as organizational symbols (Røvik, 1998). Using Victor and Boynton and their concept about 'the right path' (see chapter 3), it seems a bit strange to introduce the idea of 'a learning organization' into a company where two of the units already are far beyond this type of production when viewed from a right path perspective. In the contexts where managers attempt to transform without understanding the learning behind the unit, Victor and Boynton claim that "transformation efforts will be at best slightly off the mark, and, at worst, totally futile" (Victor & Boynton, 1998, p. 129). Furthermore, in these situations the experience is that the managers, despite their best intentions, "will fail to achieve their objectives" (Victor & Boynton, 1998, p. 129). Whether or not this was the consequence in some of the main units in Telenor is the subject of chapter 7.

CHAPTER 7

Problems in the adaptation and acceptance of e-learning

This chapter focuses on the problems that arose among employees and key actors in the first part of the implementation process. The problems started at the old locations, as some of the e-learning modules, according to the default and modified implementation plans, were to be carried out before relocation (see chapter 4). Problems also turned up at the new headquarters, some in all four main units, others among specific groups of employees, and some only in smaller parts of a unit. Whether the participants tried to solve the problematic situations alone or were assisted by others, or they simply were aware of them but ignored them, they often talked about these situations as ‘problems’. The aim of this chapter is to identify the underlying sources of these problems, and uncover why the original ambitions for e-learning were only partially fulfilled as reflected in the e-learning activity and recorded in the completion rates. Using Cooper and Zmud’s terminology (see chapter 2) on adoption and use of technology, this chapter is restricted to the stage of adaptation and the first part of the stage of acceptance.

As pointed out in chapter 4, Telenor is a large complex organization with different types of activities, varying experiences among its employees, and a broad span of competences. Analysing the many problems that emerged during the implementation in the different parts of the company requires analytical tools that manage this complexity and aid in analysing and making sense of the empirical data. This analysis has its roots in third generation Activity Theory, which views the activities as dynamic processes and non-isolated units, continuously influenced by other multi-organizational activities and changes (see chapter 3). By using Engeström’s model of the nested nature of human activity dynamics, the aim is to *identify the tensions that arose within the network of interacting activity systems and point to possible causes of the problems, obstacles, and frustrations* that arose during the implementation. As pointed to in chapter 3, since a historical-genetic analysis has not been carried out, this

chapter is not able to specify the underlying causes of these problems in detail. Thus, in activity-theoretical terms, the chapter only points to *potential contradictions* of the disturbances that have been identified.

An analysis of interacting activity systems is, in any case, a very demanding undertaking. To handle the complex and large data material and to gain a deeper understanding of the main obstacles in the process, the Grounded Theory (Glaser & Strauss, 1967) procedure, referred to as ‘open coding’ (Strauss & Corbin, 1990), was applied as a first step in the analysis. Section 7.1 shows how Grounded Theory was used as a theoretical resource to identify and categorize the problematic situations. These *categories* represent, from an Activity Theory perspective, *types of disturbances* (see chapter 3). Section 7.2 determines the four categories which, from my point of view, were the most novel and interesting, and describes the network of activity systems that is taken as the departure point for the later activity-theoretical discussion. The four categories are subsequently elaborated on in sections 7.2.1 to 7.2.4. Each category is first discussed from an activity-theoretical perspective, and, second, from related work perspectives. Finally, section 7.3 summarizes the analysis and section 7.4 concludes the chapter.

7.1 Developing categories of problems

At first, and in accordance with open coding (Strauss & Corbin, 1990, p. 61), interviews related to the relevant stages were manually broken down into discrete parts. These parts all described some kind of problem connected to the implementation. Then the text was closely examined and the concepts compared for similarities and differences. After a process of grouping the concepts around something that seemed “to pertain to the same phenomena” (Strauss & Corbin, 1990, p. 65) and comparing them with the ethnographic observations of learning and working situations, *six analytical categories of problems were identified, specified and labelled*. Table 7.1 gives an overview of these empirically developed categories together with illustrative data excerpts. Together, the six categories comprise the main obstacles, frustrations, breakdowns, etc. encountered during the implementation. While the first four categories are related to the implementation activity, the two last are linked to the work activity.

Table 7.1: Identified categories of problems (adapted from Netteland et al. (2007))

Category	Description	Illustrative excerpt
Management Control	This category includes disruptions, breaks and problems that hampered the control activities. For instance problems related to the quality of user data, the report production in the LMS and the further transformation of these reports into readable control reports for the management.	"The LMS reporting was impossible to carry out... You [the training administrator] had to know all the employees [about 1200 people] to be able to [produce] and use the reports... That's the reason why we have not produced control reports for the management."
Hardware and Software Resources	This category is related to obstacles and errors emerging during the e-learning activities and related to the lack of access to the modules and the logging of the e-learning activities. It incorporates problems related to the local network, to the PCs, line capacity, LMS, and the e-learning modules, as well as to the missing technological assistance.	"[Most of the employees] did not get access to the e-learning modules from their pre-location office due to too old PCs and missing network access. We [the coordinators] tried to arrange for a separate training PC, but [despite this], many did not have access to e-learning before moving."
Execution of Implementation Tasks	This category illustrates problems emerging as a result of a lack of collaboration between key actors in the implementation activity, within the business area, and between the business area, the project groups and help desk. The category also includes problems related to the lack of engagement, poor follow up, bothersome work flow and division of labour.	"I claim that the management of Unit A was totally absent [in the implementation activities]... [in this unit] there was an enormous focus on earnings, to make the new unit survive. In this situation e-learning was not emphasised."
Information Sharing	This category identifies complaints related to the information exchange between different actors, for instance: missing or lack of information about the e-learning activity at implementer level and employee level; negative experiences related to misinformation, information overload and difficulties in finding the desired information; as well as complaints about the written (or web-based) guidelines about the operation of the e-learning modules and access to the e-learning infrastructure.	"...at first we [the training administrator] got to know that you were logged out of the LMS after three hours... Therefore we did not inform the employees. But then we got a message that people were thrown out after 45 minutes, that is something else... People go to lunch, take a break, and when they come back none of the e-learning activities have been saved and they have to start from the beginning."
Allocation of Time	This category embeds complaints about a lack of opportunities for e-learning and conflicts between daily work tasks and competing activities. Problems due to struggling with multiple roles, disruptions from customers, emergency work as well as problems related to the new working environment, are also incorporated	"I would have preferred to work with the e-learning modules from home because we are full booked at work and have to give priority to customers."
Relevance to Work and Previous Knowledge	This category embraces problems and complaints related to e-learning modules and their lack of relevance to ongoing and future work activity. It also includes missing or poor relevance to earlier experience and competence and discrepancies in relevance to current and future needs. The category refers to complete modules as well as parts of modules.	"[The module] e-Building is not relevant for me because I do not have to book meeting rooms in my work."

In contrast to what is reported in the e-learning literature, which generally presents criteria for success or failure without relating them to particular contexts or conditions (see chapter 2), the six categories that emerged from the empirical material were, to a large extent, context specific. Indeed, most of the categories showed up in each of the four units, but as will be shown in section 7.2, they varied remarkably in scope and intensity across and within the units. The same type of problem was handled in different ways in various contexts. Therefore, a central finding from this study is that problems in the implementation of e-learning are not necessarily general in nature. Based on the empirical data, I argue that the *dimension of context* is of vital importance for whether, when, what, and how problems in enterprise-wide implementations of e-learning emerge. This is illustrated in section 7.2, which presents an activity-theoretical analysis of four of the six categories of problems listed above. Preferably all six categories should have been analysed. But, since such an analysis is rather demanding both in space and time, and an important issue of this study is to elaborate on whether this theoretical approach can be a useful tool for analysing this kind of implementation or not, the analysis is restricted to those categories that, from my point of view, were the most novel and interesting. Because the category ‘Allocation of time’, or at least allocation of training time, is already viewed as a critical variable in large parts of the e-learning literature (Barron, 2003; Simmons, 2002; Svensson, 2004), this category is not further analysed. Moreover, the category ‘Management Control’ is not analysed, partly because the involvement from management, especially from top management, is discussed in parts of the e-learning literature, and partly because aspects of this category will be indirectly elaborated on in the discussion of the ‘Execution of implementation tasks’ category. An activity-theoretical analysis of these two categories is, however, a goal for further work in this area (see chapter 10).

7.2 Identifying underlying tensions

Of the six categories of problems emerging during the first part of the implementation, four categories were selected as the object for study in this chapter. These categories, which are further described in subsections 7.2.1 to 7.2.4, respectively, are:

1. Hardware and software resources
2. Execution of implementation tasks
3. Information sharing
4. Relevance to work and previous knowledge

The discussion of each category begins by presenting empirical data from interviews, participatory and non-participatory observations, and historical documents. The aim is to analyse *in what contexts, how, and why* the different categories of problems appeared, and the degree to which the problems in the actual category represented *a barrier* for the local implementation process. From an Activity Theory perspective, the four categories of problems can be viewed as *types of disturbances*⁶². Thus, the empirical discussion is followed by an activity-theoretical analysis that uses Engeström's triangle as an analytical tool to uncover the underlying causes of these disturbances. This can be done, as in this study, by looking at their sources, or in Engeström's (1987) words, by identifying their *underlying tensions*, and the *potential contradictions* to which they point to (see chapter 3). After a comparison with related work, the theoretical findings for each category are summarized.

Four activity systems are taken as departure points for this discussion: *the Human Resources Activity System (HRAS)*, *the Work Activity System (WAS)*, *the Management Activity System (MAS)* and *the Infrastructure Activity System (IAS)*. The network of the four activity systems are presented in figure 7.1.

⁶² The term "types of disturbances" is introduced by Engeström and Mazzocco (1994) (see also chapter 3).

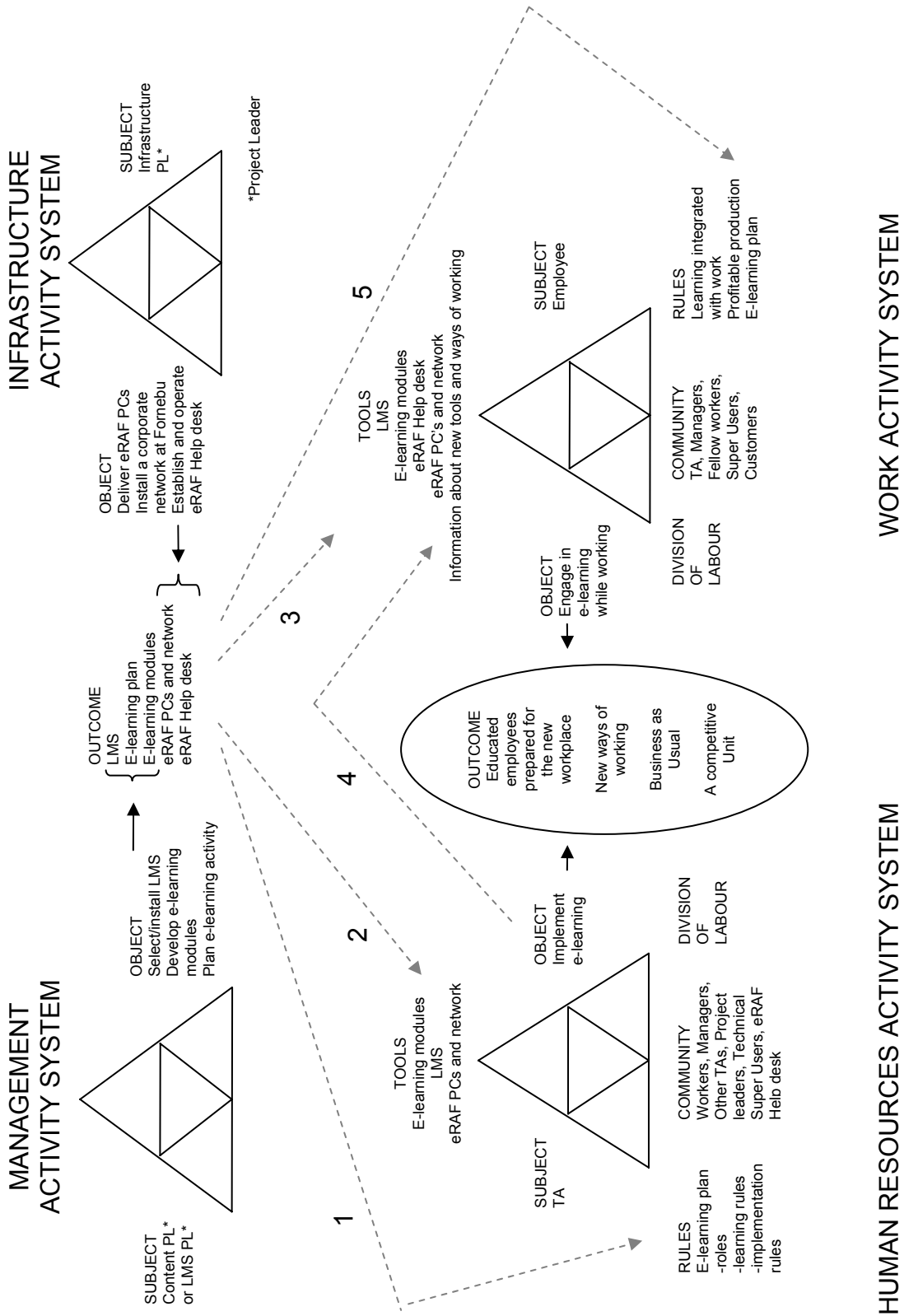


Figure 7.1: The network of activity systems involved in e-learning

As three of the four *types* of disturbances primarily concern the implementation, the presentation starts with the Human Resources Activity System, of which the *object* was to implement e-learning. The Training Administrator (TA) had the main responsibility for the majority of the implementation tasks in the business areas. Therefore, this activity system is regarded from the TA's (*subject's*) point of view. To contribute to the implementation and reach the object, the TA motivates and stimulates the employees to access and use the e-learning modules, the *outcome* of which is educated employees prepared for the new workplace, new ways of working, business as usual and, in the long run, a competitive unit. A number of tools are at the disposal of the TA. In figure 7.1 one sees the *tools*, the learning platform (LMS), the e-learning modules (content), PCs and network. The *community* comprises the project leaders of the Content, LMS and Infrastructure-projects, super users, workers, the unit managers, eRAF Help desk and maybe also other TAs, all of whom should be working towards the implementation of e-learning so the employees learn what they need to in order to be efficient as fast as possible in their new working environment. The *division of labour* specifies how the necessary tasks should be divided, both within the local e-learning team, which is between the TA and the Unit manager, and between the TA and the other members of the community (e.g., project leaders, help desk). The *rules*, which define the norms and conventions that constrain actions and interactions within the activity system, comprise the e-learning plan, which specifies implementation roles and rules as well as learning rules (when, what, how, where and who) (Netteland et al., 2007). The activity-theoretical discussion of the four problem categories in section 7.2.1 to 7.2.4 describes the HRAS components in detail.

The Human Resources Activity System (HRAS), however, does not exist in a vacuum. When viewed within a network, see figure 7.1, it can be seen as a subject producing activity system (Engeström, 1987, p. 88) in that it produces e-learning activities for the subjects of the Work Activity System, referred to as the WAS. Unlike the HRAS, this activity system is viewed from the perspective of an employee belonging to a group, who, in the interviews, gave accounts that fell into a particular type of disturbance. Thus, the *subject* in this activity system is referred to as 'Employee'. The *object* of the WAS is to engage in e-learning while working, and the *outcome* is the same as that of the HRAS. The HRAS receives *rules* and *tools* from two external activity systems, the Management Activity System (MAS), which comprises the activities involved in the two e-learning projects (e.g., Content project, LMS project), and the Infrastructure Activity System (IAS), which comprises the activities of the

Infrastructure project. In addition, the WAS has its own *tools* and *rules* (who, when, what and how, e.g., working rules). The *community* of the WAS comprises customers, super users, the TA, unit managers and fellow workers.

As illustrated in figure 7.1, the MAS produces the plan for e-learning. This means that meeting conventions, local implementation roles, implicit and explicit rules and regulations that constrain this activity (e.g., who is expected to follow up the e-learning activity at local level, how many compulsory modules shall be completed, when the modules shall be launched, when help desk is available) are delivered to the HRAS (dotted arrow 1) and the WAS (dotted arrow 5). Moreover, the MAS produces the e-learning modules and the LMS for both the HRAS (dotted arrow 2) and the WAS (dotted arrow 3). Further, the IAS produces the infrastructure on which the e-learning modules and the LMS shall run (e.g., network, eRAF PCs). These tools are all made available for the HRAS and the WAS. The IAS also produces a help desk service, which constitutes a tool in the WAS, and is part of the community in the HRAS. For simplicity, all the tools delivered from the MAS and the IAS are included in dotted arrow 2 and 3. Finally, the HRAS produces information about new tools and ways of working, which becomes a new tool for the WAS (dotted arrow 4). This network of activity systems forms the basis for the analysis of the tensions and the potential contradictions underlying the four different types of disturbances that arose during the implementation of e-learning. However, the discussion in each case is restricted to those parts of the network that are assessed as the most relevant.

The four categories of problems identified above are discussed respectively in the following four sub-sections (7.2.1 to 7.2.4). With departure points in empirical findings and observations, and viewing the problems from an activity-theoretical perspective as representatives of types of disturbances, the aim is to uncover the tensions that arose in this network of interacting activity systems, and to compare their underlying sources with related work.

7.2.1 Hardware and software resources

To carry out e-learning required access both to the e-learning modules and the LMS, as well as an infrastructure on which the modules could run (i.e., the hardware components such as PCs, communication network, network connections, etc.). From hereon these three artefacts are referred to as Hardware and software resources (HS resources) and make up the first category of problems for discussion.

The access to the hardware and software resources for e-learning represented a hindrance for the e-learning activity in all four implementation processes, either in the form of delayed modules, lack of PCs configured for e-learning, lack of access to networks with sufficient capacity and speed, problematic log-on to the LMS, or repeated breakdowns in the use of e-learning modules. This type of obstacle was most prevalent in TBS, the first unit that moved to Fornebu. In this unit it was not only the most frequent problem, but also one of the largest barriers to the implementation of e-learning. The focus will therefore be placed on this business area, and disruptions in the other business areas will only be briefly described.

The following excerpt from an interview with the TA (excerpt 1) describes the defined outset for e-learning in TBS. Already from the beginning, an important part of the necessary hardware and software resources for e-learning was missing, namely the e-learning modules.

Excerpt 1:

... [all e-learning modules] were to be delivered [a month] before we moved in, and some of the modules should [also] have been started before we relocated. The rest should have been completed relatively soon after we had moved. The first disappointment was that the modules were not ready as planned ...

According to the TA, neither before nor after relocation were any of the compulsory modules released according to the planned time schedule. For example, the two critical pre-relocation modules ('Saba LMS' and 'PC I') were first launched at a time when most of the people were either busy packing their belongings and did not have time for training, or were released after moving. Similarly, three of five modules planned to be completed the first day at Fornebu were not accessible until some days after arrival. At this point, many of the employees had already started to use the equipment that was described in these modules. This coordination discrepancy had major consequences for the people involved: the training administrator (TA) did not get enough time to try out the finished modules before they were launched to the remaining staff; information about delays and new dates for launching had to be distributed to the employees; and, people got tired of the many postponements and started to mistrust the information from the TA. The TA refers to this situation as "the first disappointment" (see excerpt 1).

The next frustration, for the TA as well as for the workers, was that the compulsory e-learning modules could not be run from most of the old offices. *The 'old' infrastructure had not been prepared for e-learning.* For example, the old PCs were not equipped with the required software and hardware, Internet connections were not plentiful enough, and, the line band-

width was not sufficient for running multimedia programs. As one employee explains in excerpt 2:

Excerpt 2:

[Most employees did not have adequate equipment in the old office in order to run the e-learning modules]. Due to this, of course, they did not get access to the e-learning modules on their own PCs. We tried to install one [common PC], but [afterwards] it became clear that many had not managed to log in and been able to try out any of the learning before moving.

After moving, access problems also turned up, but now were primarily connected to *the use of the modules on the new infrastructure*. During the first weeks, the problems showed up in the form of an unstable network, failing LMS log ins, frequent PC hangs and PC shut downs. The result was annoyed end-users, lost training logs, new learning barriers and limited e-learning activity. Despite the fact that the TA contacted the LMS project leader and he assisted her as best as he could, similar problems still remained four weeks after moving. Nevertheless, no changes were made in the default implementation plan before the next moves.

Observations in the other business areas

After TBS, the most severe problems appeared in TP, mainly because the TA in this unit had decided to use the pre-relocation e-learning activity as a tool for organizational development. A decision to replace two of the default compulsory modules with the two most bandwidth intensive modules and integrate this e-learning activity with work, led to an extensive need for additional Internet connections, new ISDN lines and new e-learning configured PCs at all desks at the old locations. As explained by the TA in excerpt 3,

Excerpt 3:

Before we could implement [organizational development] and use e-learning to support continuous learning, we had to install ISDN-lines and establish temporary connections. There was plenty of running in the corridors – to connect all the companies to the [learning] platform before we moved. And, somehow, this was something we [TP] had to be responsible for...actually one should expect that this was included in the products delivered by eRAF, that one should be able to carry out the e-learning modules beforehand. But the fact that we had different platforms was somehow our own responsibility, so that we spent a lot of energy on that – making sure that all those who would move in, had the possibility to go through ‘PC I’ as well as these programs before

we left ... [and we had to] reach an agreement with the people in eRAF; but as they invoiced outside their regular work ... they [eRAF] had several roles.

The hardware and software problems gave the TA and the project groups a lot of extra work, and led to intense discussions and meetings between the two partners. As a consequence, the TA started to question the content of the eRAF delivery (e.g., responsibilities, costs, and the division of labour between central and local level). This pre-moving state was described by the TA as ‘a war against the system’. However, in contrast to the implementation process in TBS, and according to the informants, the mess before moving only, to a small extent, influenced the training activity at end user level. After moving, the unit’s access to e-learning was generally acceptable. The problems connected to the execution of implementation tasks are further discussed in section 7.1.2.

Problems connected to hardware and software also emerged in the two remaining units (TM and TN). Although this led to complaints and some turbulence, the problems were fewer in scope and did not represent any noticeable barrier for the e-learning activity. High competence and interest in technology in both units, a tradition for looking at learning as an important and integral part of work, and, to a large extent, a tradition for following given rules, might explain some of this success. Local adjustments, such as thorough preparations of the infrastructure and explicit formulated command lines for problem handling (in unit TN), as well as traditions for collegial support and technically advanced super users (in unit TM), might also have contributed to their comparative success.

An activity-theoretical discussion

The point of departure for this discussion is figure 7.2. This figure is the same as figure 7.1, but with a more detailed HRAS. The HRAS rules are enhanced with help desk rules and three rules that governed the e-learning activity: 1) complete 3 compulsory modules before moving; 2) complete 5 compulsory modules after moving; and, 3) approval ⁶³of the modules at first when 100% (sometimes 80%) was completed. The division of labour in the HRAS is further detailed with the division of labour 1) between the Training Administrator (TA) and the three project leaders, 2) between the TA and Help desk and 3) between the three project leaders (Content project, LMS project and Infrastructure project).

⁶³ When a module was approved, it was marked as completed in the LMS and counted in the learning statistics.

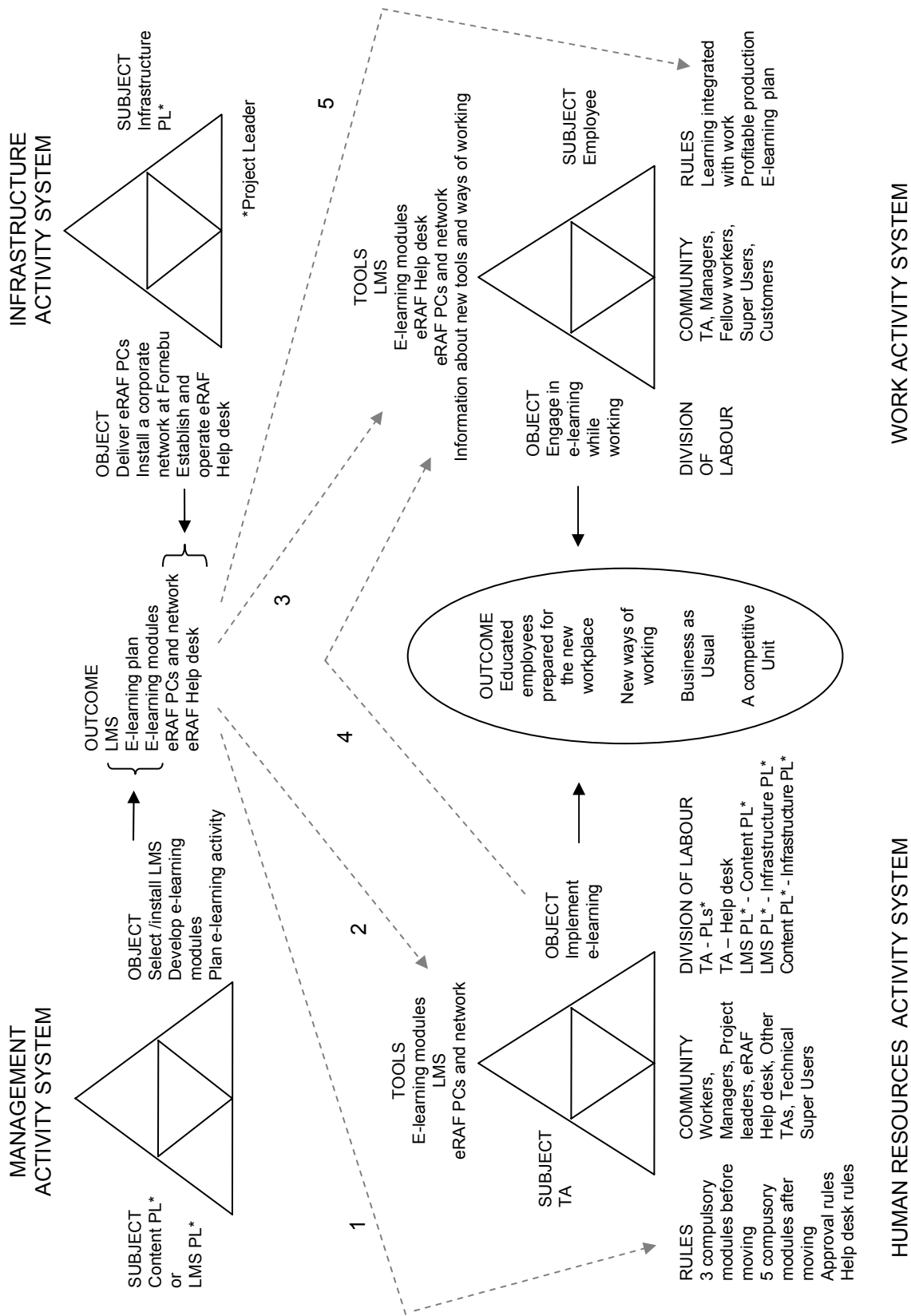


Figure 7.2: Activity systems related to the hardware and software resources category

As argued for above and in accordance with Hasu (2001), the following improvisations, all of them made by the TA in TBS, serve as departure points for the discussion:

1. She furnished some vacant offices in the old locations with an e-learning PC for joint use (since most of the PCs were not prepared for e-learning)
2. She distributed, by e-mail, a Word document describing appropriate routines for securing the most important personal files before moving (since one of the e-learning modules was delayed)
3. She negotiated with the e-learning project and tried to get some looser rules
4. During the whole stage of adaptation she was in contact with the project groups and informed them about lacking technological interoperability, functional weaknesses and technological failures, and
5. She created an internal e-learning web-site, which among other issues also addressed this category of problems (since this type of information was often requested by the employees)

Because improvisation 5 was intertwined with the category of Information Sharing, this category is further discussed in section 7.2.3. A description of the hardware and software resources disturbances in TBS as representatives of the potential underlying contradictions is presented in figure 7.3⁶⁴.

⁶⁴ Only relevant artefacts are included in the figure.

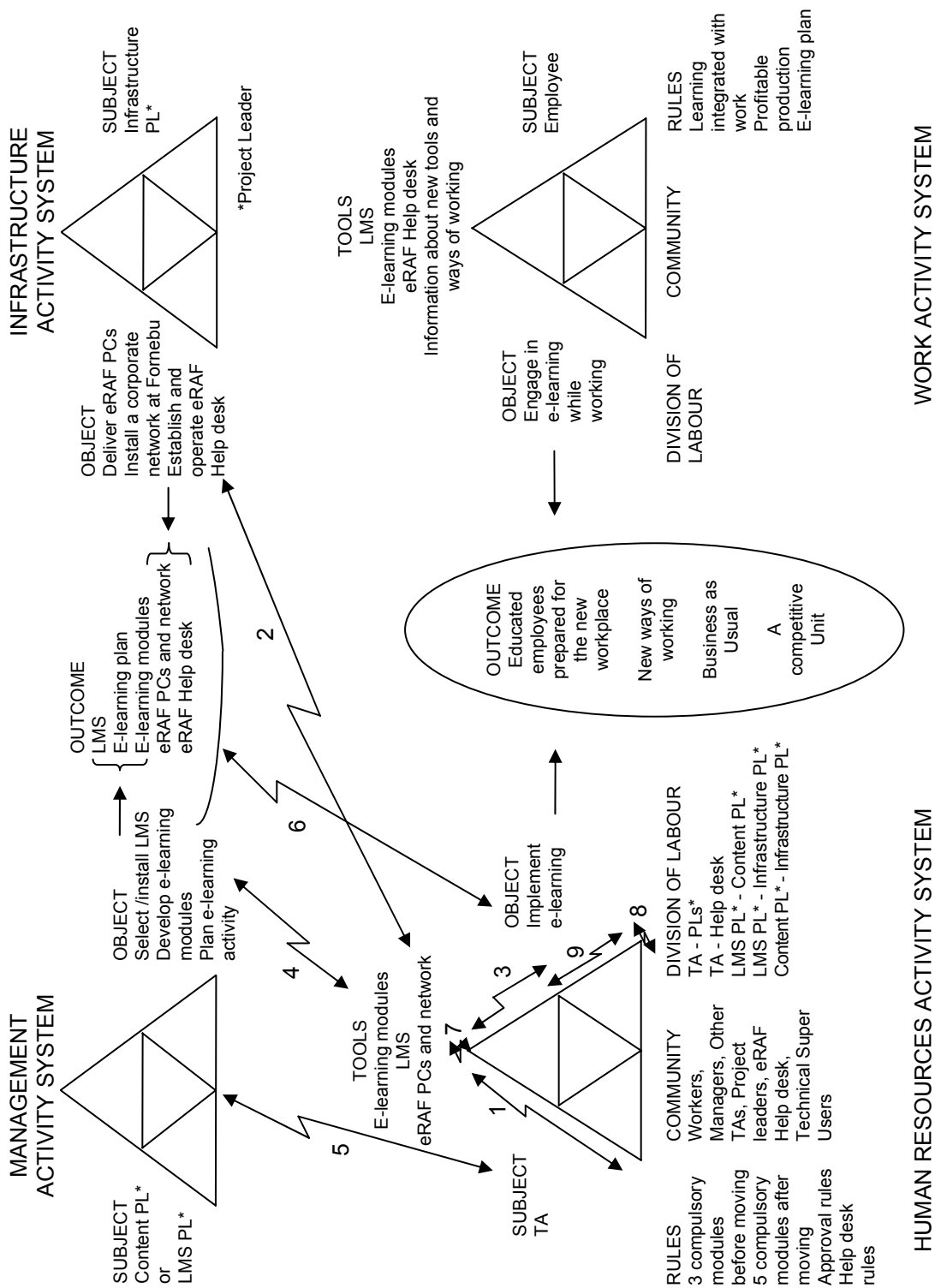


Figure 7.3: Tensions underlying hardware and software resources disturbances

Improvisation 1

The TA's effort in trying to furnish for e-learning in some of the old offices can be evidence of a potential secondary contradiction between the rules and tools in the HRAS (arrow 1, figure 7.3). The e-learning rules instructed the TA to ensure that three e-learning modules that were absolutely required were completed before moving while, at the same time, the existent infrastructure was not able to run this learning. This tension further points to a potential quarternary contradiction between the tools component in the HRAS and the tool-producing IAS (arrow 2, figure 7.3), *between the TA, who required new PCs and Internet connections to fulfil the e-learning rules, and the Infrastructure project, which was governed by a rule that told them to focus on Fornebu and let the old offices pull through as best they could*. This latter tension continued beyond the first move; in fact it even escalated in the third move (see excerpt 3). The disturbances connected to hardware and software resources for e-learning in the pre-moving phase, made it extremely difficult for the TA to 'implement e-learning', and points to a tension (and a potential secondary contradiction) between the tools and the object in the HRAS (arrow 3, figure 7.3).

Improvisation 2

The TA's distribution of e-mail before moving, which was required because of a delayed delivery of e-learning modules, illustrates a tension (and a potential secondary contradiction) between the tools and the rules of the HRAS (arrow 1, figure 7.3). This tension, continuing also after moving, points to a further potential quarternary contradiction between the MAS and the tool component in the HRAS (arrow 4, figure 7.3). *The situation emerged because the MAS did not produce the tools that were a precondition for the TA to carry out her job*. The many disturbances related to the late-arriving modules, led, according to the TA, also to an imbalance and secondary tensions in the tools - object relation in the HRAS (arrow 3, figure 7.3) and, as above, following difficulties with reaching the object.

Improvisation 3

The TA's effort to loosen the e-learning rules because some of the modules were delayed or the required infrastructure (PCs, network, bandwidth etc.) was not in place or functioning, was rejected by the e-learning project team. First, this indicates a tension (or potential quarternary contradiction) between the HRAS and the MAS (arrow 5, figure 7.3), manifested

as a tension between the TA and the Content project leader, with the latter not being willing to accept the TA's desire to postpone some of the modules. Second, this effort can be interpreted as evidence of the tension between a *global focus* at company level, where the implementation is mainly regarded as an implementation of a number of isolated components (e.g., e-learning modules, e-learning rules, LMS, PCs, network) and therefore organized as three different projects, and a *local need* for a holistic support that takes the integrated e-learning product as its departure point. This tension, represented in figure 7.3 as a potential quarternary contradiction between the HRAS and the activity system consisting of the MAS and the IAS as a whole (arrow 6), was partly caused *by the strict division of planning and implementation, and partly by the strict division of the different planning activities. The TA was seldom involved, neither in the planning in the two e-learning projects nor in the infrastructure project.*

Initiative 4

The TA's consultation with the three project leaders in order to reduce or even eliminate the many post-relocation interoperability disturbances, indicates, together with the project leaders' responses, both internal tensions within the HRAS and external tensions between the HRAS and the two tool-producing activity systems. First, the disturbances due to missing interoperability of hardware and software tools point to an inherent tension and a potential primary contradiction in the tools component (arrow 7, figure 7.3) and in the division of labour in the HRAS (arrow 8, figure 7.3). It was especially the division of labour that elicited disturbances in nearly all local implementations, and this can be evidence of a potential secondary tension between the division of labour and the object of the HRAS (arrow 9, figure 7.3). In fact, *the fragmented division of labour totally undermined the TA's ability to realize the complex object.* This aspect is further discussed in section 7.2.2. The disturbances in the tools component point further to two tensions that have already been identified, one between the tools component in the HRAS and the MAS (arrow 4, figure 7.3), the other between the tools in the HRAS and the IAS (arrow 2, figure 7.3), both representatives of potential quarternary contradictions.

Related work

From a similar theoretical approach, developmental work research, Virkkunen and Pihlaja (2004) argue for a view of learning as a distributed system of production. They also maintain that learning systems change historically as the production develops. Since information

technology, according to Victor and Boynton (1998), represents a key element in the production system, information technology should be adjusted to the different types of production. In line with this view, the hardware and software resources represent a potential barrier in the production in cases where the learning system or the chosen implementation plan does not match the organization's production system. This can only be avoided by making local adaptations of the hardware and software resources to the mode of production.

This view of hardware and software resources as a potential barrier in the learning activity dependent upon the degree to which it matches the production system, is fully absent in the e-learning literature. In the cases where the e-learning literature points to these resources as a hindrance, the effect is related to specific phases of the implementation, *mainly to the adoption phase*.⁶⁵ This perception is also reflected in Collis and Moonen's as well as in Salmon's work. While both have incorporated 'access to infrastructure' as an important element in their respective implementation models, the concepts differ. Collis and Moonen (2001) introduce the term 'Ease of Use' in which they include hardware/network issues (e.g., the network is convenient to access, adequate in terms of speed and bandwidth and reliable; computer and printer access are convenient) as well as software issues (e.g. software associated with the technology is user-friendly, does what the user wishes, and is easy to learn). Salmon applies instead the notion of 'gaining access quickly and easily to the system' (Salmon, 2003, p. 29), and refers to this aspect as a key issue of the first of five stages in her five-stage-model. Collis and Moonen also view 'Ease of Use' (hardware and software) as especially critical in the implementation phase, which in their terms lies "between initiation and institutionalization" (Collis and Moonen, 2001, p. 54ff)⁶⁶, that is before the change has become a sustainable part of the ordinary operational procedure. Their study of people in leadership positions of web-based course management systems in ten universities supports this view. 'Reliability and quality of the technical infrastructure' is assessed as one of the two most important entities in this phase (Collis and Moonen, 2001, p. 50).

While Collis and Moonen, as well as Salmon, mainly refer to academic institutions, similar references to e-learning in the workplace are rarer. Simmons' (2002) study of five hundred e-learning implementations in large, advanced, global adopter firms (e.g., consulting, information technology and financial services) is one of the few available, and his findings concur with the perceptions above. The study further emphasizes that despite issues related to

⁶⁵ This phase corresponds to the stage of adaptation in Cooper and Zmud's terminology (see chapter 2).

⁶⁶ The other important component in this phase was Engagement.

the infrastructure being ranked as number six and seven out of a total of seven barriers in the implementation ('perceived difficulty of using such a system' and 'technology infrastructure'), these issues were not critical in the long run. One of the strongest statements is made by McCormick, who describes the technology barrier (e.g., to use the technology and install or get the support personnel to install for them new plug ins etc.) as a matter of course: "New ideas [in technology] and mature integrated systems are inherently contradictory" (McCormick, 2001, p. 40). McCormick, in contrast to Simmons, draws attention to technology as *a more lasting barrier*, especially in large organizations. This is because the technology nearly becomes obsolete before it is fully implemented. From his point of view, the rapidly changing training technology has an impact on the entire organization, not just on the e-learning specialists. It is interesting, therefore, that parts of the corporate e-learning literature do not focus on problems connected to the hardware and software resources category.

Acknowledging information technology as a potential barrier in the implementation of e-learning, Cross and Dublin (2002) recommend paying 'attention to technological readiness' (hardware, infrastructure and information technology support), planning in detail and avoiding corporate silos. Also van der Klink and Jochems (2004) suggest this type of preparation, especially when an organization wants to use e-learning innovatively. While such recommendations are rather rare in the workplace e-learning literature, the literature on technological innovations focuses frequently on *planning* as a key factor in the implementation ((e.g., a detailed and comprehensive planning (for instance, who is responsible for the actions; who will help rethink the critical factors necessary step by step; and who will be in charge) and local involvement)). For instance, Voss (1994) explicitly advises a careful planning, both of pre-implementation activities, as well as of the different stages in the implementation. Referring to studies documenting that planning will reduce the numbers of problems in the use-context, Hasu (2001) goes even further and argues, from an activity-theoretical perspective, that an adopter organization should be involved in the planning. She also suggests a new, more contextual and complex interpretation of the implementation adoption processes as such. This aspect will be further elaborated in the discussion of the category 'execution of implementation tasks' in section 7.2.2. With this research as a back-drop, it is a bit strange that the need for a comprehensive planning phase is a rare theme in the workplace e-learning literature.

Section summary

As pointed to in this subsection, problems concerning the ‘hardware and software resources for e-learning’ have until now received little attention in the workplace e-learning literature. When recognized, however, the category is mainly regarded as a challenge in the adoption phase, or using Cooper and Zmud’s terminology (see chapter 2), in the stage of adaptation. With a few exceptions it is also pointed to as a barrier beyond this stage.

As the activity-theoretical discussion illustrates, problems connected to the hardware and software resources for e-learning should not only be attacked as isolated occurrences at the surface, but instead, they should be studied from a systemic perspective, where the interacting activity systems are taken into account. By using this theoretical approach, the following set of critical factors is revealed:

- A lack of a comprehensive implementation plan that takes into account all the different components necessary to run the e-learning modules (e.g., LMS and the infrastructure)
- A fragmented division of labour between the different project groups (each with its own mandate) and
- A hierarchical and strict division of labour between the project groups and the implementation team, preventing communication between key actors

The centralized planning, lack of knowledge about local conditions, and a fragmented division of labour, together are the main reason why the ICT resources for e-learning represent a critical category of problems during large parts of the implementation. The findings indicate that to make a secondary artefact such as an e-learning module useful for skills training, the supporting primary artefacts (such as PCs, LMS and networks) have to be transparent from an end-user perspective. The empirical data shows, however, that problems connected to the hardware and software resources for e-learning do not necessarily have to represent a barrier in the e-learning activity. In user groups with an advanced ICT competence or a genuine interest in new technology, as well as in working environments with a distributed end-user support, this type of problem seemed to affect the learning only to a small extent. Furthermore, the analysis shows that the hardware and software resources for e-learning represented a long-term barrier because of non-technical conditions (cost reductions due to external competition) and not, as McCormick argues for, because of continuous technological

shifts. It might, however, have represented a long-term barrier also in Telenor, when studied over a period longer than three years.

Thus, what I have shown by these findings is that the traditional interpretation of problems related to technology has been too narrow in scope. Because the infrastructure (e.g., new network and new hardware), the learning technology (e.g., the learning platform and the e-learning modules) and the integration of learning with working (e.g., from home, from customer locations and in a cafe) are all in continuous change, organizations should give an increased and ceaseless attention to the technological interoperability between these three parts of the e-learning environment. When we also know that various parts of a company develop at different paces, an explicit focus on this problem category is even more necessary. Since a contemporary large-scale implementation of e-learning is mainly technology driven, planning that involves local actors and views the different software and hardware components as an integrated whole is required.

7.2.2 Execution of implementation tasks

According to the default implementation plan two persons, *the top manager* (TopM) and *the training administrator* (TA), had responsibility for the local implementation tasks. While the TopM was defined as responsible for the *overall implementation and control of the individual e-learning* activity, the TA was responsible for *coordination*, follow up and production of learning statistics (LMS reports), and for delivering these reports to the manager. The TA was also the connecting link between the two e-learning projects and the unit (see chapter 4). Central support was added in the form of *the eRAF Help desk* (responsible for technical support to end-users and training administrators at Fornebu) and a group of *super users* (serving as first-aiders in the provision of ICT the first week after relocation).

During the first two first moves there was much confusion around responsibilities and duties. The interview data shows that the most frequent problems of this category turned up in TBS, thus focus will be placed on this unit. Excerpt 4 gives a taste of the TA's largest frustration within this category, namely *the lack of involvement of management*:

Excerpt 4:

I would like to say that the management [in TBS] was almost totally absent. Only one, maybe two managers took part actively in this ... The new top manager [in TBS] ... he had other things on his mind than e-learning ... The focus was on profit and on how to make the new company (Ltd) work, and therefore, this [e-learning] was not emphasised.

According to one of the project leaders, the top manager appreciated the new e-learning idea (see excerpt 5), but his mind was occupied with other activities. No contact was made with the TA, nor did he allocate training time, impose training on the employees, or make any effort in anchoring the new initiative at middle and lower management level.

Excerpt 5:

For in TBS, [the top manager] thinks this [e-learning] is a wonderful idea, but under him, there are so many directors who do not go along with e-learning...Many directors think this has been forced upon them and they say that they cannot be ordered to demand their staff to complete [the modules].

This lack of involvement from the top manager to lower management levels had consequences: *no one knew how the control function would be executed*. Three days after arrival at Fornebu the TA was still not informed about the organizational level for which the control reports should be generated, or to whom they should be delivered. Despite this confusion, the TA continued to produce control lists every second day, at individual as well as at an aggregated level.

The follow up and support of employees both from management level and the help desk represented a further challenge, partly because these tasks had not been explicitly defined (in the mandate or on the intranet), and partly because the support staff did not execute their tasks as prescribed. Even the TA broke the “rules” by asking the LMS project group (instead of the help desk) for technical assistance. This confusion represented a source of irritation for the TA, but more frustrating was the resulting decline in engagement at employee level. Due to the shortage of end-user support and follow up, the project group, some days after moving, recommended she involve the floor managers. They, as administrative resources for smaller units, were, however, already too busy. Therefore the TA, on her own initiative, encouraged the top manager and some middle managers to stimulate the e-learning activity. She also produced weekly completion reports that were published on the intranet, and initiated weekly competitions for those who had completed a certain amount of modules. All this was additional to her regular duties and roles. In spite of the unclear division of labour, insufficient

follow up, lack of support and help desk capacity, a discussion about a rearrangement of the implementation tasks was never undertaken.

Observations in the other business areas

In TM, the prescribed division of implementation tasks was meant to be followed, but as in TBS there were local deviations. Involvement of the top management was also nearly absent in this unit. The engagement among lower managers was, according to the TA, however, greater than in TBS's move, because they had greater personal interest. In fact, some of them even asked the TA for control lists, but due to large problems in the report production, the TA chose not to carry out this task. As a consequence, no control took place either by her, or any of the leaders. TA-support and follow-up was also rather limited and happened mostly on request. The TA's view was that learning was the employees' own responsibility, and support should be given by colleagues or one of the super users. The eRAF Help desk was used, but for more complex problems, TM's own help desk was contacted. Complaints about the division and quality of implementation tasks did not show up in this unit, either from employees or from leaders.

In contrast to the two first-moving units, TP and TN both decided to *expand the implementation team and distribute members of this team to sub units in the business area*. Leaders at local level were involved, local TAs were appointed, and floor managers were incorporated in the implementation team already six months before moving. However, some important differences existed between the two units. For instance, while the local TAs in TM were given a lot of power, all decisions in TN were centralized to the TA, and while the top manager in TP was nearly absent, the top manager in TN supported the implementation both in words and action. In TN, the person who was also responsible for TN's communication strategy was heavily involved in the implementation.

Altogether, the number of problems was extremely low for the implementation teams both in TP and TN. Complaints about the help desk also showed up here, but rather rarely, and this hindered, to a small degree, the e-learning activity. The collaboration between the TAs and the e-learning project group was also satisfactory, and mostly took place between the TAs and the two project coordinators that had been nominated by the project group, one for TP and one for TN (see chapter 3). However, an intense dispute arose in TP over the payment for the

required technical preparation tasks (see excerpt 3) and the decentralized support staff training before moving (see excerpt 6).

Excerpt 6:

TA: They [eRAF Learning] were to have training in e-learning for those who were floor-managers – I thought this would be a product supplied by eRAF Learning as part of what was budgeted, [and] I got an invoice for that afterwards...

GN: So, there were no clear definitions of what the contract should cover/include?

TA: No...and there was some back and forth dialogue between me and [the project coordinator] and in the end I paid part of it.

An activity-theoretical discussion

The point of departure for this discussion is figure 7.4, which is a tailored version of figure 7.1. Again the figure is related to TBS, but now enhanced with relevant artefacts for the execution of the implementation tasks category. Since most of the disturbances are connected to the Human Resources Activity System (HRAS), the Management Activity System (MAS) and the Work Activity System (WAS), these three activity systems will be focused on. Compared to figure 7.1, the HRAS is enhanced with the e-learning project mandate⁶⁷ and LMS reports produced by the TA. The HRAS rules component is also further detailed, with help desk rules delivered by the IAS and implementation roles and adherent tasks delivered by the MAS and produced by the Content project. The division of labour between the Training Administrator (TA) and the top manager (TopM), between the TA and the two e-learning project leaders, between the two e-learning project leaders, and between the TA and the eRAF Help desk, is also incorporated. The three project leaders together with the top manager, eRAF Help desk, and the workers, are the main part of the community of the HRAS in this section. Also the WAS is expanded, with new rules for the help desk. As in the previous section, the WAS is viewed from the perspective of the Employee, but by putting the TopM and TA in square brackets, it is indicated that the WAS in parts of the discussion is viewed from the TA's and the Top Manager's perspectives, as *employees* in a large organization.

⁶⁷ "To give the right training to the right people at the right time and in the right way".

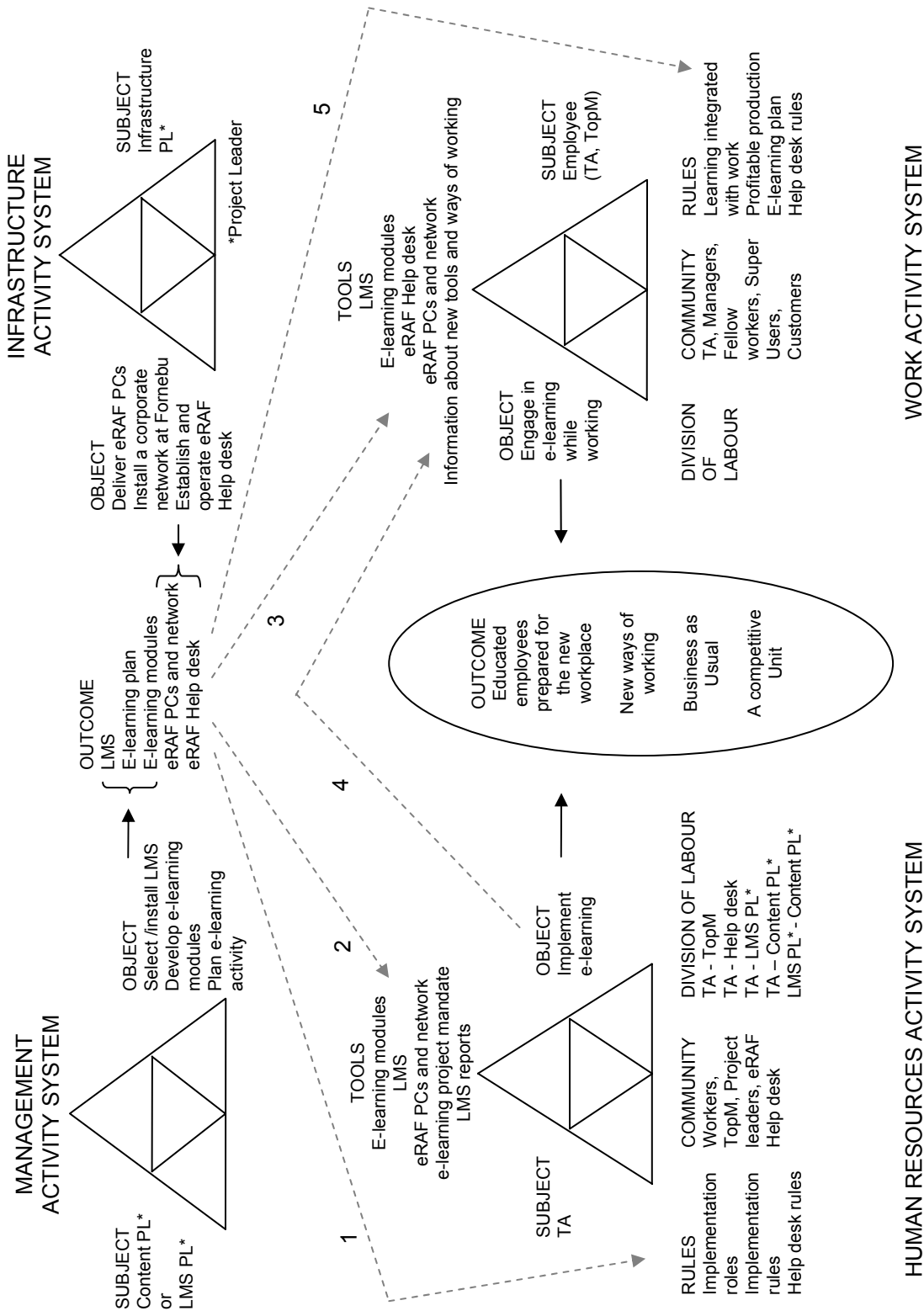


Figure 7.4: Activity systems related to the execution of implementation tasks category

Again the starting point for identification of tensions will be the many improvisations that the TA made to the implementation tasks, mainly to achieve the defined object:

1. She asked the top manager and some of the middle-managers to follow-up and encourage e-learning among the employees
2. She asked the floor managers (on recommendation from the project group) to support the e-learning at the local level
3. She requested assistance from the technical staff instead of from the help desk
4. She also asked the technical staff in the project group to help her in the report production
5. She arranged weekly competitions among the employees who had completed the modules, and
6. she published aggregated lists on the intranet, so that both managers and employees could control the e-learning activity and compare the completion rates across the business area

A description of the execution of implementation task disturbances (in TBS) as potential representatives of the underlying contradictions is presented in figure 7.5.

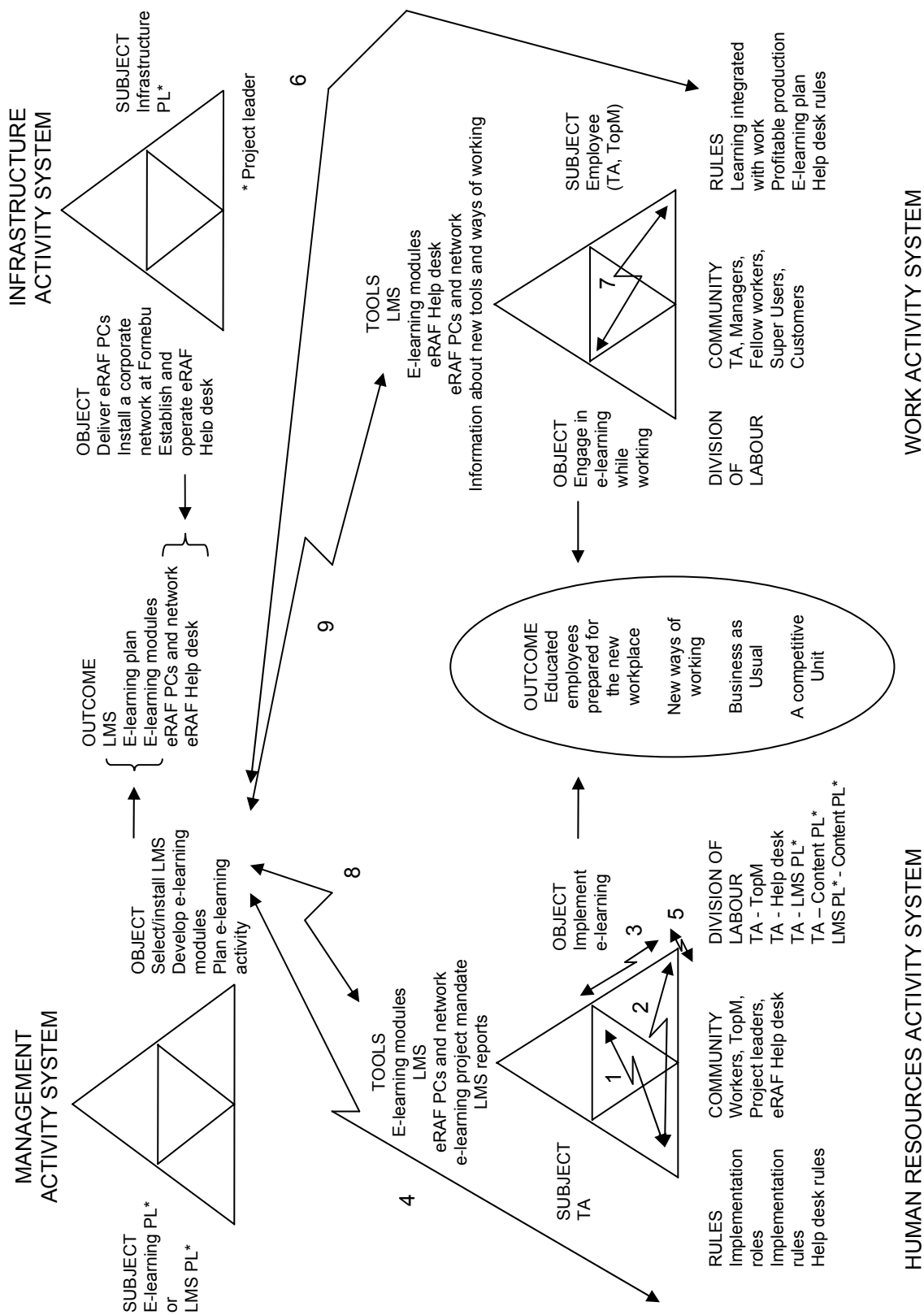


Figure 7.5: Tensions underlying execution of implementation tasks disturbances

Improvisation 1

The TA's initiative, to ask both the top and middle management to encourage and follow up the employees in order to increase the e-learning activity, reflects a tension (and a potential contradiction) between the rule and the object of the HRAS (arrow 1, figure 7.5). The tension arises from a rule saying it was the responsibility of the top manager to encourage and follow up the employees, and the TA's experience that this kind of follow-up was far from sufficient to reach the ambitious object. Further, the improvisation can be evidence of a potential secondary contradiction between the division of labour component and the rule component (arrow 2, figure 7.5). These rules, describing local roles and tasks, were unclear with respect to the *concepts* used to describe the different implementation tasks (e.g., 'follow-up') and the *naming* of the individuals meant to carry out those tasks (e.g., 'manager'), and resulted in disturbances in the horizontal division of implementation tasks between the TA and the unit's top manager, and in the vertical division of power and status. The TA could only 'encourage'; she had no authority to carry out either the top manager's or the middle or lower management's tasks. The same disturbances point, in addition, to a tension in the HRAS between the division of labour component and the object (arrow 3, figure 7.5), induced by a fragmented division of labour (e.g. the work flow for production and use of control reports) that, from the TA's perspective, did not mirror the structural need for collaboration that was required to achieve the complex object. Together, the vague description of roles and responsibilities and the lack of a description of the top manager's duty to anchor the implementation to middle and lower management, indicates a potential quarternary contradiction between the MAS and the rules component in the HRAS and the WAS (arrow 4 and 6, figure 7.5). *The MAS did not offer the TA a sufficiently detailed specification of rules and roles, or the necessary authority to take care of her role as a coordinator.*

The improvisation further manifests a tension (and a potential secondary contradiction) in the HRAS between the division of labour and the rules (arrow 2, figure 7.5), this time, however, because of the heavy work load at top management level. Despite the top manager being newly hired and having to struggle with a falling economy in a recently reorganized unit, and the TA possessing at least three other demanding roles as a member of the WAS, the TA's and the TopM's daily work tasks and responsibilities had not been adjusted. Finally, the improvisation manifests a deeper-lying tension (and a potential quarternary contradiction) between the rules in the HRAS and MAS (arrow 4, figure 7.5), where the project group had *avoided taking the key actors' work loads and the circumstances in the local unit into account*

when defining rules and roles, and when allocating and distributing support resources (e.g., super users).

Improvisation 2

The TA's request, asking the floor managers to support e-learning at end-user level, again manifests a tension between the rules / roles and the object of the HRAS (arrow 1, figure 7.5). This time, however, caused by *the lack of local support*, that, from the TA's perspective, became a bottleneck and undermined the e-learning activity. The improvisation points again, however, to a deeper structural tension between the MAS and rules component in the HRAS and WAS (arrow 4 and arrow 6, figure 7.5), between a project group having ignored the need for local support, and the actual need for follow-up at a lower level. The idea that the TopM and the TA together should be able to take care of local support, control and coordination of an implementation of e-learning to nearly a thousand people, shows a rather *unrealistic attitude in the project group with respect to the challenging implementation process in general, and to the need for local support in particular*. A consequence of this attitude was tension between the rules and object in the WAS (arrow 7, figure 7.5). This became visible through a conflict between engaging in e-learning while working (object), and rules that did not fulfil the employees' need for local support so that they could fulfil the object. *The MAS did not offer the employees any opportunity for dedicated e-learning support in their own working environment.*

Improvisation 3 and 4

The fact that the TA 'broke the rules' and contacted the technical staff for support instead of the help desk and also asked the same staff for assistance in the report production, although this was her own duty, makes visible a tension between the rules and the object in the HRAS (arrow 1, figure 7.5). The complex object, 'to implement e-learning', was, from the TA's point of view, unachievable with the given rules and the defined roles (without specific technology competence). The improvisations further indicate internal tensions (and a potential primary contradiction) within the division of labour component (arrow 5, figure 7.5) in the HRAS. The lack of dedicated technical support in the implementation team, no help desk support before moving, the lack of competence at the help desk, and the fact that the help desk not was devoted especially to e-learning but comprised all eRAF products (e.g., PCs and new IS systems), combined with the TA's need for broad technical support, emphasised this issue.

In fact, the TA was not even given any priority at the help desk and had to wait together with the other employees in long queues. Together, improvisations 3 and 4 also manifest a tension between the rules in the HRAS and the MAS (arrow 4, figure 7.5), *between the actual needs at local level and the expectations at project level that technical resources beyond the help desk were either not required in this kind of implementation, or, that this kind of resource already existed in the business area or in the implementation team.*

Improvisation 5 and 6

The weekly competitions and the publishing of aggregated lists on the intranet, make indirectly visible tensions (and potential quarternary contradictions) between the MAS and the tools in the HRAS and the WAS (arrow 8 and 9 respectively, figure 7.5). The existing tools were not enough for motivating the employees and the top manager to engage in the e-learning activity and reach the objectives. The improvisations further illustrate partly conflicting views between the TA, who experienced that competitions and comparative data served as motivating factors and increased the internal e-learning focus, and the e-learning project group that had not assessed incentives such as this as important. The project group had indeed mentioned this kind of tool in general terms in the implementation plan, but without making any proposals about this to the TA. Thus, the initial competition was first arranged one week after the arrival at Fornebu. *In other words, the use of relevant incentives had been underestimated in the project group.*

Related work

The above discussion has illustrated that both the mandate (including rules and roles in the implementation) and the composition of the implementation teams at unit and company level, caused problems in the first part of the implementation. In the e-learning literature, however, the focus is almost always on the implementation teams alone. This could reflect a tradition where the mandate is seen as given and part of the principal planning of the project, and thus, not a subject of discussion in the actual implementation process. It might also indicate that rather rarely is an explicit mandate viewed as an important tool for a successful implementation. Interestingly, not even that part of the e-learning literature that heavily emphasises the need for a detailed planning (Horton, 2001b; van der Klink & Jochems, 2004), directs any attention to this issue. One exception is van Dam (2004) who argues for *clearly defined roles and responsibilities* in all types of e-learning projects, already from the outset.

Similar and more detailed writing on this topic is found in the project management literature. For instance Westhagen and Johannessen (1991, p. 27) strongly argue for an internal project structure with *specification of responsibilities, delegation of authorities, division of labour and routines* (who does what and how). Furthermore, they suggest, in accordance with my finding, a detailed *resource planning and allocation of resources*. Another extremely relevant issue is put forward by Hasu (2001). Instead of each individual being responsible for a specific work task within the implementation, Hasu argues that all practitioners involved should take responsibility for the entire implementation and adoption trajectory.

Regardless of the detailing level of the mandate, the mandate has to be interpreted. In other words, the group who is responsible for the implementation has to determine how the mandate and the specified activities shall be understood. As Mintzberg underlines, a “[strategy] in general, and *realized* strategy in particular, will [always] be defined as a pattern in a stream of decisions” (Mintzberg, 1978, p. 935). This perspective, to look at the concretizing of a strategy as phases of interpretation, is relevant for the discussion of the mandate. The presence of underlying tensions in this section indicates, however, that it is not sufficient that the implementation team itself comes to an agreement about how the strategy shall be interpreted. In addition, the common understanding has to be communicated to the end-users. Horton (2001b) and van der Klink and Jochems (2004) place strong focus on informing the members of the implementation organization, as well as all end-users, about the different implementation roles and responsibilities, and support this assumption. Lack of communication about roles and responsibilities in the implementation teams, both at company and local level, seems to elicit tensions. By making these things clear, Horton as well as van der Klink and Jochems, claim that some of the obstacles to e-learning might be removed. As Cross and Dublin (2002) formulate it: “... make it easy for lost souls to find them [the people possessing different roles in the implementation]” (p. 86). Collis and Moonen’s study among ten change managers supports this issue. The study underlines *the functioning of the implementation team* as one of the two most critical entities in a successful implementation (see Collis & Moonen, 2001, p. 50).

The degree to which the technicians should be included in the group responsible for the implementation varies in the literature. Although most of the e-learning and management literature acknowledges a strong need for both technical and more general support for end users and hence recommends building a supportive infrastructure, only a few authors (Collis & Moonen, 2001; Horton, 2001b; McNaught, 2002; Munkvold et al., 2003; Rosenberg, 2001;

van Dam, 2004) argue for including this type of competence. The e-learning and innovation literature is also inconsistent about which levels of management should be involved in the group. It is, however, interesting that large parts of this literature stress the importance of support from top (some of them also from middle and lower) management, and not least, a need for anchoring the implementation from top to lower management (e.g., Cross & Dublin, 2002; Edmonds, 2004). This aspect is, of course, also connected to parts of the discussion in section 7.2.3.

Finally, this section gives attention to *the importance of incentives*. These can be of different kinds. One example is a competition with or without financial reward, used as a positive incitement to increase the motivation, or comparative statistics, applied with the intention to put pressure on the participants. It is financial reward that has been focused on in the corporate e-learning literature (e.g., Devlin, 1993; Ely, 1999; Jones & Laffey, 2002; Munkvold et al., 2003). This study confirms this finding, but illustrates also that launching of comparative e-learning statistics can be an important driver for increased engagement.

Section summary

When ‘execution of implementation tasks’ has been dealt with in the e-learning literature, the emphasis has primarily been on the composition of the implementation team and the necessity for support from top management. The need for a tight coupling with the technical staff is seldom addressed, with the exception of an explicit mandate that can guide the implementation process (with clearly defined tasks, roles, and authorities and not least, planning and allocation of resources). The literature, only to a small degree, takes into account the need for a shared understanding of the object and the process of implementation, in the implementation team as well as in the organization as a whole.

The above activity-theoretical discussion indicates that these issues should be given more attention. The discussion further shows that the TA was not given the necessary authority to take care of the role as a coordinator at local level. Instead of the restricted TA-role specified in this project, I suggest this role should be expanded into that of an *Introduction Coordinator*. Characteristic for this role is sufficient *authority* and an ability both to *push* the new initiative as well as adapt it to task-specific needs.

Six critical factors seem to have caused the majority of problems within this category:

- The loose mandate for the local implementation (with respect to roles, members, division of tasks, responsibility, resources, work flow and ways of working)
- The lack of a shared understanding of the implementation tasks
- The composition of the local implementation team and the missing authority given to the TA
- The current workload and responsibilities in the implementation team
- The lack of knowledge about local conditions at general project level (this aspect is also identified in section 7.2.1), and
- Missing incentives to increase the engagement at management and employee level

These items explain, to a large degree, the confusion about the division of labour among key actors in the implementation, the lack of manager involvement in large parts of the process, and the large work pressure on the TA. Together they cover critical issues that should be taken into account when an e-learning solution is taken into use in a large hierarchical organization with a complex technological infrastructure. I claim, however, that despite detailed planning and division of responsibilities and work tasks in the implementation team, all members of the team have to take responsibility for the adoption as a whole.

7.2.3 Information sharing⁶⁸

Complaints about incorrect, incomplete, too little and sometimes also too much information were made most frequently in the business area that first moved to Fornebu (TBS). The main focus will thus be placed on this unit. The dissatisfaction, to a large extent, was raised in interviews with the training administrator (TA). While the TA also talked about negative reactions from end-users during these interviews, only a few of the end-users focused on this aspect themselves.

The project group had the responsibility *to reach everyone with the most necessary e-learning information* before the implementation started. The TA tried to influence the time schedule and form of this work, but without success. Hence, a first introductory meeting was arranged at each of the five TBS locations, only one week before moving. Even though the TA had made a notice and sent an e-mail to the entire staff in advance, attendance at the introductory

⁶⁸ A broad discussion of this category is given in Nettelund, Wasson and Mørch (2007).

meetings was variable. This was partly because the meeting was optional, partly because it took place at a time when most of the staff was engaged in packing, and partly because a few employees already had carried out the two modules that were already launched. Even the participation from leadership was low; some of them had actually chosen to send their secretaries. As a result, e-learning was completely new to most of the end-users (both leaders and employees) when they later started the training activity. Most employees were also unfamiliar with the motive behind the new initiative, the expectations from the company and the management level, and the deadlines for completion. Since only a few leaders had taken part in the introductory meetings, the situation was much the same at management level.

Another source of confusion and irritation, mainly at TA level, was *the incomplete and uncoordinated information from the e-learning projects*. But since much of this information was forwarded to all TBS employees, the dissatisfaction spread to the whole unit, as explained in excerpt 7.

Excerpt 7:

TA1: We have made a link to the Fornebu site [the website of the new headquarter at Fornebu where TBS was also located], but the site is not updated...eRAF [the relocation project] does not update the site ... we have given up ... then we made our own site instead ...

TA5: Yes, that is what I also do

TA1: We are fairly critical about eRAF [the relocation project] ...

TA6: And then we lose the overview

TA2: We could have avoided this ... in a hectic relocation process we could have avoided this!

TA7: And then another thing...there are too many e-mails and information floating around ...if we had had what we talk about here [a common e-learning web site], then we could have actively taken part in this [information exchange]...we are after all Training Administrators and know what we ought to do; to log onto the site and link the site to our personal links instead of as it is now. There are seven, eight, ten people sending the same mail and we are bogged down with mail

TA5: One is bogged down with mail

Not even the 'Fornebu site', where relevant information from all project groups was expected to be found, was updated. Instead, large parts of the information from the e-learning projects were sent by e-mail to the TA. She had the challenge to sort it out, make priorities and distribute the most relevant e-mails to the rest of the unit. A combination of information

overload and non-targeted information made it completely impossible for her to get a satisfactory overview. This led to many complaints among the employees, since they did not get the correct and necessary information about delays, failures in the modules, and logging problems. As a consequence, people got tired, started to mistrust the information, and became critical towards the new learning initiative. Therefore, during the first week at Fornebu, the TA decided to make a specific e-learning site, with all sorts of e-learning relevant information and links.

A third problem in this phase was that some of the end-users found *the information from the project group difficult to understand*, as explained in excerpt 8, which demonstrates problems with the web based information about how the LMS and the modules should be accessed. Even though some of the modules had been presented at the introductory meeting, the threshold was still too high for some of the workers. More concrete information via hands-on-training would have been preferred. Classroom-based courses were initiated after one week but had to be cancelled because the attendance was low. According to the TA this was because of the employees' heavy work load.

Excerpt 8:

TA1: This introduction, how to come to Saba [the LMS], we had published it [the instructions] on the web and we had made short instructions, push this do that, there is the password and then you come in...Saba [the LMS] was not so easy that everyone managed to understand how they should operate it, how you should do it ... [this resulted in problems]...

Observations in the other business areas

Although the introduction to e-learning in TM was also given only one week before moving, the TA and the employees made few, if any, complaints about a lack of or uncoordinated information from the project group. Although the information from the e-learning projects was gratifying and partly incorrect, the e-learning activity at the user level was little affected. This was due, to a large degree, to the TA. In this unit it had been difficult to avoid the information about e-learning. The business area's ambitions and the internal expectations had been clearly communicated to each person and were in general well-known. Among other things, the TA had e-learning as a specific item on the agenda of the regular meetings (e.g., staff and leader meetings). She had also targeted the information to specific user groups and placed an e-learning banner with links to the local e-learning site at TM's intranet.

Also, in the last move, TN, there was little annoyance due to inadequate information. This was partly because a project co-ordinator had been nominated in the e-learning project, partly because the local information was targeted and given in good time before moving (six months), partly because an updated local e-learning site had been launched, and partly because local workshops had been held. The e-learning modules had also been used as preparation for parts of these workshops. Most important was the tight collaboration between the TA and the person responsible for the internal communication within the business area. As a result, a separate three-level communication plan was developed early in the implementation process, as explained in excerpt 9.

Excerpt 9:

At a higher level, [...we have] used [website] Infotorg in order to give info – at group level [...we have] brought in the leaders – they [the leaders] take the message across to the users, i.e. why this is important – and in addition we have these [local] TAs as an incredibly important part of the communication process ...

A multi-level information strategy and a dedicated project co-ordinator were also introduced in TP, but since the local implementation (as well as the information responsibility) was decentralized to the sub-unit level, the local information approaches varied. Likewise, the complaints about missing or insufficient information differed. In general, however, the complaints were few. The open conflict between the project group and the central TA due to incorrect and incomplete information about the delivery from eRAF (recall section 7.2.2), was, however, disturbing.

An activity-theoretical discussion

Three activity systems will be focused on in this discussion, the Human Resources Activity System (HRAS), which is viewed from the TA's perspective, the Management Activity System (MAS), which is viewed from the perspective of the two project leaders (LMS project and Content project), and the Work Activity System (WAS), which is viewed from the employee's perspective. Figure 7.6 gives an overview of these activity systems, as integral parts of a network of interacting activity systems. The figure is an adapted version of figure 7.1, where the HRAS tools are enhanced with the project mandate, information meetings, locally produced oral and digital information about e-learning, as well as managerial information from the Content and LMS projects (e-learning related e-mails and messages on the Fornebu web site). The division of labour is detailed with the division of labour within the e-learning team (the TA and the TopM), between the TA and the Help desk, as well as between the TA and the leaders of the Content and LMS project. The arena for discussion is again TBS, since the information sharing disturbances were the highest in this unit.

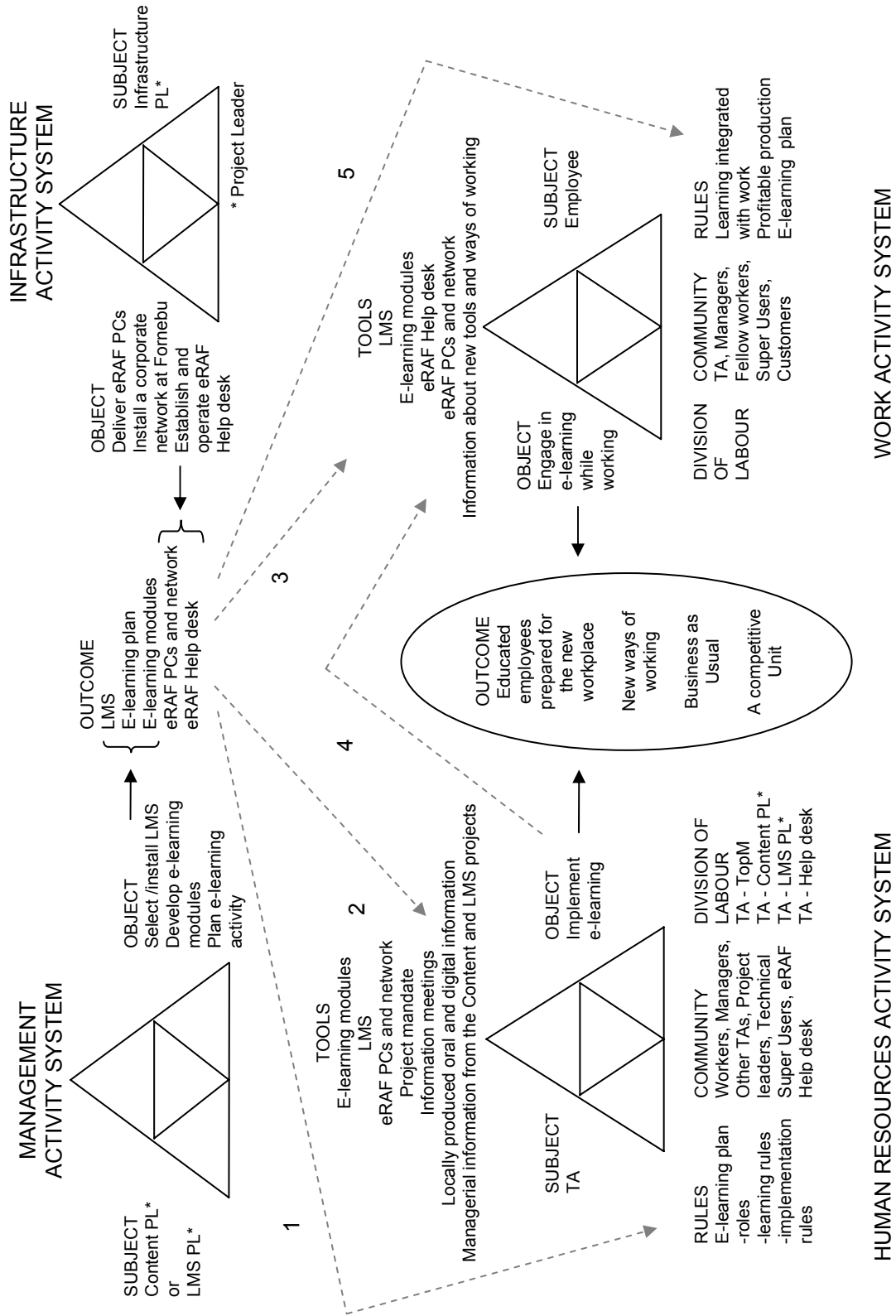


Figure 7.6: Activity systems related to the information sharing category

Because of the information sharing disturbances, the TA again made improvisations:

1. She tried to influence how and when the information about the new e-learning initiative was communicated
2. She developed a dynamic e-learning web site to offer the TBS employees one common e-learning information channel
3. She contacted the Content and LMS projects and asked for more precise and predictable information, and
4. She was one of the driving forces behind the proposal of a classroom-based course (to help those who did not manage to translate the web based e-learning instructions into practical learning activity)

Again, in accordance with Hasu (2001), these initiatives will be used as a starting point for the following identification of underlying tensions (see figure 7.7).

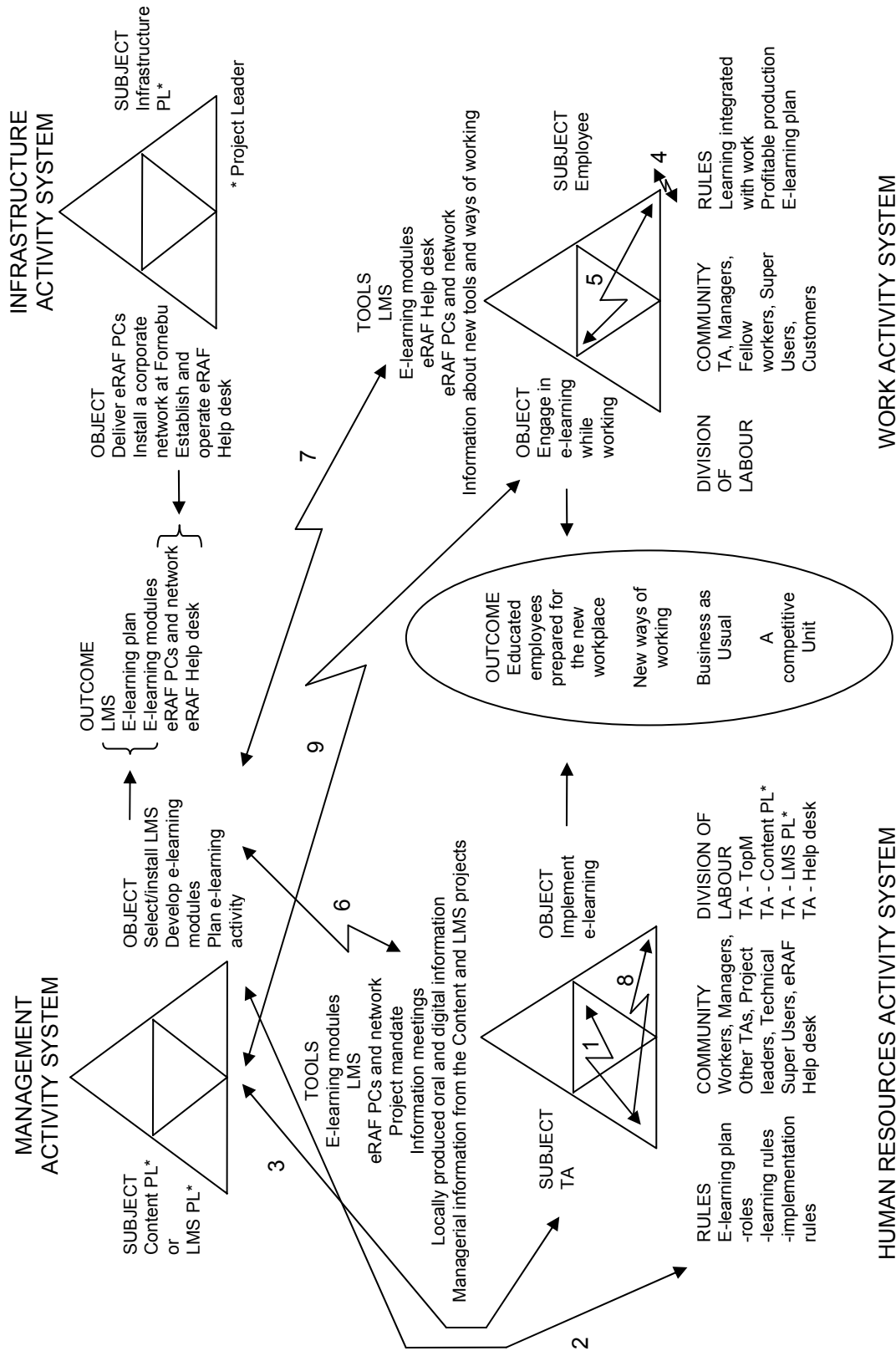


Figure 7.7: Tensions underlying information sharing disturbances

Improvisation 1

The TA's effort to influence the 'when' and the 'what' of the information meetings that were to be arranged, reflects a tension between the rules that were given in the implementation plan and the practical needs that arose when the TA tried to implement e-learning. The poor attendance at the meetings made the TA's work difficult, because many of the employees and managers were not prepared for e-learning, or, because they did not have a shared understanding of why e-learning was important. This situation reflects a potential secondary contradiction in the rules-object relation subject in the HRAS (arrow 1, figure 7.7), between the *rules specified in the implementation plan* and the TA's *practical needs* that arose when trying to implement e-learning (object). The disturbances also manifest a tension that may be evidence of a quarternary contradiction between the object in the MAS and the rules in the HRAS (arrow 2, figure 7.7). While the e-learning project regarded the information meeting to a large extent as *a bureaucratic rule* and set aside only half an hour at each location one week before moving, the TA regarded this meeting as critical for the upcoming e-learning activity and as a *primary location for being acquainted with the internal e-learning ambitions in the unit*. As pointed to previously in this section, the TA's initiative was rejected. A number of crucial information sharing disturbances can be explained by the tension between a *global focus* on e-learning in the MAS, that the implementation can be described in advance and that all units are equal, and a *local focus* on the actual implementation of e-learning given local constraints, and is the essence of a potential quarternary contradiction between the MAS and the HRAS (arrow 3, figure 7.7). Although the TA was the one who knew the unit, her initiatives were not received with interest and engagement. Thus, the rejection and tension can be attributed also to the large span in power and status between the project leaders and the TA.

The fluctuating attendance at the information meetings indirectly manifests a tension in the rule component in the WAS, and can be evidence of a potential primary contradiction (arrow 4, figure 7.7). Attendance at the meeting was not integrated in the work schedule, and shows a conflict between the rule about profitable production, and the rule to integrate working and learning. Furthermore, the low attendance also shows a tension between profitable work (rule) and engaging in e-learning while working (object) and is the nature of a potential secondary contradiction in the WAS (arrow 5). *The learning rules did not take the local work practices into account.*

Improvisation 2 and 3

The initiatives 2 and 3 were partly a response to the frustration by the TA and a lot of employees over the poor quality of the information from the two e-learning projects, and partly a response to the top manager failing to give information to the TA as a coordinator and to the employees as the main target group for e-learning. First, the disturbances related to the information overload, lack of timely information and incorrect information, can be viewed as a tension between the complexity of developing tools (e-learning modules and LMS) and in-time-delivery, and the need for the users (TA and employees) to get clear and concise information. This tension is evidence of a quarternary contradiction, between the tools in the HRAS and the WAS and the object of the MAS (arrow 6 and 7, figure 7.7). *Correct and coordinated information to the end-users, whether they were TAs, managers or employees, was not part of the implementation plan.*

The TA's initiative to create a new web site with LMS statistics, information about delays, messages from the TA and the project leaders, links to the eRAF Help desk and other learning resources as well as e-learning relevant articles (see also section 7.2.1 initiative 5), illustrates a further conflict between the division of labour and the rules in the HRAS (arrow 8, figure 7.7). In a situation with a non-involved top manager and no explicit rules about information tasks in the e-learning plan, there was fuzziness around the division of labour; who should encourage the e-learning activity among the employees? But the initiative also reflects that the TA lacked the authority to push the other managers. The web site was *her* method to handle this fuzziness and get access to the sub-units. The tension also shows that the e-learning plan underestimated the complexity and the importance of the TA role.

Improvisation 4

The TA's proposal, to enhance the e-learning activity with classroom-based courses, was made shortly after moving to Fornebu. As soon as she found out that there were many TBS employees who did not understand the technical instructions given on the web, how to log into the LMS, how to order an e-learning module, what button to press etc., she contacted the e-learning project leader and asked him to arrange a first-aid course for e-learning. These disturbances point to tensions between the expected technological abilities of the employees and their actual abilities, and were associated with quarternary contradictions between the tool producing system, MAS, and the WAS (arrow 9, figure 7.7). These tensions *again illustrate*

the global-local conflict between the project groups who think that one size fits all, and the TA, who had to deal with a lot of practical problems to implement e-learning in her unit.

Related work

Based on a similar tradition, Virkkunen and Pihlaja (2004) argue that information exchange should be tailored to the particular production system. With Victor and Boynton (1998) as a backdrop, I claim that there is not one ‘correct’ way for learning and communication; different approaches should be applied for different types of work organizations. This view represents a noticeable break with most of the corporate e-learning literature (e.g., Cross & Dublin, 2002; Rosenberg, 2001). In contrast to Virkkunen, this literature focuses on information more generally, independent of context. When information exchange is in focus, the various target groups are not taken into account. For instance, Rosenberg claims “It’s best if you can establish an enterprise [communication] strategy” (Rosenberg, 2001, p. 197). The information exchange (digital and face-to-face) is nevertheless regarded as a critical part of the implementation process, both as a means to communicate and develop understanding for the change, to establish a shared vision, and to enable two-way-communication and dialogue (Cross & Dublin, 2002; Hodgins, 2002; Rosenberg, 2001; van Dam, 2004). For example, Cross and Dublin (2002) say “Communication is the starting point for engaging your people and gaining their commitment to the change to e-learning” (p. 41). For Rosenberg (2001) communication (in the meaning of positioning e-learning’s value) is counted as one of the four C’s (in addition to champions, culture and change) that might contribute to e-learning success in the workplace. This view is confirmed by my findings; *information is crucial and exchange of information should not be underestimated in the implementation process*. Hence, it is interesting that the educational e-learning literature seldom mentions this aspect. Indeed this literature refers to the importance of a ‘shared understanding’ (Collis & Moonen, 2001; Salmon, 2003), but mainly to achieve online socialization and collaboration and not as a basis for a successful implementation. Not even Collis and Moonen (2001) pay much attention to the benefits of information exchange, despite heavy argument for the importance of creating a strategic plan – the process of marketing this plan and the communication of its content to different user groups is hardly mentioned (Collis & Moonen, 2001).

To achieve a shared understanding of the new learning initiative, most of the management based e-learning literature recommends applying tools, models and language known from consumer marketing and promotion (Cross & Dublin, 2002; Moshinskie, 2002). A few

authors give more explicit advice on how and when the different tools should be applied. One of those is van Dam (2004). He suggests utilizing existent communication channels as far as possible, and giving the management level an opportunity for training. Reed and Oelze (2001) argue instead for training the coaches and system administrators, especially in the pre-implementation phase. They also give more explicit advice for what information should be communicated during training and recommend focusing on the implementation process, the new roles and the critical part the different actors play in the implementation. None of the authors, however, argue for targeted meetings or targeted training for different types of end-users, as proposed in the previous section. Nor is the use of manager-led workshops for employees recommended. Hasu's (2001) study of implementations of technological innovations advises the use of workshops as a tool in the adoption phase. The aim is to take care of meta-reflection, communication and collaboration, mainly to enable 'the emergence of a shared object' among the involved parties (Hasu, 2001, p. 16).

According to the management based e-learning literature, the requirement for information exchange is not only a part of the pre-implementation phase; the need continues to exist during the whole implementation process. For instance, much of the literature (Edmonds, 2004; Moshinskie, 2002; Rosenberg, 2001) recommends creating a web based top-level gateway to success histories as well as all learning resources and e-learning databases. Rosenberg (2001) refers to this decision as "one of the biggest political and cultural hurdles you will face" (Rosenberg, 2001, p. 107). He even claims that the inability to manage critical information might be *a major barrier* to a successful implementation. Any argument for why such a portal should be enterprise wide, however, is missing. Instead it is stressed that the communicators have to be credible, that the information is timely and truthful, and that consistency between messages, actions and company initiatives is imperative (Cross & Dublin, 2002; Rosenberg, 2001). This is confirmed by my second finding that stresses a strong need for a shared, updated e-learning site. Furthermore, this view indirectly supports my argument for a clear division of tasks between the different distributors of digital information, but with a mutual responsibility to avoid inconsistent and duplicated information.

Section summary

In contrast to much of the educational literature, the workplace e-learning literature is dominated by a view of information exchange as critical both before and during the implementation

process. This view is confirmed by my findings. Less emphasis is placed on tailoring the information towards specific user groups or specific types of production in accordance with Virkkunen and Pihlaja (2004) and Victor and Boynton (1998). Nor does this literature point, as Hasu (2001) does, to the importance of creating arenas where people can be prepared for meta-reflection and communication, and where a shared object can be developed. Interestingly, these latter points of view have been supported by the activity-theoretical discussion.

The identification of underlying tensions *within* and *between* the HRAS (the central activity system), the WAS (the object activity system), the MAS and the IAS has uncovered the following critical factors:

- *A centralized belief in a standardized information and communication strategy without regard to specific target groups, local conditions and other contextual factors*
- *A lack of focus on information as a critical element in the local implementations, and an underestimation of a persistent need for a shared understanding and one access point to updated information*
- *A poor division of labour between central and local level in the introduction part in the implementation process*
- *A lack of attention towards existent work practices and work rules and the need to prepare for integration and work, and*
- *A lack of understanding of the TA role*

As a whole these identified fields of tensions reflect a missing organizational understanding for seeing an implementation as “a collective endeavour involving developmental transitions” (Hasu, 2001, p. 37).

In accordance with Hasu’s arguments for developing collaborative relationships and a shared understanding as part of these transitions, I claim that communication and reflective meta-cognition are also important elements for mastering the various critical transitions that an e-learning implementation comprises. To achieve this object, I suggest that tertiary artefacts should be taken into use, for instance, in the form of targeted meetings/workshops for the different user groups. I further argue that a standardized information approach without any involvement of local knowledge is insufficient, both in the pre-implementation and in the adoption phase. More targeted information for different user groups seems to be necessary in order to establish a common understanding for organizational e-learning ambitions and the

expectations for different roles. I also recommend that an easy accessible e-learning site with consistent, timely, truthful and user centred information should be available when the implementation starts. This presupposes, however, not only a clear division of information tasks and responsibilities already from the beginning, but also a collective approach to information as a common resource, collaborative relationships between those engaged in the implementation, and a dedicated person responsible for taking a holistic view on the information exchange into account.

7.2.4 Relevance to work and previous knowledge

This section looks at relevance to work and previous knowledge. The interviews illustrate a large span in opinions about why some e-learning modules were not started, others started but not finished, and yet others finished. It was often mentioned that the modules, or parts of them, were not of interest, did not have any connection to daily work, or were too basic in relation to the end-user's previous knowledge, competence or experience. Sometimes the modules were referred to only as 'too simple', 'too detailed' or even 'dull', without any further specifications. The concept 'relevance', defined in the Merriam Webster Online Dictionary ⁶⁹ as 'the ability ... to retrieve material that satisfies the needs of the user' and 'relation to the matter at hand', will be used as a collective term for these explanations. This type of disturbance was not only referred to by employees, but also reported by the TAs. Since the issue was mentioned in most of the TBS interviews, this business area provides the main context for the discussion. The issue of relevance was, however, visible in all four business areas. The category is, for short, referred to as 'Relevance'.

The e-learning modules were primarily assessed as not relevant for three reasons. First, *the content was not necessary for carrying out existing or future job tasks*, as highlighted by excerpt 10:

Excerpt 10:

eBuilding [The eBuilding module] is not relevant for me when I don't need to book a meeting/conference room in my job.

⁶⁹ <http://search.eb.com/dictionary?va=relevance&query=relevance> access date 01.04.2005

As a consequence of this and similar employee reactions, the TA asked the leader of the e-learning project to reduce the number of compulsory modules. This was rejected by the e-learning project team; all TBS employees were expected to complete the eight modules. This resulted in a lot of complaints, mostly because some of the modules were assessed as not work relevant. This perception was frequently confirmed by the TA; the actual person would in the near future not need the topical competence. The fact that some of the modules focused on technologically advanced issues and were filled with functionality that not was felt as personally required, contributed even further to the employee's feeling of its irrelevance to work. This reaction was first of all found by employees with rather specialized and strictly defined work tasks (e.g., accounting staff and operating staff).

Second, *the content was directed to technology that would not be part of the employee's future working environment*. For example, since the Telephony module was compulsory, all employees had to learn about IP telephony even if their unit had decided not to use this technology. While some employees adhered to the strict rule and completed eight compulsory modules, a lot of individuals, either on their own or encouraged by the TA, decided to skip irrelevant modules, or some irrelevant sequences. These short cuts led, however, to lower individual logging rates, and, as a consequence, lower completion rates in the business area.

Third, *the employee possessed in advance (parts of) the knowledge that was incorporated in the e-learning module*, as explained in excerpt 11.

Excerpt 11:

[I] did not learn anything new [in the telephone module]...[because I] have had both SMS and fax through Outlook as a pilot-user. When you are already familiar with mobile telephones, you know how to use a mobile answering service.

This type of irrelevance appeared, to a large extent, among technologically advanced and well educated users. In some cases the whole module was irrelevant, sometimes only smaller parts. The e-learning rules were, however, absolute. Even when the employee had served as a pilot user of the ICT system or the technology that the module contained, or he had achieved the same type of competence by practical use of the equipment (e.g. the multifunction machine), deviations from the rules were not accepted.

The three types of irrelevance had a negative effect on many of the employees, reduced their motivation, and made them give up the whole, or parts of, the module.

Observations in the other business areas

Similar problems existed also in TM, but the number of complaints was essentially lower and mainly restricted to the first and third problem. However, in contrast to TBS, where the first type of work irrelevance primarily was mentioned by employees with specialized work tasks, in TM this aspect was also brought up by some of the senior consultants. Their complaints were mainly related to the two optional soft skill modules ‘Self Management’ and ‘Vision’, which they referred to as waste, banal and pathetic. Furthermore, a few senior consultants criticized some passages in the compulsory modules, and described the passages as unnecessary. As the content of the compulsory modules in general was assessed as too familiar and plain, the modules were often referred to as ‘survival skills’ and some consultants skipped them. Others did not carry out the modules and used them instead as a reference book. Despite these complaints, the majority of the TM staff carried out the modules as prescribed, and some referred to them both as practical and time saving.

Relevance disturbances showed up in TP in two different contexts. First, they appeared in the Customer Service (CS) unit, where most of the staff skipped the compulsory modules as they were not relevant to their work. Second, complaints about lack of relevance to previous knowledge arose in the technical staff (e.g., the ICT staff), mostly in the form of negative comments (e.g. redundant information, basic, slow and too detailed modules). It should be noted that the TA often confirmed these personal perceptions of irrelevance.

In TN, some employees also experienced the lack of relevance to work as problematic. The complaints came mainly from the operational staff. The frustration was high, not least among the monitoring staff, who found it difficult to combine the e-learning activity with daily work. The attitude to e-learning among operative senior consultants was far more reflective, as illustrated in excerpt 12.

Excerpt 12:

There were some topics in each of them which were somehow very relevant – not one [module] then, but parts of the different modules – I don’t remember which of them [compulsory modules which were the most relevant], but I mean I remember that there were essential parts, good to have acquired, in each of the product-packs... [They were not irrelevant].

Although some of the modules describing the new technology were referred to as boring and not necessary among senior consultants and large parts of the operative staff, the hard skills modules were more or less deemed as relevant. As in TM, however, the two soft skill modules were mostly assessed as of little use.

The empirical data shows that the individuals and units in Telenor reacted very differently to the relevance discrepancy. In some groups or units this led to a standstill in the e-learning activity. In other groups the result was a temporary halt, and in yet others only a few complaints came after the module was completed.

An activity-theoretical discussion

For the discussion of potential contradictions underlying the relevance of work and previous experience disturbances, the network of activity systems depicted in figure 7.8 is used. The figure is a detailed version of figure 7.1 and again related to TBS. In contrast to the three previous disturbances that have been discussed, the relevance disturbances were connected to all four activity systems. Compared to figure 7.1, the Work Activity System (WAS) is expanded with the three new tools ‘Previous experience and knowledge’, ‘Job description’ and ‘Technological environment’, and the Human Resources Activity System (HRAS) tools with the e-learning project mandate, telling the TA to give “the right learning to the right people at the right time and in the right way”. Since this kind of disturbance first and foremost affected the daily work among *senior consultants, specialized workers and operating staff*, it is the WAS that will be the departure point in this section. The activity system will be studied from the perspective of the three mentioned groups.

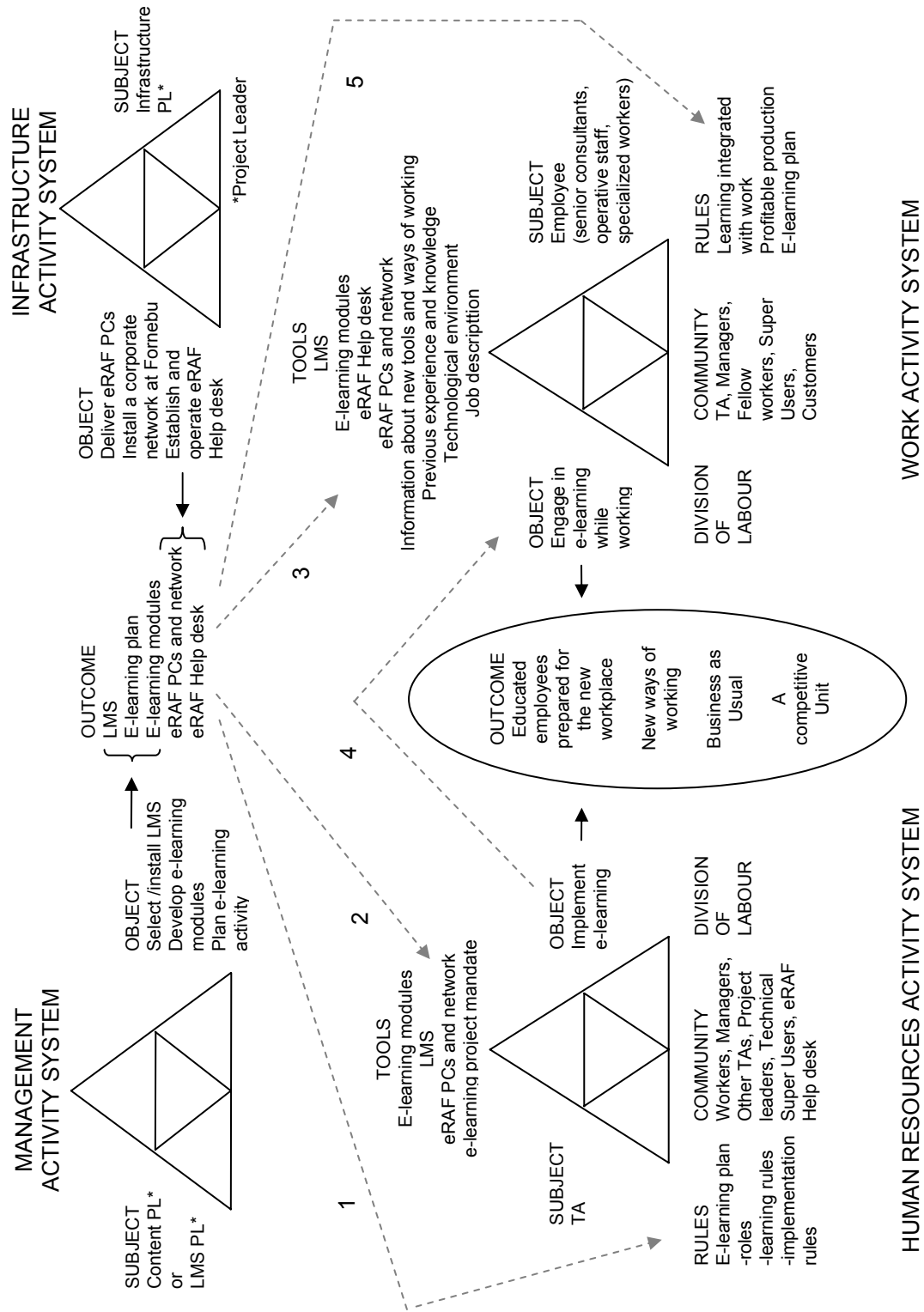


Figure 7.8: Activity systems related to the relevance to work and previous knowledge category

The TA made four improvisations to deal with the disturbances in this category:

1. She asked the project group to make only four modules compulsory
2. She permitted employees to drop some of the modules (or parts of the modules) because they were assessed as irrelevant to their work
3. She permitted employees to skip irrelevant sequences of some modules because the described equipment was not installed in the unit
4. She permitted some of the employees to skip irrelevant sequences in some modules because the employees already possessed the actual knowledge

It should be underlined that the three permissions (improvisations 2, 3 and 4) never were published on the intranet or distributed by e-mail to the end-users. The improvisations were to a large degree a result of a concrete context, and came at first into being in a concrete meeting between the TA and the employee. A description of the relevance to work and previous experience disturbances as potential representatives of the underlying contradictions is given in figure 7.9.

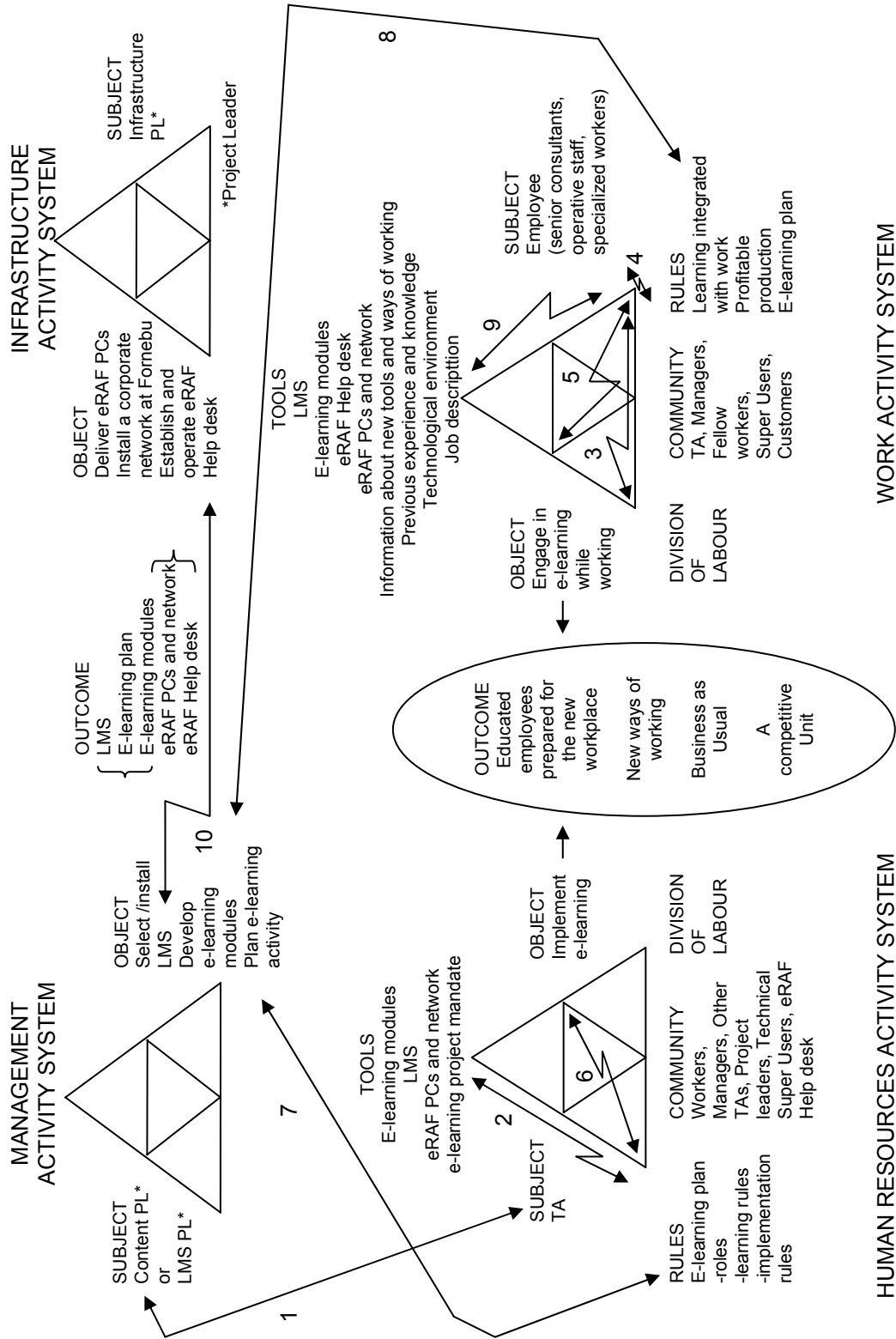


Figure 7.9: Tensions underlying relevance to work and previous knowledge disturbances

Improvisation 1

The TA's inquiry, to reduce the number of compulsory modules in the unit, and the e-learning project group's rejection of this request, points to a tension and a potential quaternary contradiction between the subjects in the HRAS and the MAS (arrow 1, figure 7.9). The tension illustrates a conflict between a project leader with a *global focus*, governed by a rule to give the same learning to all employees, and a TA with a *local focus*, who experienced that a common knowledge base was not required among all employees in the unit. The TA's initiative points further to a tension between the e-learning project mandate, saying that the right learning should be given to the right people at the right time and in the right way, and the rules given in the e-learning plan, forcing all employees to carry out the same learning at the same time (within one week after moving⁷⁰) and in the same way. This conflict shows the nature of a potential secondary contradiction in the rules-tools relation in the HRAS (arrow 2, figure 7.9). *The e-learning idea embedded in the project mandate* ((created by the eRAF project and handed over to the e-learning project)), *represented a break with the rules in the e-learning plan* (created by the Content project) (see also chapter 6).

Improvisation 2

This improvisation points to an inherent tension between the rules and the division of labour (e.g. the job description) in the WAS, and is evidence of a potential secondary contradiction in this activity system (arrow 3, figure 7.9). Bedlam arose mainly among employees with rather specialized or restricted work tasks, who experienced that the *old division of labour* to a large extent was maintained without utilizing the new technology or new ways of working (see excerpt 10). Despite this, there were e-learning rules saying that all employees should learn to handle all new resources whether the resources were needed or not. The improvisation further points to a tension (and a potential primary contradiction) in the rules components in the WAS (arrow 4, figure 7.9). From the employee perspective, there was a conflict between the current working rules that focused on doing business as usual, and the e-learning rules, instructing the employees to complete all compulsory modules although the content was regarded as irrelevant and the workload in advance was heavy. In addition, the disturbances in this category indicate a tension in the WAS between rules telling the employees to carry out work and be profitable, and the object, to integrate e-learning and

⁷⁰ As mentioned earlier in this dissertation, the expression "a few days after relocation" was also used.

work (arrow 5, figure 7.9). This kind of integration was rare. *Altogether, the tensions illuminate how difficult transformation of work really is. Rules that could have contributed to such a transformation were, however, fully absent in the implementation of e-learning in Telenor.*

The many requests about skipping work irrelevant modules, resulted in a lot of breaks in the TA's work, and point to a further tension between the rules and object in the HRAS (arrow 6, figure 7.9). From her perspective, the absolute and strict rules were not possible to follow if the employees' positive attitude to e-learning were to be maintained. The disturbances also point to a tension and a potential quaternary contradiction between the rules components in the HRAS and the WAS and the object of the MAS (arrows 7 and 8 respectively, figure 7.9). While the MAS produced rules that should ensure that all employees were able to handle the new tools and the new ways of working, the WAS and the HAS instead would have required rules that one should educate the employees in work relevant tools and ways of working.

Improvisation 3

The many questions from employees who wanted to skip sequences about tools that were not present in the unit (e.g., IP telephony and laptops), indicate a tension and a potential secondary contradiction in the rules-tools relation in the WAS (arrow 9, figure 7.9). This tension was indirectly a consequence of the decision that the e-learning success should be measured as the number of completed modules. And because, according to the approval rules, at least 80% (some of them even 100%) of the modules had to be completed, even modules containing sequences describing technology (or equipment) that was not installed in the working environment, were expected to be completed. This led to much annoyance at employee level. *The tension is a brilliant illustration of how the decision about how to measure the e-learning success (as in Telenor by e-learning and approval rules), directly influences the implementation, and can lead to a displacement of the original implementation object.* The requests further point to tensions in the rules component in the WAS (arrow 4, figure 7.9), manifested as a conflict between the current working rules, focusing on doing business as usual, and the given e-learning rules, instructing the employees to complete all (or nearly all) sequences, despite the content being completely irrelevant to the whole unit. This situation again elicited a tension in the rules-object relation in the WAS (arrow 5, figure 7.9),

this time, however, between an object aiming to integrate work and learning, and *rules forcing the employees to do e-learning 'just in case'*⁷¹.

The disturbances also elicited tensions between the rules and the object in the HRAS (arrow 6, figure 7.9). From the TA's perspective, there was an imbalance between the complex object and the given rules, which fully ignored the choice given to the units between stationary PCs and laptops, fixed lines and IP telephony, etc. This tension manifests a deeper-lying tension between the objects in the two rules and tools producing activity systems, the MAS and the IAS (arrow 10, figure 7.9). When the e-learning project team made the approval rules, it did not take into account that, through the infrastructure project, not all units chose to install all the new tools that were at their disposal, i.e. the infrastructure was not standard across units. *The fragmented division of labour at project level, together with the lack of collaboration between the project team and the main units, resulted in rules that made the embedded flexible navigation in the e-learning modules nearly redundant and useless for the end-users.*

Improvisation 4

The many employee requests to skip (parts of) the modules because the content was already well-known (see excerpt 11), again point to a tension and a potential secondary contradiction between the tools and rules in the WAS (arrow 9, figure 7.9). This tension was first and foremost related to employees, who, because of their experiences as pilot users, their previous education and/or their earlier work practices, *were already acquainted with the new technology and new ways of working* (e.g., project work, PCs) (see figure 7.9 'previous experience and knowledge'). Not unexpectedly, this kind of competence and experience was found among the senior consultants. As in improvisation 3, the requests also point to a potential primary contradiction in the rules component in the WAS (arrow 4, figure 7.9) as well as a potential secondary contradiction between the rules and object (arrow 5, figure 7.9), this time, however, because of a conflict between working rules focusing heavily on the bottom line, and an object of having the employees integrate learning in work, without taking into account the previous knowledge of the employee.

The disturbances caused by irrelevance to previous knowledge led to extra work for the TA, who either had to make time-consuming manual registrations in the LMS, or had to accept

⁷¹ This type of learning is a linear and structured approach that aims to foster a broad portfolio of knowledge and continuity among related skills. It is usually viewed as a contrast to 'just-in-time' learning (recall chapter 2).

that the LMS-reports contained low completion rates and that the implementation thus was regarded as only partially successful. This conflict illustrates a tension between the rules and object in the HRAS (arrow 6, figure 7.9). The TA was expected to recommend the employees carry out the modules and fulfil the object to implement e-learning, even if they already possessed the knowledge. Even those who had created the modules and/or contributed to the content and/or made the story board had to complete the modules. The disturbances again illustrate a quaternary contradiction between the object in the MAS, having a global focus when the rules were produced, and the HRAS and the WAS (arrows 7 and 8 respectively, figure 7.9), *which both would have needed more flexible rules to reach the ambitious object, for instance rules in accordance with the e-learning idea in the project mandate, the right learning to the right people at the right time and in the right way.*

Due to the many tensions identified in this section, the e-learning modules never became a tool for improving existing work practices in this unit. In contrast, the modules were rather frequently regarded as a bureaucratic rule, or an administrative demand from above. The many disturbances in the relevance to work and previous knowledge category in the WAS and in the HRAS strengthened this view, at least among some senior consultants, many of the operators, and among the employees with rather restricted and specialized work tasks. Such a displacement or ambiguity between the rule and the tool is, according to Engestrøm (1990a), not uncommon. He claims:

“To the contrary, it is typical to forms and administrative procedures in a variety of settings. This displacement is not just a subjective failure to grasp the tool. It is a built-in feature of the system” (p. 179f).

I will return to this aspect in chapter 10.

Related work

In the corporate e-learning literature, ‘relevance to previous knowledge’ is seldom taken into account when e-learning implementations in the workplace are discussed. One of the few who focuses on this aspect is Rosenberg (2001). In his list of eleven reasons for why computer-based training does not work, he argues for giving people an opportunity for skipping material that they already know; or, in own words ‘one size didn’t fit all’. He refers to Cisco to support this view. After having reinvented their training organization, the firm gave up the completion requirement. Now, “it [Cisco] simply requires that people demonstrate

competence”(Rosenberg, 2001, p. 254). These views indirectly confirm my finding; when e-learning rules are defined, previous knowledge should be considered.

As presented in chapter 5, Virkkunen and Pihlaja (2004) argue for aligning the learning system with the production system. Such a tight connection between work and learning is not reflected in the workplace e-learning literature (see chapter 2). However, statements about ‘relevance to work’ exist, most of them related to the design phase, fewer to the implementation process. Common for most of these statements is that work context (e.g., type of work, type of function or type of business) is poorly specified. The recommendations are also seldom based on empirical research. The next paragraphs give a brief overview of how this literature elaborates on this dimension.

The arguments for taking work relevance into account in the design and production phase vary among the different authors. For example Schank (2002 p. 201) argues that this ‘motivates learners to try hard’, and Clark and Mayer (2003) that this contributes to avoid transfer failures in learning, to achieve changes in job performance and to desire an increased return on investment. Although the motive is most frequently driven by business needs and is not about individual development, work relevant content is indirectly seen as a means to achieve a successful implementation. To achieve this goal, the following design elements are recommended: design of practice exercises in a realistic job context; interactions that mirror the thinking processes and environment on the job (Clark & Mayer, 2003); realistic tasks (Schank, 2002); a tight coupling of learning goals, content and daily work tasks (Dahl & Rolfsen, 2005); and an emphasis on relevant information or content (Tabbers et al., 2004). Svensson (2004) has a more balanced view. Dependent on the intended scope and purpose of the educational initiative and the needs in the organization, two criteria should be decisive for the design, first, whether the learner should be socialized into existing practice or participate in negotiation and change of practice, and second, whether the course is intra- or inter-disciplinary in nature. When the aim is to plan and develop education for the unknown future, he therefore recommends developing course packages that can serve the role of initiating a discussion on how practice is affected by the changing conditions.

Parts of the e-learning literature regard work relevance as critical also in the adoption phase. Both Cross and Dublin (2002) and Collis and Moonen (2001) underline its importance, not least in the selling phase. E-learning must be relevant to the employees’ needs. One way of doing this is by embedding e-learning into work and making it an integrated part of the

employees' daily routines, tightly connected to daily work tasks. By doing this, the performance improvement for both the individual and the business will be significant and sustainable (Cross & Dublin, 2002; Rosenberg, 2001). Similar arguments are also given by Simmons (2002) and Green (2001). Green even claims that *work relevance is one of five success factors in the implementation of corporate e-learning*. Rosenberg (2001) supports this view, and in his eleven point list of why most CBT⁷² doesn't work he claims: First, 'the content wasn't any good' (e.g., inappropriate for the audience or for the purpose) and second, 'the learning wasn't authentic' (e.g., the learning programs did not reflect what the people's jobs were really like so that identification was possible) (Rosenberg, 2001, p. 41ff). A similar focus on content is found in the Forum study (Simmons, 2002), which identified the 'quality of learning content' as the fourth of seven barriers to adoption of e-learning at work. A focus on sustainability is far less frequent. One of the few authors who points to work relevance as a critical factor in this phase is Rosenberg (2001).

A relevant and important observation is made by Collis and Moonen (2001). Although they strongly recommend that the employees' personal needs should be used as the departure point for the e-learning activity, they admit that this might be difficult. The reason for this view is that much of the motivation for flexible learning is coming from pressures on the institution to respond to new conditions in the market. The degree to which this aspect might reduce the importance of work relevance as a critical factor in the future, or if it increases the importance of other factors in the adoption phase, is not elaborated (Collis & Moonen, 2001 p. 55).

Section summary

Only seldom is it discussed in the workplace e-learning literature whether and how 'relevant pre-competence' or 'relevant previous knowledge' should be treated when e-learning is implemented in the workplace. Flexible learning is frequently used as a slogan, but more practical advice is difficult to find. When discussed in this literature, the focus is placed on 'relevance to work', and is often viewed as important both in the design and adoption phases. Empirical data, however, is rather limited. References to the effect of relevance on sustainability indeed exist, but are far rarer. A closer discussion of the substance of the concept, however, is missing. Nor is it discussed how this aspect should be manifested in concrete e-learning modules and concrete implementation rules in large enterprises.

⁷² CBT means Computer Based Training.

With an activity-theoretical analysis as a basis, three critical factors have been identified:

- *An underlying assumption that learning should be standardized, compulsory and measurable by completion rates*
- *A lack of ability and/or prioritizing at management level to transform present work in accordance with the opportunities embedded in the new tools, and*
- *Implementation of learning rules and technology that undermined the embedded opportunities for flexibility and relevance in the modules and in the e-learning project mandate*

The impact of the learning view represented in the first and the third item was that the e-learning modules never became the prescribed tool to improve existing work practices. This was the case both at employee level and at management level. For instance, the management in TBS only, to a small extent, managed to use the e-learning tools and the embedded descriptions of an advanced use of the new technology as a sort of tertiary artefact, as objects of ‘imaginative instruction’ (Engeström, 1987). In this business area the modules were not thought of as a playground for restructuring of practices, identities and rules (Ponti & Ryberg, 2004). Two of the business areas (TP and TN) partially managed this transformation of the e-learning modules from secondary artefacts into tertiary artefacts. To some degree these units utilized the opportunities described in the e-learning modules as a tool for transforming existing capabilities into new ones, and thereby had a vehicle for change.

7.3 Summary

Using Cooper and Zmud’s terminology, the activity-theoretical discussions in this chapter have uncovered that many of the problems in the stages of adaptation and the first part of acceptance were the result of choices made in the two previous stages in the implementation process – the stage of initiation and the stage of adoption (see section 2.3.3). With the section summaries as a backdrop, the following factors should be given account when e-learning is implemented in a large, multilevel and heterogeneous organization integrated with work:

- A comprehensive implementation plan that gives attention to the complexity of the e-learning technology, the underlying infrastructure and the large span in local conditions and other contextual factors
- Central and local mandates that make clear the key roles in the implementation and the division of implementation tasks and provide the means of a shared understanding of responsibilities, for a shared object, and collaboration and communication across and within the different organizational levels
- A multi-level and targeted information strategy that aims to build a common understanding of the short-term and long-term goals of the implementation
- Alertness to local work and learning traditions combined with a continuous focus on transforming current work in accordance with the opportunities embedded in the new learning tools

Together these items point to the necessity of less standardization and for an implementation plan that opens up for local adaptation and individual flexibility while maintaining one common organizational goal. By focusing on these issues during the early stages in the implementation process, the organization will most probably reduce the level of disturbances when e-learning is introduced and adopted at end-user level.

7.4 Conclusion

This chapter illustrates that the challenges in the stages of adaptation and acceptance are great. Six categories of problems appeared to be problematic in this case: *the hardware and software resources; the execution of implementation tasks; the information sharing; the relevance to work and previous knowledge; the allocation of time; and, management control.* These categories of problems slowed down or hindered the e-learning adoption in large parts of the Telenor organization. Looking at the categories of problems as representations of types of disturbances, the activity-theoretical discussion above has identified the causes of these disturbances. As it appears in sections 7.2.1 -7.2.4, the adaptation of the implementation plan to the local work environment is crucial. In addition to *the involvement of management at all levels, a detailed local planning, targeted information and the way the TAs played their role and carried out their work, turned out to be critical for the e-learning success in two of the four units (TP and TN).* These factors are further discussed in chapter 8 (with respect to the

exploitation phase) and in chapter 10. However, the fact that one of the units (TM), despite a lack of management involvement, local planning, TA support and top manager control, managed to achieve equally high completion rates as the two mentioned units, indicates that these factors are not absolutely paramount. Explanatory factors for a successful e-learning result in this unit, were, emphasised and included, *the tradition for giving the employees responsibility for their own learning, the unit's focus on collegial support, and the individual competence and interest in technology.*

These findings indicate that the connection between critical factors and an engagement in e-learning, measured in the form of completion rates in the LMS, is more complex than recognized in the workplace e-learning literature. Based on the discussion in this chapter, I claim that an enterprise-wide implementation of e-learning should be open for adapting the local implementation processes to the work environment, learning culture and individual and collective competences in the different units. The same level of support, control, coordination etc. is not required everywhere and means 'overkill'. Instead, the implementation resources should be allocated to the units where they are most needed. A common feature across the four units was, however, that more general knowledge (often referred to as 'soft skills') is difficult to "distribute" via an LMS without any opportunities for collaboration. Only when the modules were introduced or carried out in plenary sessions in the unit/sub-unit, they were completed by most of the employees (see also figure 4.10). This study suggests that this type of content (a sort of tertiary artefacts), e.g., about new visions and more independent ways of working, should be combined with meetings, workshops and other forms of collaborative situations in order to achieve a shared understanding.

The deviations between the findings in the two units TP and TN, and the unit TM, indirectly support the chosen research design. When the recommendations in the case literature had been followed and the study restricted to the two 'most similar' or 'most dissimilar' units (see chapter 5), the compensating factors, like those found in TM, would still have been hidden.

CHAPTER 8

Expansion and contraction of e-learning activity

It is a mistake to believe that implementation of new technology and new learning initiatives by themselves facilitate organizational learning (Hasu, 2001; Rosenberg, 2001, 2006; Voss, 1988). Indeed, barriers and success factors for this kind of implementation have been identified (see chapter 2), but to make e-learning stick and make it contribute to long-lasting changes, seems to be difficult (Attwell, 2004a). Research also shows that the broader, long-term effects are demanding to assess (e.g., when and what) (Gilley & Maycunich, 2000; Horton, 2001a). Using Cooper and Zmud's terminology (see chapter 2) on adoption and use of technology, the main focus of the e-learning literature until now has been on the stages of adaptation and acceptance, at the expense of the stages of routinization and infusion. These latter stages, where the aim is to encourage e-learning as a normal activity or even support higher level aspects of organizational work, are also challenging, and for Telenor it was no exception. This chapter describes the development of e-learning from the closing of the e-learning project in 2002 and up to 2005. The analysis is based on LMS data as well as follow-up interviews with previous, as well as current key actors.

From the beginning, Telenor's idea was to hand over the responsibility of e-learning to the local level immediately after the initial implementation. However, in fear that the focus on e-learning would fade away so that the large investment would be in vain, Telenor decided to launch a one-year exploitation project (Learn@Telenor). Its aim was to support the business areas in identification and specification of its learning needs, and to provide assistance in the development of new modules to support them. This project began in June 2002, a point in time when there was a global recession in the telecom industry. Fornebu was also hit by this recession. The result was a following restructuring as well as cost and workforce reductions. It was in this realm that learning needs had to be defined and new development tools had to be implemented and put into use. The task to lead this initiative was given to people who never,

or to a small extent, had done this before. The challenge was to learn an activity that was not yet there and had to be constructed. In many ways this learning might be regarded as the first step in what Engeström (1987) refers to as 'learning by expansion', or learning that produces culturally new patterns of learning and work activity (Engeström, 2001). It should be noted that I use an enhanced definition of the concept, which includes vertical, horizontal, as well as inter-organizational learning (Engeström, 1996, 2000b, 2001, 2005; Engeström et al., 1995). This means that learning is not only viewed in terms of the stages a person passes as he/she becomes more expert in a specific domain (vertical), but also in terms of crossing fields (horizontal) as well as disciplinary and organizational boundaries (inter-organizational) in order to collaborate and develop new types of competence and work (see chapter 3).

The trajectory of e-learning in Telenor from 2002 to 2005 did not just represent an expansion towards vertical or sideways movement. In some units e-learning faded totally, either immediately after the relocation phase, or shortly after a small number of course modules (one or two) had been developed. Looking at the organization as a whole, the spreading and further development can be described more accurately by the following three categories of exploitation:

- Integration – technological, organizational and pedagogical
- Spin-offs – new applications & new user groups
- Contraction of e-learning activities

While the two first categories include both vertical and horizontal learning, the third represents a rather different type of change. Engeström (2000b) has acknowledged a similar trend, which he referred to as 'negation of the old' and 'partially destructive rejection'. Engeström, as far as I know, has only identified this type of development by groups of individuals in private contexts, and not, as in this study, by organizational units as a collective activity. He further views the phenomenon as the first decisive indication of a significant developmental process. Sections 8.1 to 8.3 describe the three categories of exploitation, and this is followed by a general discussion (section 8.4) and concluding remarks (section 8.5).

The most frequently used sources to explain factors contributing to the sustainability in the implementation process can be found in the traditional e-learning and management literature (e.g., Collis & Moonen, 2001; Kanstrup, 2004; Lee & Krayner, 2003; Rosenberg, 2001; van Dam, 2004). This literature is, to a large extent, characterized by lists of more or less commonly

accepted success factors and barriers, based on a view that e-learning implementation is a homogenous process. An interesting approach to the field, from my point of view, is represented by Hasu's (2001) study of technological innovations. Looking at e-learning as a technological innovation, one can therefore argue that the exploitation not only depends on factors described in the e-learning literature, but will be constructed as a result of the organization's history, its ongoing activities and challenges, and the different critical transitions to which this part of the implementation of e-learning is exposed (see chapter 6). Another approach to the exploitation can be deduced from Virkkunen and Pihlaja's (2004) hypothesis that different learning systems are required to *develop* and *maintain* different modes of production. Section 8.4 explores this hypothesis, in order to analyse whether the expansion of e-learning depended on the degree to which the new e-learning initiative matched the unit's specific learning needs and production modes, or not. The same section discusses three further aspects, which from my point of view seem to be important for the outcome of the exploitation: the financial situation in the adopter organization; the role of the Exploitation Coordinator; and, anchoring.

8.1 Integration

Three types of integration activities took place after the initial implementation, all unplanned and without any assistance from the exploitation project. They were:

- Technical
- Organizational, and
- Pedagogical

The first type is referred to as *technical integration*. This took place in the mobile Customer Support (CS) division, a unit that since 1996 had desired a system for course administration of its ICT based courses. As the TA put it:

Excerpt 13:

They [mobile customer support] have indeed used it [e-learning], but what has been lacking is to see who has completed. Right now, [with the LMS] we have gotten a new dimension.

The launch of the new learning platform gave them this opportunity. Thus, an important goal became to integrate all current and future customer support (CS) modules with the LMS. In this way TM wanted to ensure that all learner profiles in the business area were automatically updated, learner statistics were available, control was executable, and that all CS-modules were made accessible for the rest of the organization. This is a brilliant illustration of Guribye's (2005) concept of 'rationality of control'. It was not the LMS, as a pedagogical device, that made the new learning platform interesting, but exclusively the broadened opportunities for managerial control, far beyond the manual control that had been performed by the team leaders. From 2002 to 2005 nearly twenty CS-modules had been delivered via this platform. The majority of the new CS-modules, however, were not included in the LMS. This was partly because the product related content was seldom relevant beyond a few months, partly because most of the modules were carried out in tight connection with the team leader, and partly because the preparation for the LMS⁷³ would have led to increased programming costs. Furthermore, the LMS was assessed as a rather complicated interface. Hence only the more permanent modules, such as competence tests, certification tests and support for ICT systems were integrated in the new LMS. A corresponding technical integration did not take place in the Customer Support division in TP, because this unit already had a learning platform.

The second type of integration can be labelled *organizational integration*. Although an idea about a broader use of the LMS may have underlain the introduction of a learning platform already from the beginning, the first manifestation of this idea emerged in the last part of the e-learning project (in 2002). As the leader of the Human Resource staff at company level said:

Excerpt 14:

...and what we [the management group] have done, or are about to do, is to take SABA LMS as a common platform and then put together the numerous processes and people etc., 'process and people' and that sort of thing – and we will call the whole concept Learn@Telenor [L@T] ... where L@T is Telenor's common platform for all learning, not just e-learning, not just netbased learning; it should be a common platform for every type of learning.

Thus the LMS changed from being a platform for e-learning to an arena for all types of learning (i.e., individual and organizational). Both internal classroom courses and external

⁷³ To be used as part of the LMS, the e-learning modules had to be developed according to the standard AICC ((Aviation Industry CBT (Computer-Based Training) Committee)), see <http://www.aicc.org/> date 1.2.2007.

education programmes were integrated. This broadened use of the LMS can be viewed from three different perspectives. First, it might be viewed as an effort to monitor and control the training, and indirectly also the employees, as argued for by Guribye (2005). Second, the enhanced application of the LMS might be seen as a trial to control personnel related costs (Nordhaug, 1993b). The integration made possible a coordination of the supply of courses, a more selective selection of vendors and, as a result, a reduction of course prices. From a third perspective, the widened utilization of the LMS might be interpreted as an initiative to build up the internal knowledge about the total work force competence in the company. In this way the LMS represented a tool for strategic personnel planning (Nordhaug, 1993b). This dynamic of the LMS resembles Ciborra et al.'s (2001) description of an information infrastructure, as "a true citizen of the runaway world" (Ciborra et al., 2001, p. 4), tending to deviate from the planned purpose, for a variety of reasons, and often outside anyone's world. This was also the case with the LMS at Fornebu; the platform was both open-ended and in part, out of control. In October 2004 traditional courses accounted for 50% of the learning offerings. Although the access to e-learning was essentially free, most of the non e-learning courses had a price to be paid. A screenshot of the LMS is given in figure 8.1. E-learning modules are referred to as 'Downloadable' in the LMS, while traditional courses are marked as 'Information'.

Add	Title	Media	Price (NOK)
	2 Mb/s installasjon og idriftsettelse	Informasjon	0
	ADSL - Innføring og feilretting	Informasjon	0
	ADSL - terminalbasert feilretting	Informasjon	0
	ATM Grunnkurs	Informasjon	0
	AV-Utstyr - Audiovisuelt utstyr i møterom på Fornebu	Downloadable	0
	Antenne- og radiobølgeutbredelse	Informasjon	0
	Atento - e-Innkjøp i Telenor	Downloadable	0
	Bachelor and Master of management programs - Leder og teamutvikling	Informasjon	0
	Bachelor and Master of management programs - Prosjektledelse	Informasjon	0
	Bachelor and Master of management programs - pros.basert omst. i int.perspektiv	Informasjon	0
	Bachelor of management program - Selvledelse	Informasjon	0
	Bakgrunn for PROSAK modellering	Informasjon	0
	Brannvern - Kurs for ansatte i Telenor	Downloadable	0
	Cisco - opplæring og sertifisering	Informasjon	0
	Delta4 Innkjøp - Bruk av innkjøpskort i Telenor v02	Downloadable	0

Figure 8.1: A screenshot of the LMS in October 2004

A further type of organizational integration is represented by the exchange of e-learning expertise from business area to company level. As the developer team in the Customer Support unit in TM had taken part in the exploitation project, this staff continued to assist the rest of the organization after the project had closed. In addition, a new corporate unit was established in 2003. Its main responsibility was to transform the LMS into a flexible and dynamic learning platform by creating a common competence base and, as a result, a common Telenor culture. It should be underlined, however, that the launching of a centralized e-learning organization and enterprise wide learning management, reflected, in many ways, a mass production view on learning, and not a learning approach in accordance with Telenor's ambitions of becoming an organization of process enhancement (Victor & Boynton, 1998). The competence unit still existed in 2005, despite little focus on competence development during the following years.

The third type of integration can be viewed as *pedagogical*, as reflected in excerpt 15 from the TA in TN:

Excerpt 15:

... e-learning has often been combined with ordinary traditional courses. It [the different parts of the course] has also been organised in sequence, and it has been said that e-learning should be completed before one attends the course. This is common. It is, in a way, a request.

In TN it was most often the case that a general e-learning session for a large user group was held first, followed by more targeted workshops or team based classroom courses. Occasionally, however, the education took place in the reverse order, starting with workshops and followed by a compulsory e-learning module. Irrespective of order, the more advanced content was, as a rule, presented in a traditional way. This type of hybrid learning, often referred to as 'blended learning', is frequently recommended in the e-learning literature (e.g., Munkvold et al., 2003; van Dam, 2004). This approach was also found in the mobile Customer Support division and in the leader programmes at company level. Based on current educational traditions, e-learning was mixed with face-to-face lectures, self study, group assignments/tasks and workshops. Sometimes learning was also integrated with work. In many ways this integration mirrors an internal change in Telenor, away from traditional competence development in the form of classroom courses, towards a view of learning as part

of work. The LMS was, however, still the same, without any opportunities for personalization and collaboration.

8.2 Spin offs - new applications and/or new user groups

As referred to above, the aim of the exploitation project was to help the business areas to develop new e-learning modules for delivery via the LMS. As Ciborra et al. (2001) point out, however, technology for cooperation and collaboration is often drifting and out of control. This also happened in Telenor. From the starting point in quadrant I, where the e-learning modules had been used for relocation to the new headquarters (old applications and old user groups), three different types of expansion took place, II, III and IV, as illustrated in figure 8.2 below. All three types represent intra-organizational learning, but while type IV involves a transformation within one single activity system (TN, TP or TM) and thus can be regarded as vertical learning, the two others include movement along the horizontal dimensions – with sideways movement between various activity systems and actors (Engeström, 2003).

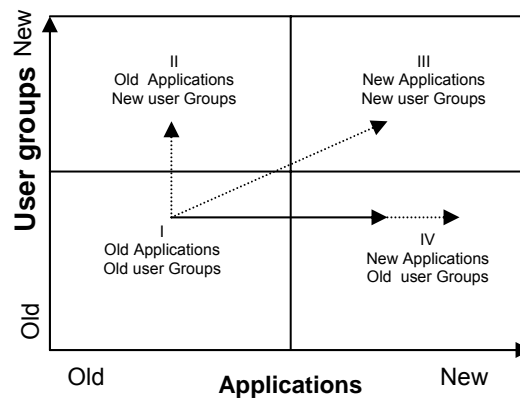


Figure 8.2: Exploitation of new and old applications to old and new user groups (solid arrow =planned, dotted arrow= unplanned)

8.2.1 Expansion of old e-learning applications to new user groups (II)

Due to the successful e-learning experiences at Fornebu (in Oslo), Telenor decided to reuse the e-learning modules at their venues in the four largest Norwegian cities (Trondheim, Bergen, Stavanger and Tromsø), where so called ‘profile buildings’ equipped with the Fornebu technology had just been set up. In this way, Telenor hoped to reduce internal training costs⁷⁴ and develop a common Telenor culture across the country. The implementation model was also copied, with compulsory learning, incentives, LMS reports and Training Administrators (TAs). A new and more detailed project mandate was formulated with far more precise performance measures, roles, control routines and division of labour. According to Koper (2004), this opportunity for sharing and reuse is perhaps the most promising advantage of e-learning, but as he claims, also one of the most complex advantages. Principles for this type of economy to succeed have not yet been established. This reuse and replication of learning modules etc., together with ambitions about standardization and efficiency is, from my point of view, undoubtedly yet another approach that matches the embedded logic of mass production (Victor & Boynton, 1998).

8.2.2 Expansion of new applications to old user groups (IV)

The focus in this section is on the development of new LMS modules at the business area level. Such new modules, in sum thirteen, were created in TM, TP and TN⁷⁵. Table 8.1 gives an overview of how the modules were distributed and when they emerged⁷⁶. Most of the modules were process related, a few connected to new ICT systems, and one directed to support a new product.

⁷⁴ http://portal.telenor.no/index.jsp?view=voew_resource&id=59821 date 19.09.2002

⁷⁵ This description, as in the previous chapters, does not take into account the development of new e-learning modules in the Customer support units in TM and TP, since these were delivered outside the common learning platform. As mentioned previously, these units had already (from 1996) developed their own learning modules based on ICT. Only those parts of the respective business areas, which were unfamiliar with e-learning by relocation, are included.

⁷⁶ Because of less detailed LMS reports in 2004 and 2005, these two years have been merged.

Table 8.1: The expansion of different types of new LMS-delivered modules in the business areas

Year/ Business area	2002			2003			2004/2005		
	ICT	PROCESS	PRODUCT	ICT	PROCESS	PRODUCT	ICT	PROCESS	PRODUCT
TM	1	0	0	0	0	0	0	0	0
TP	0	0	0	0	0	1	0	0	0
TN	0	0	0	0	4	0	3	4	0
Total	1	0	0	0	4	1	3	4	0

The three involved business areas were all rather optimistic and started with high e-learning ambitions. The most ambitious was probably TN, which had decided to apply the new tool for the forthcoming transformation from mass production to process enhancement. As the TN TA explains in excerpt 16:

Excerpt 16:

[E-learning] was quite suitable in a way - ... we [TN] have seen the advantage of e-learning in the move to Fornebu. Thus we knew that, in relation to this process introduction, many would need training at the same time. This is when we saw the possibilities of e-learning... Naturally, it [e-learning] has indeed become an instrument for the management to carry out process organisation... [in order to] teach the employees how to work in this process, in order to obtain a change of attitude, or what we choose to call it. First, [to] know what this is about, as in what is new for you in your everyday life, all right? It is about seeing the connection between processes, indeed that you are like an element in a large value chain, would I say. That you ... that everything holds together, in a way.

The transfer of responsibility from the e-learning project to the business areas did not represent the same challenge to the three TAs. While the dedicated exploitation group rather soon after relocation invited the TAs in TP and TN to separate workshops, assisted them in the definition of learning goals and later on contributed in the production, the TA in TM had to handle the e-learning exploitation quite on her own. Early on she established an internal group consisting of some of the most experienced developers in the business area. They assisted her in the production of the first e-learning module. Similar arrangements were also made in the two remaining business areas, but while the TA in TP chose to involve large parts of the HR staff, the TA in TN engaged the internal project leaders instead. It is interesting that this latter group was nearly identical with the group that had been given responsibility for the

planned process transformation of TN. As a result, eleven new modules were developed in this unit. In contrast, TP and TM only produced one module each. Due to the high number of e-learning modules in TN, in some periods e-learning accounted for more than 50% of the formal learning initiatives in this unit. Interestingly, while most of the TN modules were combined with classroom courses or workshops and directed to larger parts of the business area, the modules in the remaining units TM and TP were based on individual learning and targeted to smaller user groups. Due to a funding shortage, limited time and/or integration problems with the LMS, some of the modules were developed without audio and/or video, or, were even written in English (see section 8.4.1).

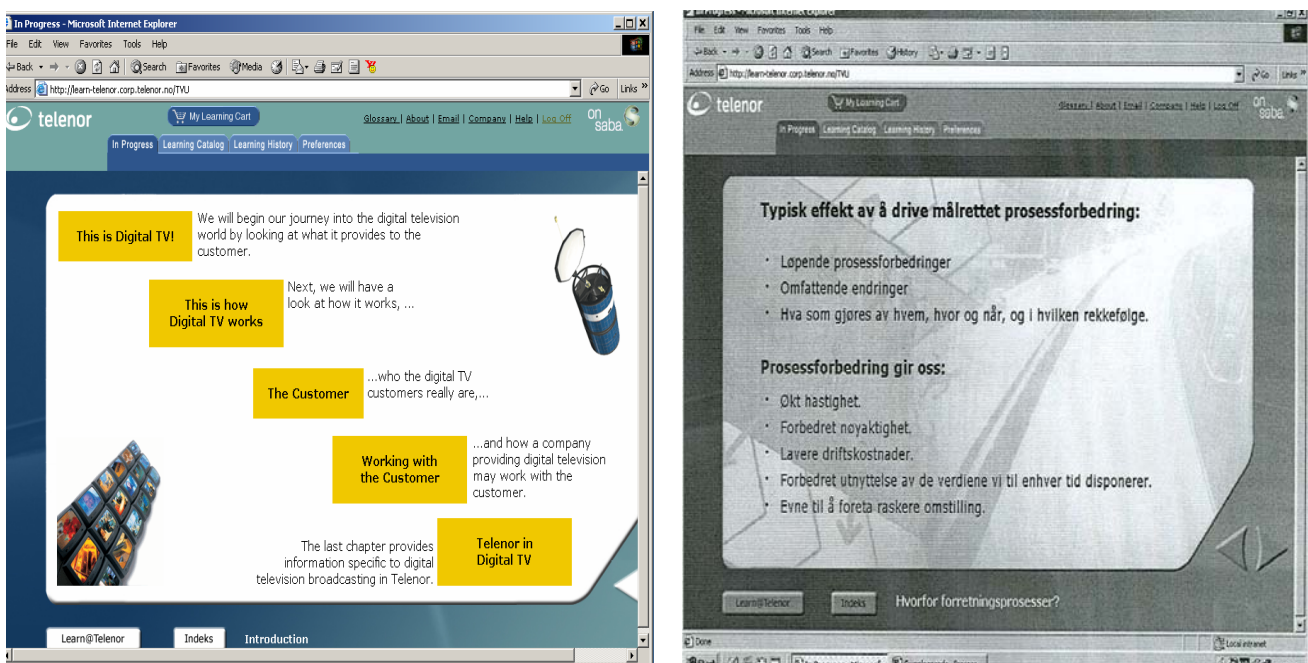


Figure 8.3: Screenshots of Digital Television and Process Management

Common for all modules, irrespective of unit, was that they were produced to support strategic challenges and/or changes, either in the form of new standardizing ICT systems (TM and TN), new prioritized products (TP) or new demanding processes (TN). For example, two of these modules, depicted in figure 8.3, addressed digital TV and Process Management. This alignment of e-learning with business goals is frequently recommended in the e-learning literature as a way to success (e.g., Hall, 2002; van Dam, 2004). Van Dam (2004) argues, however, that this alignment is still no guarantee for a real business impact and further revenue, earnings, growth and sustainability (van Dam, 2004, p. 18). This is illustrated by the later contraction of e-learning in the two business areas TM and TP (see section 8.4).

8.2.3 Expansion of new e-learning applications to new user groups (III)

New e-learning modules also emerged outside the business areas, the first one in May 2002. From that time and up to 2005, twenty one modules, spread over five categories, had been launched at company level. Table 8.2⁷⁷ gives the distribution of developed modules over the different categories of information communication technology (ICT), process development (PROC), policy development (POL), leader training (LT) and health, and environment and security (HES).

Table 8.2: The expansion of different categories of new LMS-delivered modules at company level

Year	2002					2003					2004/2005				
	ICT	PROC	POL	LT	HES	ICT	PROC	POL	LT	HES	ICT	PROC	POL	LT	HES
Telenor	0	3	1	0	2	2	1	0	0	1	1	0	2	5	3

In detail, the modules supported new company wide ICT systems aimed at standardization of procedures and cost reduction (e.g., new purchasing routines), informed about new standardized ways of working (e.g., about the new project model), spread new policies (e.g., policies for codes of conduct) and educated the management (e.g., value indicators) and the HES staff (e.g., first aid). Behind this approach seemed to be a desire for a more centralized and standardized organization with more efficient production both of goods and services as well as a desire for building a common Telenor culture. As a whole, the modules seem to reflect the increasing alignment of learning and competence development with business goals, expressed in the annual reports of 2002 and 2003 (Telenor, 2002a; Telenor, 2003). Also the desire for an increased strategic focus, operational strength and a value driven leadership, seems to have been manifested. However, the distribution of modules across the different categories, and the total absence of product related modules, is in strong contrast to Kristiansen et al.'s (2000) study, which found that ICT based learning in Norwegian companies⁷⁸ was used primarily for product- and ICT-related courses. It should be underlined, that except for the modules aimed at certification, the majority of modules at company level were defined as optional, and designed for individual learning. During the later phases, there were some 'blended' learning modules, developed for leader training. Two of the modules are shown in figure 8.4. It is somewhat surprising that an extremely important e-learning module meant for all employees (developed in 2004) was not launched via the LMS as expected, but by e-mail. The module was tracked via a particular report generator outside the LMS, and the event was characterized as a success.

⁷⁷ Because of less detailed LMS reports in 2004 and 2005, these two years have been merged.

⁷⁸ The following branches were represented in Kristiansen et al.'s study: Oil and offshore, Machine industry, construction and building, bank and assurance, chemical industry, electrical industry and graphical industry

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Delta 4 -innkjøp : Policy for Konsulentkjøp

Målgruppe
Ale ansatte i Telenor som bidrar til eller foretar anskaffelser av konsulent tjenester.
 - Dette vil typisk være prosjektledere, linjeledere, tekniske fagpersoner og innkjøpere

Forventet gjennomføringstid
 20-30 minutter.

Temaer


- Hva innebærer policy ?
- Hvorfor innføre policy ?
- Hvordan gjennomføre kjøp iht. policy ?
- Konsekvenser ved brudd på policy
- Sluttprøve med krav til bestått

Om programmet
 Programmet gir en innføring i hva policy for konsulentkjøp i Telenor innebærer for deg som vurderer å kjøpe konsulent tjenester. Programmet gir også anvisninger på hvor maler forefinnes og hvilken dokumentasjon som pliktig skal utarbeides.

Fullført
 For å bestå testen må du ha 80% riktige svar.

Når du "består" testen ved å svare riktig på 80% eller flere av spørsmålene, har du ikke mulighet til å gjennomføre testen på nytt.

Hvis du ikke består testen (mindre enn 80% riktige svar), må du repetere opplæringen og ta testen på nytt – helt til du har bestått.



telenor

Local intranet

Start Temp mail2web - Mic... Learning Cat... mail2web - Mic... HTTP 500 Inte... Document1 - ... 16:00

Learning Catalog - Microsoft Internet Explorer

Address http://learn-telenor.corp.telenor.no/TVU

telenor My Learning Cart

Glossary | About | Email | Company | Help | Log Off ON saba

In Progress Learning Catalog Learning History Preferences

ABSTRAKT

Delta 4 -innkjøp : Innkjøpskort

Målgruppe
Ansatte i Telenor som skal få utlevert innkjøpskort.
 - Dette vil typisk være avdelingsledere og floor managers/sekretærer. Dessuten, enkeltpersoner som bestiller fra spesielle leverandører.

Forventet gjennomføringstid
 20-30 minutter.

Temaer


- Hva er innkjøpskort
- Hvorfor innkjøpskort
- Hvordan bruke innkjøpskort
- Sluttprøve med krav til bestått

Om programmet
 Programmet gir en innføring i hva et innkjøpskort er og hvorfor Telenor ønsker at dette skal tas i bruk i hele organisasjonen. Programmet viser også hvordan kortet skal brukes i praksis og hvordan man skal følge opp i etterkant.

Fullført
 For å bestå testen må du ha 80% riktige svar. Innkjøpskortet vil ikke bli utlevert før du har oppnådd 80% riktige svar !

Når du "består" testen ved å svare riktig på 80% eller flere av spørsmålene, har du ikke mulighet til å gjennomføre testen på nytt.

Hvis du ikke består testen (mindre enn 80% riktige svar), må du repetere opplæringen og ta testen på nytt – helt til du har bestått.



telenor

Local intranet

Les mer ... (English Locale) Start Temp mail2web - Mic... Learning Cat... mail2web - Mic... HTTP 500 Inte... Document1 - Mi... 16:00

Figure 8.4: Modules supporting cross-organizational cost reductions

8.3 Contraction of e-learning activities

Previous sections have shown that e-learning in Telenor expanded both sideways via integration, and vertically via new user groups and/or new modules. In some parts of the organization, however, a different development took place. In these units e-learning gradually faded, either *after the production of one or two new modules* or as soon as e-learning was *handed over from project to line organization*. This type of occurrence, which happened in as many as three of the four business areas, in TBS, TP and TM, is in this dissertation referred to as an instance of ‘contraction’, meaning a reduction in learning activity or growth⁷⁹. This contraction did not reflect any determined and conscious action, but a more or less unconscious rejection of e-learning. It is more closely described below.

TBS

The first business area where contraction took place was in TBS, a unit that for a long time had been exposed to reorganizations, workforce reductions and an increasing demand for financial earnings. Limited involvement from management and numerous technical and organizational implementation problems reduced the motivation at user level, and led to low completion rates. Despite the TA embarking on a new e-learning initiative a few months after the relocation, this was followed up only to a small extent. The TBS employees continued their previous learning praxis. When a learning need arose or a new product was launched, these employees gathered in a meeting room or sat down for some hours together with a super user. Afterwards they went back to their desks and started to work. Later on they exchanged their new experiences. This obsessive focus on a dynamic and continuous configuration of knowledge was to a large extent in alignment with their production (see co-configuration in Victor & Boynton, 1998).

An invitation from the exploitation project, half a year after moving, did not stimulate any engagement. Due to considerable challenges and an ongoing struggle against a red bottom line, there was no interest in modules that could be used by “non-paying passengers” in the rest of the company. The TA’s limited knowledge of large parts of the unit and the management level’s restricted interest, time and resources to identify internal learning needs, resulted in no agreements for development being signed. The focus on workforce reductions

⁷⁹See Merriam Webster online Dictionary’s definition of the word, <http://search.eb.com/dictionary?va=contraction> date 1.3.06

blocked most initiatives, including those within the e-learning field. One year later, in fall 2003, the TA summarized it in this way:

Excerpt 17:

...[electronic training] has been put on ice for good in our business area ...Why did it not go any further? I would claim it must be for financial reasons, and that the bottom line is all that matters for the autumn of 2002. I can also envisage the fact that employees are worried about having a job or not. Focus, strategy and the future is just about earning money, products, and how we are going to save money; [in addition] many TAs were involved in reducing their workforce/staff... Most of those who were TAs were HR-related in one way or another. They did not lose their jobs. They had to prepare and carry out staff reduction and assist the employees affected by reduction. Focus was shifted from the role of TA.

Despite this situation, the TA was still engaged in e-learning and viewed it as necessary for future competence development. Nevertheless, the e-learning activity faded. Some of the cross-organizational modules were completed, but at the time of writing no TBS specific modules have been developed. Excerpt 17 above gives *some* indications of why this happened. These concerns, all of them related to *economy*, seemed to be of vital importance in explaining why e-learning vanished in TBS. From my point of view this type of barrier has been considerably underestimated, maybe even omitted in the e-learning literature. The lack of anchoring at management level escalated the negative effect of these factors.

The excerpt also shows that the TA's participation in the workforce reduction took focus away from constructive exploitation. This made the transition from project to line even more complicated. The fact that the exploitation efforts were postponed for half a year after moving had a similar negative impact. This confirms Collis and Moonen's (2001, p. 65) finding that the integration of e-learning with other ongoing tasks represents a potential problem in transition from implementation to institutionalization⁸⁰. When the current TA-forum was dissolved at the same time, and many of the TA's previous colleagues disappeared, this surely did not help.

Furthermore, those responsible for the implementation should be well informed about ongoing tasks, challenges and production activities in the unit, and have a close connection to management so that learning needs can be identified early and appropriate learning initiatives

⁸⁰ Svensson (2004) regards this as a dilemma in all types of large scale educational projects where e-learning is integrated with work.

can be launched. This aspect, which was missing in TBS, has not yet been addressed in the e-learning literature. One could also ask whether the current e-learning solution was at all able to produce the learning that was required. The fact that only a few employees completed any of the previously developed LMS courses, and that no needs for new modules were articulated, might support such a point of view. I will return to these issues in section 8.4.

TM

Contraction also happened in TM despite the TA having expressed high ambitions for succeeding (section 8.2). According to her, see excerpt 18, e-learning had come to stay:

Excerpt 18:

... I don't think it is possible not to use it [e-learning] now that we have become used to it...indeed.

Without any assistance from management and/or the exploitation project, she had initiated the development of one new module and engaged the Customer support (CS) unit to integrate the e-learning production with the LMS. However, when she left the organization half a year after TM moved to Fornebu, no new modules appeared (except in the CS division). This contraction in major parts of TM happened despite the existence of an e-learning team in the business area (in the CS division), and despite the fact that this team assisted e-learning production in other areas of Telenor.

It can be argued that one important reason for this abrupt stop was that the key person, the TA, left the unit. The critical role that champions or change agents seem to play in successful innovations of technological change, was already observed by Schön (1963) in 1963, and has been frequently referred to as a critical factor in the e-learning literature (e.g., Cross & Dublin, 2002; Rosenberg, 2001). A weak point in TM was that its e-learning champion, the TA, had worked alone during the entire process, and had not given enough attention to communication and collaboration functions in the organization. According to Michael (1973) and Allen (1977), these functions are of great importance in the implementation of technological innovations. This aspect, and nearly no anchoring at the management level, reinforced the negative development. Some of the e-learning literature points to the necessity of anchoring at top management in order to provide financial commitment (Rosenberg, 2001). This might have been crucial, not least since the contraction in TM coincided with a period of

economic downturn. In accordance with Nordhaug (1993b) who emphasises that competence building and improvement of personnel routines demands input of capital, this might also be the case for e-learning. I suggest, however, that the explanation for contraction should also be understood by the fact that TM was never a unit for mass production, but instead characterized by mass customization. This type of production system presupposes, according to Victor and Boynton (1998), a learning system prepared for teamwork and dynamic networks. These problems will be addressed in the discussion in section 8.4.

TP

The initial positive engagement evidenced after the first module had been developed (section 8.2) also faded in TP. The status in 2005 is described by the TA in excerpt 19.

Excerpt 19:

...[e-learning] is almost forgotten as a sector to be followed up...[e-learning] is left in the lurch because we have too little in terms of resources, so that it has no longer been given priority. Consequently, since 2002, we have had to do a lot of reshuffling, so that many [of HR people, who were indeed familiar with electronic teaching/learning] have left us...

As in TBS, limited financial resources seem to have ended the e-learning initiatives. This aspect has been underlined by Nordhaug (1993b), who claims that parts of the human resource field are particularly exposed to fluctuations in the company's economy (see section 8.4.1). This study indicates that e-learning might be such a vulnerable area. Not only did the development of new business area specific modules vanish, also the company wide LMS modules had only been marketed to a small degree in the period from 2002 to 2005.

Frequent reorganizations and workforce reductions in TP's local TA staff were also mentioned by the TA as an explanation of the contraction of e-learning: the TA had to reduce his engagement in e-learning due to new work tasks; some of the local TAs lost their jobs; and, the only manager at sub-unit level engaged in developing new e-learning modules, left the organization. This created a vacuum in the e-learning field. Just as in TM there was no one to pursue the project. This happened despite both top and middle management having been heavily involved in the moving phase, and the attitude to e-learning in general was positive. This indicates that an anchoring at top and middle management, which is referred to as one of many critical factors in the e-learning literature (e.g., van Dam, 2004), may not, in itself, be sufficient. The internal structure in TP, with eleven independent companies, might have

influenced this result. First, a centralized push was lacking. Second, small units and small user groups meant high developmental costs per employee. E-learning did not become profitable, as underlined by the TA in excerpt 20:

Excerpt 20:

I used to be very positive towards e-learning, but I have become more realistic both when it comes to how many [end users] there should be before you devote resources to it, and especially when it comes to the job which becomes important when the product is finished'

...developing e-learning is expensive for small units, and when you do it for 6000, it is costly.

This aspect has only been indirectly mentioned in the e-learning literature, via a focus on 'Return-On-Investment' and 'Cost-versus-Value' (e.g., Cross & Dublin, 2002). The production system in the business area should also be taken into consideration. This varied from a nearly craft like production in some sub-units, to mere administration and process enhancement in others. This aspect is further discussed in 8.4.3. Rather than creating any new e-learning modules, the current learning practices continued to exist, with a comprehensive use of project work, or by gathering a group of employees around a table or in a classroom when a learning need arose.

8.4 General discussion and broader implications

This chapter has analyzed the exploitation of e-learning in Telenor from the initial implementation at Fornebu in 2001/2002 until 2005. During these years a lot of changes took place, some of them technological (module level and LMS level), others organizational (division level, business area level and company level) and/or pedagogical (module level and LMS level). The major changes are summarized as follows:

- The previous *e-learning* portal changed into a company wide *learning* portal
- E-learning was to a large extent *integrated* with other types of learning initiatives (e.g., workshops, meetings and classroom courses)
- Existing e-learning modules *expanded* to cross-organizational user groups
- E-learning activity *expanded* to new application domains mainly in one business area and at the corporate level
- E-learning *contracted* in three of the four business areas⁸¹
- Development of e-learning changed from being primarily *external* to becoming *internal*, using rather simple authoring tools
- *Most* of the new e-learning modules were *technologically less advanced* than the multimedia based modules developed for the move (e.g., without sound or were mere power point presentations)
- *Some* of the new e-learning modules were *in English*

While the three first issues reflect activities where the existing e-learning infrastructure (e.g., modules and LMS) is applied in new ways and/or in various contexts within the organization, the remaining five issues reflect activities where a set of new tasks as well as a new product (i.e., an e-learning module) is developed. This development work, incorporating new activities like identification of fields of learning, identification of learning goals, production of learning content, and, finally, design and production of modules, is, as documented in the e-learning literature (e.g., Alessi & Trollip, 2001), extremely demanding and time consuming. As pointed to in the same literature, if e-learning shall survive, an e-learning platform has to be dynamic, with continuously updated modules and compelling and attractive materials (e.g., Attwell, 2004a). This chapter shows that it was first of all *this* part of the exploitation work that was difficult. The fact that the modules were not regarded as a necessary tool for the production, but only as one of many tools to learn to operate the tools of production, probably increased the challenges connected to the development phase. Using Wartofsky's (1979) concept of secondary artefacts, the e-learning modules were not related to a productive practice in a direct sense (recall chapter 3). *E-learning was not a matter of necessity, but rather a matter of convenience*, or in Devlin's (1993) words, a '*nice to know*' and not a '*need to know*'.

⁸¹ Except for the Customer Support units in these business areas where e-learning has been used since 1996.

With this as a backdrop, the further discussion is directed to some factors that seemed to be of importance for the sustainability of e-learning. These are: 1) the financial situation in the adopter unit, 2) specific characteristics of the TA role, 3) the match between the e-learning system and the production system, and 4) anchoring. Sections 8.4.1 -8.4.4 go more thoroughly into these issues and discuss their broader implications. Due to time and space limitations, one other element that should get attention, the characteristics of the project-to-line transition, with regret, is skipped. Instead I have chosen to focus on the aspects which, from my perspective, will give the most interesting contributions to the e-learning literature.

8.4.1 The financial situation in the adopter organization

Around the millennium Telenor was exposed to increased international and national competition. The result was a descending economy, with comprehensive workforce reductions and frequent restructurings at all levels in the company. The situation led to a lack of funding of new e-learning modules in large parts of the company, and not least, discharge or redeployment of some of the key actors from the implementation phase. A further consequence was that many of the remaining TAs, because they were part of the Human Resource (HR) staff, had to reduce their focus on e-learning and instead take responsibility for tasks related to workforce cuts. Although new modules emerged both in units with a negative and a positive economy, the effect on e-learning was striking. I claim that the negative financial development in Telenor, both directly and indirectly, was an important cause of e-learning contraction in two of three business areas (section 8.3). I further claim that the decline in economy was of importance for why new authoring tools were taken into use, all modules were produced within the company, the e-learning platform was transformed into a common learning platform, the activity in the TA forum was reduced, and why some of the modules were produced without audio, video and flash, and some even in English. Interviews with key actors in the organization, all point to scarcity of money as one of the main reasons for why this happened.

According to Nordhaug (1993b), competence building and improvement of personnel routines requires input of financial capital. One of his studies, referring to Danish and Norwegian investigations, documents further that corporate education budgets during recession are largely exposed to balancing of accounts. Three reasons are given. First, the position of power of those responsible for HR staff is generally low compared to other units. Second, education is viewed as an expense rather than as an investment, and third, the HR staff do not manage to

argue for their own existence from a business administration or productivity perspective. Interestingly, however, the e-learning literature has not at all focused on this issue. Indeed some authors such as van Dam (2004) and Collis and Moonen (2001) speak about return on investment and the importance of e-learning in alignment with the value chain. But not even Collis and Moonen, who identify the reduced funding after the first phase of implementation as a critical factor, take into account the potential negative effects of the company's economy on further implementation.

Nordhaug's findings about why educational initiatives are reduced in periods with falling economy are also of relevance here. For instance, the reduction of the TA staff indicates that at the company level the TA-role was not regarded as a matter of necessity in the period of recession. A similar attitude, not only to the TAs but also to e-learning in general, was found among some of the employees and leaders at unit level. It is therefore interesting that in units where e-learning was not looked upon as an expense, but rather as a strategic tool for an improved economic position and future income, e-learning continued to exist and was further developed. This was the case in TN and at company level. In both groups e-learning was regarded as an investment with a potential for future income, and as a necessary tool for handling future challenges. Despite a challenging financial status both at company level and in TN, more than thirty modules were developed in these parts of the organization, all of them aimed at forthcoming organizational transformations. This indicates that a shortage of money did not necessarily lead to cuts in the development of modules, which supports Ellström and Nilsson's (1997) finding that financial downturns were important drivers for training initiatives (see chapter 2). However, although the findings indicate a not fully symmetric relationship between the financial situation and training, it seems evident that the financial conditions in many ways affected the production of e-learning. The in-house e-learning production, the many stripped modules without advanced technology, the broadening of user groups (by introducing English modules) as well as the contraction, point to the financial situation as a critical factor in the exploitation phase. It is, however, interesting that to whatever degree competence development place took place during this period it was always delivered as e-learning. In many ways e-learning contributed to rescue the internal competence development.

This chapter has documented that e-learning is vulnerable. To make e-learning sustainable in periods with a descending economy, I suggest that the learning content should support critical work tasks, crucial ongoing organizational changes, and/or contribute to future income. Only

by developing modules or an e-learning solution that is experienced as a matter of necessity and/or an integrated part of the value chain, does e-learning seem to survive. As underlined by Nordhaug (1993b), the people involved in staff development should also learn to argue for learning from a business administration or productivity perspective. One way of doing this is by teaching them how to specify the Return-on-Investment (ROI) in terms of cost/benefit issues, including elements connected to future profit of e-learning. While Groth (2005) argues for incorporating this type of capacity in all types of project work, van Dam (2004) and Rosenberg (2001) explicitly suggest drawing on cost-benefit analyses in implementations of e-learning. Given the fact that e-learning seems to be considered as a matter of convenience and not a matter of necessity, and with the sustainability of e-learning through shifting economies in mind, the study raises the question whether e-learning has to be ‘something else’ and used for different purposes in times of recession than in times with a growing economy. I will return to this discussion in chapter 10.

8.4.2 The role of the Exploitation Coordinator⁸²

As referred to earlier, the exploitation trajectory varied from expansion to contraction in the different units. I suggest that an important reason for the dispersed outcome was the large span in history, culture and personal characteristics among the TAs, that is, their different backgrounds, technological competence, and organizational position. This span gave them, from my point of view, very different starting points and opportunities to handle the exploitation phase and achieve the expected e-learning success.

For example, the TA in TN, responsible for leader and competence development in the business area, was informed both about emerging challenges in the unit and the ongoing collective transformation to process management. With more than twenty years in the business area, she was familiar with major parts of the production, knew the internal history, was acquainted with many of the employees and managers, had a direct line to the top manager, was part of the business culture, enjoyed confidence, spoke their language, cared for the people and the unit and had her own formal and informal network. All this gave her implementation force in the relocation phase as well during the exploitation. In the exploitation she involved the top manager, the internal change manager, all current project

⁸² The term exploit means to “make productive use of” (see <http://search.eb.com/dictionary?va=Exploiter&query=Exploiter>) or ‘to use something for advantage’ (see <http://dictionary.cambridge.org/define.asp?key=27112&dict=CALD>) date 1.10.05

leaders and parts of her large network. As an ‘ambassador for e-learning’, as she named herself, she managed to mobilize the internal resources. In return she was met with respect at all levels. The interviewees referred to her frequently also as a ‘fiery soul’. In this unit (see table 8.1) the number of e-learning modules increased during the whole period. The situation at company level was much the same, with the person responsible for the LMS in a similar position, and with an increasing number of modules.

In the three remaining business areas the conditions were somewhat different. The local anchoring was partly missing, contact with the management level restricted and the TAs’ knowledge about local production limited. Two of them had also a rather short history in the organization. No matter why, when the responsibility for e-learning was handed over from the e-learning project to the business area, none of the TAs in the three units managed to play the role as an Exploitation Coordinator. Less than half a year after relocation, e-learning had contracted.

Two of the few authors dealing explicitly with the role of the Exploitation Coordinator in the e-learning literature are Collis and Moonen (2001) and Attwell (2004b). While Collis and Moonen only claim that the team leader role in this phase should involve different skills and different perspectives than in the previous phases, but without giving further specifications, Attwell is more specific. He draws attention to the presence of creative people who can drive initiatives forward. In fact, he regards this issue as the largest and most common factor for transforming ICT based learning into knowledge development (Attwell, 2004b). The topic is more broadly dealt with in the literature about workplace learning. According to Kanstrup (2004) this literature frequently refers to the value of locally anchored people possessing multiple roles who serve as a link between the management and employees, between external and internal actors or between different departments of the organization (e.g., gardener (Nardi & O’Day, 1999), fiery souls (Thång et al., 2001), bridge builder (Wenger, 1998), super users (Åsand et al., 2004), and knowledge activists (von Krogh et al., 2005). Certainly these roles cover some of the characteristics described above, but none of them reflect key characteristics such as linking new business challenges to e-learning, acknowledging the financial need for cost efficient e-learning, and the ability to make progress in the exploitation phase.

These characteristics, however, are often referred to in the change management literature and in research on implementations of technical innovations. For instance Pettigrew and Whipp (1991, p. 105ff), in their study of change management, underline just this process of linking

strategic and organizational change, and the importance of linking actions at all levels of the business. They also emphasise the firm's ability to recognize and carry out human resource management that prepares for 'the total set of knowledge, skills and attitudes that firm needs to compete' (Pettigrew & Whipp, 1991, p. 107). Rothwell et al.'s (1974) term 'business innovator' is also of interest in an e-learning context. This role, responsible for the total progress of the implementation, just because of his power, respectability, status and experience is, according to Rothwell, the main factor of success. Kaplan's (1999) focus on entrepreneurial characteristics and Michael's (1973) focus on so called 'boundary spanners', characterized by 'scanning, stimulating data-generating activity, monitoring, evaluating data relevance, transmitting information, and facilitating interpersonal intercourse', are also of interest for my study. Because e-learning seems to be regarded as a tool of convenience and not a tool of necessity, I argue that the person responsible for the exploitation phase should possess much of the same attributes as described in the change management and innovation literature. From my point of view, there is a need for a new role, an Exploitation Coordinator of e-learning. This role, which in accordance with the workplace learning literature should be local, must however go beyond the *social* and *technical* properties specified by Kanstrup (2004). The person should, in addition, possess a thorough knowledge of the *business* domain and be able to serve both as a motor and as an integrator between the partially conflicting needs within an organization (a sort of 'broker function').

8.4.3 Correspondence between production and learning

The e-learning solution in Telenor was marked by many of the same characteristics as those typical for mass production (see chapter 6). Implemented in units with different production systems, different traditions for learning, and in different developmental phases, the result, in the form of new e-learning modules, varied greatly. This section elaborates on whether or not the outcome is a result of a match/mismatch between the *embedded opportunities for learning* in the e-learning system and *the actual learning needs* in the different production systems.

From a business area perspective, the e-learning solution was first of all a success in the business area, TN, which referred to itself as *the factory* in Telenor. In this unit, e-learning, combined with physical meetings and workshops, was used to train a large group of specialized workers to efficiently and correctly master a specific task (mainly new ICT systems), and to teach the employees how different internal processes and elements of a process interacted. A number of modules, aimed at supporting the planned change towards

increased task efficiency and improved process quality, were developed. By doing this TN hoped to cope with the necessary and forthcoming transformation of workers from ‘doers’ to ‘doers and thinkers’ (Victor & Boynton, 1998, p. 78ff), or, at least, to support and improve the current mass production. In the three remaining business areas, all deviating from mass production, the e-learning activities were rather limited: in the co-customization-like unit TBS no modules appeared; in the mass customization business area, TM, one; and, in a small, but growing mass distribution sub-unit in TP also one. All modules were based on individual learning. Regarding the new LMS-delivered modules in the business areas as a whole, e-learning was mainly used to support internal business changes and challenges. Using Victor and Boynton’s terminology (1998), e-learning was applied either for development upwards along ‘the right path’ (in TN and TP), or, for consolidation and standardization of current production (in TM). Similarly, the majority of modules at company level were developed to support Telenor’s vision, to create a more streamlined organization and a leading innovative workplace. In detail, the 21 e-learning modules that were created were used to support new standardized ICT systems, to educate the managers and to increase the employees’ awareness of new streamlining procedures, strategies and policies. All except the management development modules were delivered as individual learning. Just as Virkkunen and Pihlaja (2004) argue for looking at workplace learning as a furtherer of the production, this seems also to be the case with e-learning in Telenor, at least in periods of recession. Whether this is the case for workplace e-learning in general, should be looked at in further studies. Based on my empirical data, there is room for saying that the extent to which e-learning survives at all seems to depend on whether it is a furtherer of current or future production.

Virkkunen and Pihlaja (2004) propose: 1) that the learning system will be closely related or equivalent to the production system when they represent the same historical stage of development, and 2) that the learning system will change according to the development of the business. Similar views are found by Ahonen (2005) in her study of informal learning, and by Lahn (2005) who suggests that internal learning systems differ, especially in large companies and at least in work integrated learning contexts. Such a connection has seldom been elaborated on in the e-learning literature. In Telenor, the mass production like LMS based e-learning contracted in the co-construction unit TBS, in the mass customization unit TM and in the process enhancement unit TP. The latter contraction happened, surprisingly, despite the TA having an ambition of making the business area into a learning organization. Of course there might be many reasons for these local contractions, as pointed to in the previous

sections, but the fact that many of the interviewees in these units asked for a more dynamic platform, more flexible modules, better push functionality, more demanding and competence based content, and a better integration with other types of learning as well as work, indicate that the current e-learning solution was not satisfying. The statement made by the TA in TM, that e-learning was best suited for user instructions and in combination with classroom courses, modules and workshops, emphasises the same issue. In TN, and at company level, however, the empirical data shows that the mass production like e-learning system not only represented an important tool for more specialized work tasks, but also for increased streamlining of the organization, and a further development to a next stage of production, or in Victor and Boynton's (1998) terminology, to the next phase of 'the right path'. By combining e-learning with workshops and classroom courses, the mass production like e-learning system could be applied for a broader production, beyond mass production. These additional learning events, which were integrated with the mass production e-learning, offered an opportunity for a more detailed and deeper learning, with both dialogue and reflection. In this way the learning as a whole aimed to take care of the demands of the necessary learning connected to the transformation from mass production to process enhancement.

On the basis of the discussion above, there exists no one-to-one relation between the e-learning system (viewed merely as e-learning modules and the LMS) and the production system. By widening the concept 'e-learning system' however, to incorporate not only the modules, but also the LMS, the e-learning content, the way the modules are implemented, how they are used and how they are integrated and supplemented with other traditional learning events ((see Guribye's (2005) concept 'learning infrastructure'⁸³)), I argue that there seems to be such a relation. If the e-learning system is to be used and to survive over time, I propose that the logic of the total e-learning system ought to equate to the concept of the work activity. In a shifting world, the e-learning system as a whole must both match the existent production system and satisfy the internal learning needs for growth.

⁸³ Guribye (2005, p. 62) sees a 'learning infrastructure' as a set of physical, technical and social resources that support a certain learning practice. This term includes the computing infrastructure as an integral part. In my discussion, however, the focus is on the learning related resources that are offered through the computing infrastructure. The term 'e-learning system', as I use the concept, does hence not include the computing infrastructure.

8.4.4 Anchoring

The massive cost reductions in the middle of 2002 had resulted in none of the top managers being engaged in the exploitation phase. *Both at company level as well as at business area level, attention to e-learning was missing.* With this as a starting point, this section elaborates on the issue of anchoring as a critical factor for the sustainability of e-learning.

As referred to earlier in this chapter, the LMS-based e-learning contracted in TBS, TP and TM. In all these units the TAs had either received new tasks (in addition to or at the sacrifice of the TA role), or had left the organization. This was also the situation for many of the local TAs in TP. Thus, there was no one left to take responsibility for the anchoring tasks when the line management ‘dropped out’. A similar contraction also happened in TM despite the fact that a sub-unit in this business area had had its own multimedia team for many years. No new modules beyond the one initiated by the TA before she left the organization, were developed outside the CS unit.

In TN, however, the TA took responsibility for this development. She involved relevant leader groups at different levels, engaged the many ‘project owners’, and made it clear that *one* e-learning module should be developed as part of all ongoing and new projects. She also made it clear that those who had received money to run the project (project owners), were also responsible for specifying learning goals, defining and encouraging the target group, following up, and controlling. Together with the project leaders, often also the TA, they distributed e-mails, participated in leader meetings, and requested that the leaders of the operating staff⁸⁴ pushed their subordinates. The anchoring at lower and middle management was, in this phase, and from the TA’s point of view, regarded as crucial.

At company level, however, a member of the corporate staff took care of the exploitation. As the one responsible for the LMS and with a heavy e-learning engagement, she initiated a process where learning needs were identified and twenty-one cross-organizational modules were developed. This was done despite a large resistance from the rest of the corporate HR staff. Any further initiatives to anchor the modules upwards or downwards were not made. Her meaning was clear; e-learning should be optional and control should be unnecessary.

Rather frequently the e-learning literature focuses on ‘support from top management’ as a critical factor in the implementation (e.g., Ely, 1990, 1999, Jones & Laffey, 2002; Munkvold

⁸⁴ The TA used the term “førstelinjens ledere”.

et al., 2003; Rosenberg, 2001; van Dam, 2004). Specifications about where in the implementation this type of support is important, and how this concept should be interpreted in large organizations with multiple levels of management, are, however, missing. Nevertheless, this section has shown that e-learning can survive (as in TN and at company level) also without such an anchoring. The above paragraphs illustrate *that the anchoring at lower management, or more correct, at that level where resources and training time are allocated, was far more important*. I suggest that the level of anchoring, at least in this part of the implementation, should depend on characteristics of the e-learning initiative as well as on the organization. From my point of view this aspect has been underestimated in the e-learning literature. The study raises, however, two further critical questions, both of vital importance for the exploitation of learning: 1) who should be responsible for the identification of learning needs and for initiating the production of new e-learning modules in this phase?; and, 2) who should be responsible for anchoring the e-learning initiative at middle and lower management? Of course, the answers will depend on many factors such as: whether the e-learning initiative is cross-organizational or linked only to one unit; whether e-learning is project based or accepted as part of ordinary work; and, whether an internal e-learning organization exists or not. I propose that both these questions should be given much attention, especially when implementing e-learning in large organizations. Only by doing this, can e-learning be sustainable.

8.5 Concluding remarks

This chapter has reported on the sustainability of e-learning in Telenor from 2002 to 2005. As expected, both sideways and vertical expansion of e-learning is evident in the form of an enhanced and broadened application of the implemented LMS and new e-learning modules for local or cross-organizational use. Contraction of e-learning also took place, far beyond the negative development referred to by Engeström (2000b) as ‘negation of the old’ and ‘partially destructive rejection’. This contraction was *not* intended; it did not represent any active and conscious rejection of e-learning as such. Nor was it, as Engeström identifies, the first step in a significant developmental process upwards. In three of four Telenor units, e-learning only faded, without returning. While still provisional, I claim that this finding should provide a significant point of departure for further development of the version of the theory of expansive learning.

An examination of the development trajectory of e-learning in different parts of Telenor has identified four factors that seem to be of importance for sustainability: 1) the financial conditions in the unit; 2) specific characteristics of the TA role; 3) the match between the e-learning system and the production system; and 4) anchoring. From my point of view, the financial situation in the adopter organization, specific historical, cultural and personal characteristics possessed by the leader of the exploitation (the Exploitation Coordinator), as well as anchoring at middle and lower management⁸⁵ seem to have been underestimated in the e-learning literature. I also propose that the logic of the e-learning system as a whole (e.g., e-learning content, implementation form, supplemental hybrid learning forms), ought to equate to the logic of the work activity. Therefore, it is suggested that large organizations with a diversified production, should take into account both the current production system as well as future developmental changes and challenges when planning an enterprise wide implementation of e-learning.

⁸⁵ I suggest that the optimal level of anchoring will depend on characteristics of the e-learning initiative as well as on characteristics of the organization.

CHAPTER 9

Evaluation and limitations of the study

This research began in 2001. At that time Telenor, the largest telecommunication company in Norway, was about to relocate its more than forty offices to a new headquarters at Fornebu, and decided to introduce e-learning as one of many tools to transform the organization into a modern company. By following the implementation process for more than four years the aim *has been to explore problems and identify opportunities arising in the short and long run when e-learning is implemented enterprise-wide in a large organization*. An additional issue has been to elaborate on *whether* and *how* contextual factors affect this kind of implementation, not least when the involved organization, as Telenor, is heterogeneous and spans across multiple organizational levels.

At first glance the Telenor case might call for a ‘replication’ logic used in experimental research (Yin, 1994). The same implementation plan was expected to be carried out in all the four business units, in sequence, and in accordance with each unit’s relocation schedule. The end results were also expected to be the same: competitive units and innovative employees. However, the starting point for the local implementations differed (see chapter 4). First, there was a large span in experiences, history, qualifications and work tasks across the four units. Second, the implementation plan was modified in some of the business areas, and third, modifications were made at project level after the two first moves. To make a comparative study in this setting would have required the development of a broad theoretical framework, control of the implementation process and carefully selected cases – preferably ‘most similar’ or ‘most dissimilar’ cases (Andersen, 1997; Yin, 1994). With no opportunities to influence this process, and a large variety in contextual variables within and across the four business areas, a decent comparative study was difficult to carry out.

Instead I decided to follow the four local implementation processes with an open mind, trying to identify the ongoing modifications, describe the local contexts, study the local implementation plans and monitor the local e-learning activities. By designing a study that

gave a rather ‘thick’ description of all the four units, the aim was to uncover how different contextual factors can affect the implementation of e-learning in various working environments within one and the same company. An alternative approach, restricted to the study of only one or two units, was also assessed, but since such a design would have impeded and partly concealed the large variations in work activity, contextual factors and how these elements interplay, this approach was decided against. By opting for a strategy to collect and analyze data at different levels and in different units of the organization, the ambition is to show how the organisational context both shapes, and is shaped, by the implementation and learning process (Ciborra et al., 2001).

This chapter aims to reflect, from a critical point of view, on the research process, and assess to what extent the four research questions have been adequately addressed. This is done by first elaborating on the theoretical challenges and practical problems encountered in the course of the research (section 9.2). The potential limitations of these problems and challenges are also discussed and identified, preparing for the last part of the chapter (section 9.3), which focuses on the validity and generalisation of the study. The chapter begins, however, with a brief description of how I, as a researcher, decided to cope with my new role (section 9.1).

9.1 The researcher as a multi-cultural subject

As underlined in most of the qualitative research literature, the researcher is always part of a historical tradition that guides and restricts his or her work (Emerson, 2001; Gummesson, 2000). This background is reflected in the researcher’s perception of research problems, in his or her view of which methodological approaches can be used to tackle them, and in the many choices that have to be made during a research process (e.g., whether the researcher shall observe, be observed or intervene, what type of data is going to be collected, and, when and how events are interpreted) (Emerson, 2001; Gummesson, 2000). It is also the case in this study. To avoid biases and enable the reader to make his or her own assessment of the research, the applied theoretical perspectives used are stressed throughout the thesis. By doing so, the aim has been to make visible my theoretical perspective and how this might have influenced the research.

There is always a danger, irrespective of historical background, that the researcher affects those researched. A related challenge is that he becomes part of the field he or she is studying (Engeström, 2000b; Skjervheim, 1976). To avoid these problems and achieve distance (Emerson & Pollner, 2001), I decided to apply different modes of data collection (e.g., face-to-face, telephone, observation and digital and paper-based media) and not to stay at the research site for longer periods than two weeks at a time. By travelling home and getting physical distance, I had an opportunity for switching between “doing closeness” and “doing distance” (Emerson & Pollner, 2001, p. 240ff), an issue, which is critical for all forms of qualitative research. It was also an advantage that I, during my stays at Fornebu, was given the opportunity to sit in the research and development unit in Telenor and not in the business areas. This made it easier to enter and perform the critical role as researcher. Although I explicitly emphasised this role from the beginning in all interviews and meetings, this role was often challenged, for instance in face-to-face interviews. This problem, acknowledged by Emerson and Pollner (2001) as a paradox within fieldwork, even increased because of the aim of doing a longitudinal study. This made me dependent not only on getting *initial access* to key actors and gatekeepers, but also *maintaining this access* for over more than four years. To keep a critical distance during the whole process, I repeatedly reminded myself of Pettigrew’s words that the researcher is in the “perspective business” (Pettigrew, 1995, p. 107). Before offering his or her own perspective, the researcher is recommended to seek and listen to different versions of reality in order to get access to all significant views before presenting his/her own synthesis (Pettigrew, 1995).

9.2 Limitations in the research process

In order to explain the different achievements of change objectives in organizational settings, theoretically sound and practically useful time-series research should explore the contexts, the content, and processes of change together with their interconnections over time (Pettigrew, 1995, p. 92). Such a research process is demanding, both because this type of research *spans several activities*, and also because time sets a frame of reference for what changes are seen and how the changes are explained. This was also the situation in the Telenor case. To evaluate the study and identify its limitations, focus in this section is placed on the three major components of qualitative research *data, analytic or interpretive procedures*, and,

written and verbal reports (Strauss & Corbin, 1990, p. 20). The main focus is placed on the first component, since data quality is decisive for the validity of the rest of the study.

Data

When starting the data collection, I had not specified the theoretical framework for the analysis in detail. One decision had, however, been made. The study would be grounded in the socio-cultural tradition (Säljö, 2000), mainly because of its strong focus on human actions as situated in social practices and mediated by artefacts (Säljö, 2000; Wertsch, 1985, 1998). Because this perspective requires an explicit need for context and situation sensitivity, the data collection should draw on the principle of *openness* originating from the ethnographic research tradition. For studies of implementations and change within the management and business field, Gummesson (2000, p. 58 ff) strongly recommends that the researcher uses his or her *preunderstanding*, a concept which includes theoretical knowledge, a certain attitude, commitment and personal experience. Thus, drawing on my previous knowledge about implementations of Information Systems, Pettigrew's recommendations concerning longitudinal studies, and personal experience from a position as IT leader in a rather large public organization, I decided to *focus the data collection on the most relevant series of key events* and the social construction of those events. Two series of key events were followed: first, the unfolding of e-learning from its first appearance as an idea in the corporate strategy at company level, via the launching of the two e-learning related projects described in chapter 3, to the instantiation of e-learning at local levels; and, second, the further evolvement of e-learning in the Telenor organization during the next three years. In order to achieve a rich and contextual, but still sufficiently detailed account of the change in both series, the principal strategy has been to combine the relevant time-series events with historical analysis (Hasu, 2001)⁸⁶, a social and theoretical sensitivity (Strauss & Corbin, 1990) and triangulation of data and partly also of methods (e.g., Denzin, 1989).

Following the principle of openness (see Baszanger & Dodier, 1997), ethnographic observations have been carried out by participating in meetings and training sessions at the research sites, by informal talks, and by interpretation of published texts on the intranet and in the in-house journal. Even during interviews the element of observation was present, for instance by remaining open also to information that could not be codified at the time of study, and by using individual and group based semi-structured interviews to open up suggestions

⁸⁶ Hasu (2001) introduces the term "ethnography of change".

and an open dialogue. Data collection in longitudinal studies, however, is concerned with observation and verification (Pettigrew, 1995). This makes an iterative process necessary. More or less continuous access to the key people during the whole research period, access to archival data at Telenor's intranet and access to learning statistics (e.g., LMS reports) at least in the relocation period, made this job rather unproblematic. Two key actors who left the organization less than one year after moving were also contacted, mainly to obtain additional information about the local implementations, local learning traditions, local conditions and local work tasks, but also to establish their reflections on various aspects of the local process. To prevent potential biases, these, as well as the other accounts, were handled with specific care.

In all kinds of qualitative research unlimited access to data is of vital importance. However, to get such access is not a matter of course – in any case not in large business organizations exposed to financial challenges and extensive national and international competition. One challenge is restricted access to data concerning ethics, strategies, the financial situation, internal operations, customers and external competition (Gummesson, 2000). This was not any problem in this case, where access was given to documents on condition of confidentiality. A potential limitation, however, was the absence of documents describing the introduction of e-learning in the first part of the implementation process, or, in Cooper and Zmud's (1990) terminology, in the stage of adoption and adaptation (see chapter 2). For instance, there were, as far as I know, no documents describing the attitude to e-learning in the corporate staff, in the steering committees and in the two e-learning related project groups. To the extent that where documents existed at all, they were in general rather short and not very detailed. So too were the descriptions of implementation roles and implementation rules during the two first moves. In this period the information was mostly distributed in smaller parts via the intranet. As far as I know, a comprehensive project plan was never published. Nevertheless, by combining historical documents in the form of written plans, mandates, and texts published on the intranet, with detailed information from interviews with key actors who had followed the discussion and the implementation from the start, and reminding myself that everything written always has ideological connotations⁸⁷, it became possible to give an adequate reconstruction of history. After the two first moves the e-learning project group developed a more precise implementation plan. When the e-learning project closed and the responsibility was handed over to the four business areas a few months later, written or web-based

⁸⁷Refers to R. Barthes' terminology, see <http://www.ic.arizona.edu/~comm300/mary/semiotics/barthes.terms.html#connotation> date 1.6.2006

documentation again was basically absent. Thus, due to the small amount of available official papers, the many interviews have been an invaluable source for proofing the different parts of the implementation process.

The validity of the research, however, is not only influenced by access to *documents*. In activity-theoretical studies, which espouses the principle of *multiple voicing* (Gergen & Gergen, 2000), access to *individuals* is viewed as equally important. In this study three aspects of this kind of access should be discussed. *First*, the information from key-actors is mainly based on *subjective accounts*, and to a small extent on observations of actual events and real actions. This problem, acknowledged by Argyris and Schön (1978) as a discrepancy between *espoused theories* and *theories-in-use*, was dealt with by triangulating different accounts and forms of data and/or by pointing to the discrepancies in the text. *Second*, the *voices of the top managers* are only “visible” through other people, e.g., through training administrators, project leaders, project members, employees and representatives of the corporate staff. However, by presenting the indirect top manager accounts in interviews with other actors, it became possible to shed critical light on the accounts and contribute to a dialogue that deepened the interpretation (Miettinen, 1993). Despite this, the missing top manager voices represent an evident weakness of the study. Access efforts were made via gatekeepers, repeated telephone calls and e-mails, but without any success. During the entire research period this group was extremely busy, first because of the relocation and the recent listing on the stock-exchange, later due to the burst of the dot-com bubble, falling economy, continuous reorganizations and gradually also noticeable personnel reductions and discharges. The quality of the data is ensured by crosschecking and balancing among different sources of data using a triangulated methodology (Gummesson, 2000; Miettinen, 1993; Yin, 1994), and by underlining that the analysis is mainly viewed from a training administrator and an employee perspective. *Third*, it should be noted that dependency on gatekeepers represents in itself a possibility for biases in data (Gummesson, 2000). By being dependent on door openers during large parts of the research process, there was a danger that the gatekeepers selectively gave voices to interview objects with a positive attitude to e-learning. However, by realizing that such a danger existed and by continuously giving it attention, this issue was never experienced as a problem. From my point of view the interview objects appeared reflected, critical and honest. They admitted, without encouragement, what they disliked and what problems they had experienced during the implementation and during the e-learning activity. My impression was that information was not consciously withheld and, not less important,

that employees and key actors felt free to suggest changes and improvements. One of the training administrators even arranged a meeting for me with one of the most sceptical training advisors in the organization, just to give me input to how e-learning could alternatively have been implemented.

Data analysis

From an ethnographic perspective Emerson claims that “Description is necessarily analytic” (Emerson, 2001, p. 28). This is also my experience after having done this research. During the description it became necessary to go back and forth between interviews, historical material, description, analysis, conceptual refinement, reframing and then back again, to search for new forms of data relevant to the concerns and to the later specified theories. Based on this iterative and interpretative process, which is typical for qualitative research, I have tried to make a bricolage, or in Denzin and Lincoln’s words, to piece together a “set of representations that are fitted to the specifics of a complex situation” (Denzin & Lincoln, 2000, p. 3). Similar iterations and interpretations were also necessary during the analysis, even after the theoretical framework had been decided.

From an outsider’s view, an obvious question to this research would be “Why was the socio-cultural perspective used as an umbrella for studying an e-learning solution that fully lacked elements of collaboration and interpersonal interaction?” In brief this choice was first and foremost driven by a view on the implementation as a cooperative and collaborative process aiming to integrate individuals, technological equipment, digital tools, learning and work in a new social practice. Since, according to Säljö (2000, p. 233), these elements represent an *indivisible unit of description* in a socio-cultural understanding, this perspective was used as a basis. However, specific characteristics of the case also made this perspective particularly interesting, for instance, how twelve vigorous and sophisticated artefacts, referred to as e-learning modules, were developed to incorporate the required knowledge for handling the new working environment at the new headquarters, and how the completion of these artefacts was defined as mandatory and seen as necessary for performing current and new work tasks (see chapter 4). As I near the completion of this research, I claim that using a socio-cultural approach has been decisive for getting a broad view of how different factors interact and how social and cultural factors influence the learning and implementation activity, when e-learning is introduced as an integrated activity in a complex and multifaceted working environment.

As pointed out in chapters 1 and 3, third generation cultural-historical activity theory has been an inspiration for structuring large parts of this analysis. By interpreting practice as activity, this theory explores the links between event and context and provides a way for analyzing organizations as distributed, decentred and emergent systems of knowledge (Blackler et al., 2003, p. 127). Applied to my case study, this approach gives the researcher an opportunity to uncover the interaction between contextual factors, learning, implementation and work within an organization in continuous change. Also crucial in this was the Activity Theory's emphasis on cultural and historical conditions as both the outcome of, and the precondition for, social activity and its view on disturbances as manifestations of deeper-lying structural tensions and sources for new activities. These key principles have made it possible to identify the underlying sources of surface disturbances, as well as the developmental opportunities emerging as a result of the new learning technology. Both these issues, which are of vital importance for an implementation process, have received little focus in the corporate e-learning literature. The fact that the top manager perspective is only indirectly present and the top-manager related activity systems have not been taken into account represents, however, a limitation of the research. These activity systems are not only important for understanding the collective implementation practice and the integrated learning and work practice, but also for elaborating on how authority patterns might influence these activities. This latter aspect is not merely of minor interest, since the introduction of e-learning, as pointed to by Guribye (2005), can be driven by a rationality of managerial control.

Altogether, by using the socio-cultural perspective which takes the context and practice into account, by drawing on third generation Activity Theory which views the implementation activity in continuous interaction with other business activities, and by applying techniques from other practice based approaches as methodological resources, the study, from my point of view, has a solid base for answering the four questions that were posed in chapter 5.

Reporting

As Pettigrew (1995, p. 100) points out, there is no ideal time to write up research. *When* one puts pen to paper, will influence *what* the researcher will see and say. This subjective aspect, which is always incorporated in social science, will affect both the quality and quantity of evidence and theoretical interpretations. Therefore, a guiding principle has therefore been to report the diverging point of views before I have argued for my own view, and to always underline the theoretical foundations for the analysis.

Regardless of this, there are many ethical considerations connected to how qualitative research should be reported. For instance, in this case study, about twenty people have placed themselves at my disposal for my research over more than four years, and have willingly been studied with critical eyes and have partly been “compared” across the four main units. A significant question is, “How can I as a researcher give an adequate description of the different situations without compromising these people who have invited me into their thoughts and actions?” Because of the restricted number of key actors involved in the implementation process and the danger of being recognized, this task has been highly challenging. To handle this situation, I have, from my standing point as a critical researcher, chosen to describe the relevant actions as far as they are not sensitive, but connect them to context and history and in this way bring forward the important interplay between conditions, contexts, actions and activities. Therefore, it should be emphasised that when individual actions are described, it is not the individual actions as such that are of interest, but how these actions, the technology, the subjects, the social conditions and the contexts as a hybrid and intertwined *as a systemic whole*, affected the implementation and the learning activities both at local and central level.

In addition, reporting in research on business organizations competing in the national and international market makes additional considerations relevant. For instance, “How can relevant and sensitive information be reported without revealing strategic business information and damaging Telenor’s future conditions for competition?” With Pettigrew’s (1995) recommendations in mind, I have rechecked information in order to avoid factual errors and information of commercial value to competitors. I have also been careful to respect information that has been passed to me for background understanding, and have not published confidential information when this was not allowed.

9.3 Reliability, validity, and generalization

The favourite criterion of science is *reliability* (Gummesson, 2000; Yin, 1994). Simply put, following exactly the same procedures and studying the same case with the same purposes, the researcher should later arrive at the same findings and conclusions. With this in mind, this report aims to document applied procedures and give a thorough overview of how the study was carried out. But, as Gummesson and Pettigrew say, *contexts are changing* (Gummesson,

2000, p. 91; Pettigrew, 1995, p. 95). Because all business situations have uncontrolled elements, it becomes considerably likely that existing theory will prove to be inadequate in new investigations (Gummesson, 2000). This issue is indeed of relevance for my study, with a case that all along is exposed to continuous shifting internal and external contexts. To repeat the study and reach approximately the same result, would therefore be difficult. The fact that this case study describes a “once-in-the-time-event”, with the relocation to Fornebu in 2001 as a departure, makes, however, in any case, a repetition of the study highly unlikely⁸⁸. Two earlier studies covering parts of the moving phase, both with quite different research perspectives, organizational focus and time horizon (Guribye, 2005; Welle-Strand & Tjeldvoll, 2002)⁸⁹, however, give no indications that my findings are unreliable.

Another key concept for judging the quality of research is *validity*. Different aspects of this term are in use within the qualitative research tradition, but in short, validity means that a theory, model, concept or category describes reality with a good fit (e.g., Gummesson, 2000; Kidder & Judd, 1986; Kvale, 1997). Testing this criterion in a case study, however, is not simple since validity is embedded in each part of the research process (Andersen, 1997; Holter, 1996). By having made sure that the collected data is sufficiently diverse and relevant to answer the posed research questions described in chapter 1 (e.g., Andersen, 1997; Holter, 1996), by (to that extent it was possible) having prepared for balance among the sources of data (e.g., Pettigrew, 1995, p. 106), by having managed the degree of involvement with the research site (e.g., Emerson & Pollner, 2001; Pettigrew, 1995), by having argued for the various steps in the conclusion and given reasons for why alternative interpretations are less plausible (e.g., Holter, 1996), the aim is, that the obtained results can be accepted in a discourse with the research community or with the public. Section 9.2 has, however, pointed to potential limitations of the research. As underlined above, the most serious weakness, from my point of view, concerns the lack of first-hand data from the top management level. This does not, however, mean that the identified problem areas and opportunities are unreliable or incorrect, or that the described transformation of e-learning from company level to local level is false. Probably it would have been more correct to say that unlimited access to the top management might have led to a larger number of identified problem areas, an increased

⁸⁸ As underlined by Yin (1994, p. 36) the emphasis is on doing the *same* case over again, not on “replicating” the results of one case by doing *another* case study.

⁸⁹ Based on data from the two first-moving units, Guribye (2005) studies the implementation of e-learning at Fornebu in terms of organizational rationalities and infrastructures for learning, while Welle-Strand and Tjeldvoll focus on how some of the key actors in the organization assessed Telenor’s future policy aims for e-learning. The latter report, however, does not explicitly specify how many key actors had been interviewed and what roles and positions the different key actors held.

number of sustainability driving factors and opportunities, and a broader and “richer” description of the transformation of e-learning from top to bottom in the organization. However, as always, there is a chance that some of the identified factors would have been excluded because of new information from the top management about connections and complexities.

A discussion of the third concept, *the generalization of a case study*, is more complicated. The opinions about this concept are many, from doubt and scepticism (Gummesson, 2000) to an approach to the issue as a contributor to ‘reconstructing’ theory (Burawoy, 1998, p. 16). To the degree that the research community views the concept as fruitful, the validity of a case study is mostly assessed as a prerequisite for generalization (Gummesson, 2000, p. 91; Kvale, 1997). To specify *for which classes of phenomena* and *under which conditions* the created concepts and identified connections identified in this study are valid, is hence important. Potential implications should also be deduced and tried out on new data (Andersen, 1997, p. 16ff). As referred to by Andersen (1997), one way of generalizing a theory generating single-case study such as mine, is to position the study so that the problem focus goes beyond the unique case. Looking at e-learning as an idea on journey across and within companies, the findings can be of relevance also for implementations of other ideas that are introduced within large organizations. By further connecting the rich empirical variation of a case to theoretical relevance, the case can be viewed as an occurrence of a class or type of phenomenon of interest. This has been done by drawing both on the corporate and educational e-learning literature as well as literature about project work, strategic personal development, organizational knowledge development and innovation. In accordance with some of Andersen’s recommendations, for instance by having made the study ‘implicit comparative’ and having connected the rich empirical variation of the case to relevant theory, there should be an opportunity for generalizing some of the findings. However, because one of the findings in this research is that the critical factors in this type of e-learning implementation in large, multi-level and multifaceted companies seems to be contextual and to lesser degree general in form, the findings will not be given as general advice as is done in most of the corporate e-learning literature. Instead, I will introduce a research-based checklist that can be used as help for future implementation of e-learning in large organizations. This list, as well as possibilities for new theory generation, will be further discussed in chapter 10.

In closing this chapter it should be underlined that alternative theoretical approaches could have been applied, not least given other circumstances for the case study. Having the

opportunity to plan the data collection in more detail and getting open access to all the interview objects, research sites and technology, it would have been interesting to use Activity Theory not only as an analytical tool, but also as a departure point for the research design as such. An alternative approach would have been to use overlapping theories for the data analysis and herewith achieve theory triangulation. It could also have been of interest to create a comparative research design more optimal for generalization, for instance by comparing the units with the most extreme completion rates (first and last wave). Whether these alternatives, or even a cognitive perspective, would have given another result, is not possible to judge.

CHAPTER 10

Summary, conclusions and implications

As underlined in chapter 1, the overall focus in this work is on how e-learning is introduced in a large organization, and how this implementation, in the short and the long run, gave rise to problems and opportunities. To place the case in a broader historical context and position the study in the large field of workplace learning, chapter 2 introduces some case-relevant aspects of this kind of learning before it goes deeper into e-learning in particular. Based on a review of central parts of the workplace e-learning literature, the chapter questions and challenges the main trend in this domain. That trend is to generalize barriers and success factors in one context almost uncritically across to other contexts.

The socio-cultural perspective serves as an umbrella to organize this research. The relevant aspects of this perspective and the selected aspects from related theories that have been used to address the research problem and the four research questions (see chapter 1) are presented in detail in chapter 3. The chapter further argues for how and why the selected theories and methods are a useful framework for studying this type of complex implementation and change process. Particular attention is given to the ICT artefact and its context-sensitivity, an issue that rather frequently is underestimated in the IS- and e-learning literature. The next chapter, chapter 4, is dedicated especially to my case, Telenor. To understand why Telenor decided to use e-learning as a strategic tool for change, chapter 4 delved into the company's history, work capacities, learning traditions, challenges and ambitions. The company's expectations with regards to new learning technology are also described, as well as the enterprise wide spread of the implementation, the default implementation plan, and the later modifications of the plan at local level. Based on the characteristics of the specific case and the research problem, chapter 5 specifies the research design and methods used for data collection and analysis.

Chapters 6, 7 and 8 are dedicated to the four research questions, chapter 6 to the two first ones, and the next two chapters to the third and fourth, respectively. Finally, chapter 9

evaluates the research process. My role as a researcher is described and potential limitations of the research are underlined. These reflections also set the stage for the discussion in this chapter – to what extent can the findings in this study be generalized. Furthermore, the chapter aims to answer the research questions, first in a condensed form with a minimum of theoretical concepts (section 10.1), then in the form of a broader discussion of key findings (section 10.2). Theoretical and practical implications are thereafter suggested (section 10.3), before section 10.4 elaborates on areas for further research. Some general remarks close the chapter (section 10.5).

10.1 Research questions revisited

The following research problem has guided my research: *What problems and opportunities arise when e-learning is implemented enterprise-wide in a large organization?* Four research questions were also defined. One by one, these are discussed in this section.

To answer research question 1 – *in what ways were the underlying ideas of e-learning reflected in the default implementation plan* - two critical transitions have been analysed and classified using Victor and Boynton's (1998) historical forms of work as the conceptual framework:

- T1: The transition from company level to steering committee level⁹⁰
 - From: The idea of e-learning in the company strategy
 - To: The mandate of the e-learning project
- T2: The transition from steering committee level to project level
 - From: The mandate of the e-learning project
 - To: The default implementation plan

First, I scrutinized the idea of e-learning in the company strategy, and classified this idea as *process enhancement*. Second, I analysed the mandate of the e-learning project. The idea of this mandate, “*to give the right learning to the right people at the right time and in the right way*”, was in accordance with *mass customization*. Third, I examined the default implementation plan, consisting of the LMS, a set of implementation rules and twelve e-learning modules. Again, the underlying idea of e-learning had been further modified. Despite

⁹⁰ This level points to the steering committee of the e-learning project.

the plan having features characteristic of mass customization (e.g., free access to all modules accessible via the web from different locations), the plan was to a large degree marked by the ideas of *mass production*. Thus, the e-learning idea changed from company level to project level as a result of transitions across organizational levels. From being a strategic tool for developing Telenor into a learning organization at the top management level, in alignment with process enhancement work, e-learning was transformed more or less into a standardized implementation plan typical for mass production at the project level. The transformation was analysed in detail in section 6.1 and 6.2.

Research question 2 - *how was the default implementation plan changed at the local level* - was also explored by Victor and Boynton' typologies of work and analysed from a critical transition perspective:

- T3: The transition from project level to business area level
 - From: The default implementation plan
 - To: The local implementation plans

The starting point of T3 is the outcome of T2, the default implementation plan. As identified above, this plan was first and foremost distinguished by the logic of mass production. However, this logic did *not* characterize the outcome of T3, the four local implementation plans. In three of four units the default implementation plan was modified *in advance* of the introduction; in TM in the direction of *mass customization*; in TP in the direction of *process enhancement*; and, in TN towards *a mix of mass production and process enhancement*, but with mass production as the dominating characteristic. Only in TBS, the first unit to relocate, was the default implementation plan maintained. Furthermore, unplanned changes arose in all units *during the course of* the implementations. These were introduced either because the prescribed implementation tasks were not executed or because the infrastructure was incomplete or absent. Thus, the underlying ideas of e-learning changed in all the units during the T3 transition. From incorporating features of mass production and standardization, the output changed to include features of mass production, process enhancement and mass customization. First of all the following issues were altered: the degree of centralization and standardization; the opportunities for flexible learning; the extent and way of communication; and, the routines of control. Chapter 4 (see also table 4.1) and section 6.3 described these changes in detail.

Research question 3 - *why did problems emerge in the adaptation at local level*- was analysed in chapter 7, in two steps. First, Grounded Theory was used to build and identify the six most typical categories of empirical problems. Then, in-depth discussions of four of the categories based on third generation Activity Theory were given. The four categories represent, from my point of view, the most novel and interesting categories. By leaning on the activity-theoretical principles of disturbance and contradiction, potential deeper-lying sources of the problems were identified. Table 10.1 summarizes the findings.

Table 10.1: Four of the identified categories of problems and their sources⁹¹

Categories	Sources
Hardware and Software Resources	<ul style="list-style-type: none"> • The lack of a comprehensive plan • A fragmented division of labour between the different project groups • A hierarchical and strict division of labour between the project groups and the implementation team
Execution of Implementation Tasks	<ul style="list-style-type: none"> • The loose mandate for the local implementations • The lack of a shared understanding of the implementation tasks • The composition of the local implementation team • The current work load and responsibilities in the implementation team • The missing knowledge about local conditions at local level
Information Sharing	<ul style="list-style-type: none"> • A centralized belief in a standardized information approach • A lack of focus on information as a critical element in the local implementations, and an underestimation of a persistent need for a shared understanding and updated, coordinated and consistent information • An unclear division of information tasks, responsibilities and routines for collaboration between central and local level
Relevance to Work and Previous Knowledge	<ul style="list-style-type: none"> • An underlying assumption that learning should be standardized, compulsory and measurable by completion rates • A missing ability /prioritizing at management level to transform present work in accordance with the opportunities offered by the new tools • Implementation of learning rules and technology that undermined the in-built opportunities for flexibility and relevance

Principles of Activity Theory were also applied to study research question 4 - *how did e-learning activities change over time at different levels in the organization* - but now using part of Activity Theory dealing with expansive learning, growth and development. Looking at the organization as a whole over a period of more than three years, the spreading and further development of e-learning can be described by three different tendencies:

⁹¹ The categories 'Management Control' and 'Allocation of Time' were not analyzed further due to space and time considerations.

- Contraction of e-learning activities
- Spin-offs to new applications & new user groups
- Integration at different levels (technological, organizational and pedagogical)

Less than one year after the first introduction, LMS-delivered e-learning had contracted in three of Telenor's four business areas. It was only in one unit that e-learning managed to survive. Here it still existed even three years after relocation, as a strategic tool for transforming the work from mass production to process enhancement (primarily to support ICT applications and new processes). Similarly, e-learning sustained at company level where new modules were developed to inform about new company policies and to educate cross-organizational user groups⁹², management and the HES staff (see chapter 8). Many of the modules were also reused at Telenor's offices at locations other than Fornebu. In addition, three types of integration emerged. First, e-learning expertise was exchanged from business area to company level and internal classroom courses and external education programmes were integrated in the LMS (organizational integration). Second, e-learning was integrated with other learning initiatives (pedagogical integration), and third, previously developed standalone modules were delivered via the shared LMS (technical integration). A description of the changes and a discussion of potential critical factors for sustainability are given in chapter 8.

As referred to in chapter 1, e-learning was introduced in Telenor as a strategic tool for internal competence development and organizational change. The long-term goal was to transform the company into a learning organization. As this section shows, this goal was only partially achieved. The weaknesses of the e-learning implementation that I have uncovered can, from my point of view, in part be explained by an underestimation of the following aspects: the large organizational span in work forms and learning traditions; the large span in ICT-competences and experiences; the complexity of the implementation process; the importance of specific roles in the implementation; and, the effect of external factors and challenges (e.g., financial challenges in the market). The lack of understanding for these aspects can, possibly, be a relic from the time when Telenor was a state monopolist, with a hierarchical and centralized organization and a focus on individual learning (see chapter 4). There might also be other explanations. As a result of the chosen implementation strategy, e-learning was by many employees and managers regarded a bureaucratic rule, not as a tool for change,

⁹² For instance user groups responsible for handling cross-organizational ICT systems and branding

improvement and development. The low e-learning engagement in some of the units in the period of recession indicates, further, that a downward economic trend calls for e-learning modules tightly linked to practice. However, this area calls for further research.

10.2 Discussion of key findings

While the previous section aimed to answer the research questions without any broader theoretical discussion, this section goes more thoroughly into three key findings of the study. Common for these findings is that they underline the complex relationship between humans and technology, and the challenges represented when technology is introduced as a tool for learning and development in the workplace. Together the three problem areas illustrate how difficult it is to implement e-learning according to a top-down implementation plan, across multiple organizational levels, when the aim is to make e-learning sustainable. Chapter 6 illustrates this challenge. The shortcoming of the implementation plan and the partial success of the e-learning implementation can partly be explained by Suchman (1987) who points to the *emergent, contingent nature* of human activity as a reason for why it is difficult to shape activity in a top-down fashion. *This* study, which looks at real behaviour in real situations, makes this challenge apparent. The modification of the e-learning idea through three critical, poorly guided transitions (chapter 6) is a good illustration of this aspect. The study also demonstrates, however, that goals and plans, at least when they are locally created, can have a considerable adaptation force on activity. This is supported by the Activity Theory. In two of the units with the highest completion rates, detailed planning was carried out in advance of the implementation in order to prepare for, and structure, the e-learning activity. This is assessed as one of the reasons for success.

Based on this study, three findings should, from my point of view, be given increased attention, especially when e-learning is implemented in a working environment with a large span in work, ICT literacy and multiple organizational levels. They are:

- E-learning as a complex artefact
- The Introduction Coordinator (IC) and the Exploitation Coordinator (EC)
- E-learning as part of work

The three aspects are discussed in the following sections.

10.2.1 E-learning as a complex artefact

An important finding of this study is associated with the notion of the “complex IT artefact” (see chapter 5). This term was originally introduced by Orlikowski and Iacono to refer to “those bundles of material and cultural properties packaged in some socially recognizable form such as hardware and /or software“ (Orlikowski & Iacono, 2001, p. 121). Based on the empirical analysis and inspired by this terminology, I introduce the term “e-learning artefact” and suggest that the complexity of this artefact until now has been underestimated in the corporate e-learning literature. Chapter 7 illustrates that there are understudied challenges connected to the *use* of e-learning, primarily related to:

- The interplay of e-learning modules and the technical infrastructure for e-learning, and
- The individual’s perception of the new learning tool once it is introduced

As pointed to in this study, these issues hampered the TA’s work and reduced the e-learning activity among large groups of employees. Only to a small extent are these aspects discussed in the corporate e-learning literature (e.g., Cross & Dublin, 2002; Jochems et al., 2004; McCormick, 2001; Simmons, 2002; Suchman, 1987). When they are dealt with at all, the main focus is placed on the interplay of e-learning modules and the technical infrastructure. In general, ‘e-learning’ and ‘e-learning systems’ are talked about as a whole, as a seamless or single piece, or, as *one* single component. My case illustrates, however, that this picture should be more nuanced and balanced. In the first unit to relocate (TBS) there was an incompatibility between the different components in the installation, PCs, network connections, (matching) bandwidth, LMS and e-learning modules. This is a mismatch between different hardware components in the infrastructure, and between hardware and software components. It resulted in an insurmountable number of problems and elicited a lot of frustration. Also, the incompatibility between the applications that interacted in real-time with the database (e.g., between the SAP application and the LMS) represented a challenge. This can be explained by Star and Ruhleder (1996) who argue that an infrastructure does not grow *de novo*, but wrestles with the ‘inertia of the installed base’ and inherits strengths and limitations from that base. An installation of e-learning also inherits the strengths and weaknesses of the installed base, even when the installed base is rather new (as in this case, defined by the infrastructure of the new headquarters). To ensure a successful implementation, I therefore claim it necessary to look at the e-learning artefact as recommended by Orlikowski and Iacono (2001, p. 31), as a multiplicity of often fragile and

fragmentary components that seldom are fully integrated, can break down, and in many situations even shut down. For such systems to work they will need: 1) a well-defined infrastructure that will keep the components together, and 2) components that are made to integrate with other components and which can be enhanced with new components. This two-way compatibility was not present at the old locations except for in two units where the TAs, in advance of the relocation, had prepared for this.

This study also indicates that different individuals perceive one and the same e-learning module, one and the same LMS, one and the same infrastructure, and one and the same problem, very differently. For instance, the abrupt (system initiated) log outs and the disappearing log data of training progress were totally ignored by some end-users, whereas for others they created frustration and anger, and, in some instances, led to reduced learning activity or even a total rejection of the e-learning modules. Documentation of these individual differences is also to a large extent absent from the corporate e-learning literature. However, a notable exception is Simmons (2002) who indirectly mentions this aspect by speaking about the “perceived difficulty of using such a system [e-learning]” (Simmons, 2002, p. 21). The fact that various employees have different experiences, ICT competence, expectations and needs, and that these aspects influence their personal perception of e-learning, is only discussed to a small extent. Neither is the introduction of e-learning in an increasingly complex working environment questioned. Some of these working environments already have large demands on individual computer skills; many of them are also staffed with people having a keen interest in electronic gadgets. Chapter 7 clarified and addressed this issue and documented how the unit that, from my point of view, exhibited the largest technological curiosity and had some of the most advanced ICT users, received top-scores and high completion rates, despite the minimal support from the training administrator, and despite the control and follow-up being nearly absent. Inspired by the assumption that the information infrastructure is *fundamentally and always a relation* (Star & Ruhleder, 1996), and that ICT artefacts are always embedded in some community and culture (e.g., Engeström, 1987; Orlikowski & Iacono, 2001; Säljö, 2000), I suggest that the large span in the employees’ ICT literacy, technology skills, previous experiences and cultural and material conditions, should always be taken into account when an implementation plan for e-learning is put forward.

In summary, looking at the e-learning artefact as a set of components that needs to be integrated to perform together, I identified the following issues as important to consider when the complex e-learning artefact is implemented in a large and heterogeneous organization:

- Local identification of infrastructural requirements based on situational demands
- A tight coupling of central and local planning
- Identification of local ICT expertise and technological skills
- A view on support and assistance as complementary to current skills

10.2.2 The Introduction Coordinator and the Exploitation Coordinator

As pointed to in chapter 4, the e-learning project groups were responsible for *planning* and developing new e-learning modules, while the top managers and a number of coordinators were expected *to put e-learning into use*. Due to minor engagement from the top management group, however, it was first of all the coordinators that operationalized the implementation. A key finding of this study is that *the way these coordinators played their role, their specific characteristics and their experiences*, to a large degree affected the e-learning activity and in many ways influenced this activity. This happened both at company level and in the four business areas. This section focuses on the typical characteristics of a successful coordinator during two crucial phases:

- The introduction phase, and
- The exploitation phase

During the *introduction* phase the most successful coordinators were marked by the following characteristics: they all enjoyed the top manager's trust; they had broad internal credibility; they motivated their employees; they explicitly expressed the internal expectations; they were demanding as well as understanding; they were capable of adjusting the e-learning activity in alignment with internal needs; and, they pushed the e-learning activity with a large engagement. Common for all of them was that they played their role with a high degree of involvement, and established a tight relation to all levels of management (see chapter 7). Based on these empirical findings, I suggest that when the aim is a successful, large-scale introduction of e-learning, key actors possessing this set of characteristics should be available at all organizational levels. Some of these characteristics are indeed listed in parts of the workplace e-learning literature. While simple attributes such as leadership (Ely, 1999), sponsorship (Rosenberg, 2006) and involvement of 'the right people' (Munkvold et al., 2003)

are mentioned, the majority of the literature focuses instead on *specific roles*⁹³ such as champions (Rosenberg, 2001), stakeholders (McGuire & Goldwasser, 2001), signal people (Ognedal & Dahl, 2005), tutors (Devlin, 1993), super users (Andresen & Digernes, 2005; Devlin, 1993; Åsand et al., 2004), and gardeners (Kanstrup, 2004). No matter what concepts are used, a common feature of most of this literature is, as pointed to in my study, an emphasis of the value of locally anchored people with a strong involvement. However, the reviewed literature gives little attention to personal characteristics such as authority, independence and credibility, and the coordinator's ability to build relations with management, all attributes that emerged as important in this research. This role is in chapter 7 referred to as an *Introduction Coordinator*. Characteristic for this person is an ability both to push the new initiative as well as to adapt it to task-specific needs.

After the introduction phase, the e-learning projects were dissolved and the responsibility handed over to the operational units. In this exploitation situation, when it was expected that e-learning would be spread to new areas, some additional characteristics of the successful coordinators were observed. These included familiarity with the current production, knowledge about internal history, and requirements and information about the local needs and ongoing change processes. It was also important that the coordinators were part of the business culture, managed to involve other change agents, and not least, had their own formal and informal network (see chapter 8). In other words, it was their ability to combine information about the company's or unit's history and future challenges with the emergent opportunities of the new learning technology that became crucial in this phase. Some of these aspects are also pointed to by Suchman (2003), who, in her study of a large bridge-building project, argues for giving attention to the importance of building "a figurative bridge between the fields of technology and organization" (Suchman, 2003, p. 201). From my point of view, the described characteristics were an absolute necessity for whether or not e-learning would be sustained in the long run. With a few exceptions (Attwell, 2004b; Collis & de Boer, 2002), this kind of characteristic is nearly absent when the corporate e-learning literature discusses potential success factors in the exploitation phase. Building on research about workplace learning, change management and technological innovations, chapter 8 argued for introducing a new role, the *Exploitation Coordinator*, who incorporates just this additional set of characteristics. I suggest that to succeed in this phase, this new role must go beyond

⁹³ The top manager role is also mentioned (e.g., Jones & Laffey, 2002; van Dam, 2004) as important in the first part of the implementation. This role is, however, mostly seen as a resource in the anchoring of the project.

technological and social aspects to include business specific knowledge, and an ability to integrate the conflicting needs within the organization. Characteristic for this role is therefore an ability to play the role of a broker.

Thus, to coordinate the implementation and to contribute to the sustainability of e-learning in the long run, I propose that two different sets of characteristics are required, one for the introduction and one for the exploitation phase. Both sets of characteristics can, however, be possessed by one person.

- The Introduction Coordinator – capable of pushing e-learning and adapting e-learning to internal needs
- The Exploitation Coordinator – capable of combining information about the business's history and future challenges with social properties and knowledge about technological opportunities

10.2.3 E-learning as part of work

Since the short-term goal of e-learning was to prepare all units for the same type of technology and ways of working, it was not surprising that Telenor chose a standardized implementation approach for e-learning in the company. In fact, it is this kind of approach that most frequently is recommended by the corporate e-learning literature (see Rosenberg, 2006). *A key finding in my study was, however, that a successful implementation mainly depended on the extent to which e-learning could be, and was adjusted to fit the different unit's ways of working.* Two specific issues are discussed:

- The e-learning *content* and
- The e-learning *delivery*

The aim of workplace learning, according to Victor and Boynton (1998), is to support or transform current production. Similar expressions, although couched in other terms, can be found in the corporate e-learning literature, for instance by Edmonds (2004), who recommends developing content that matches the business situation, and by Devlin (1993), who advises focusing on a 'need to know'. In Telenor, work-relevant content also turned out to be important, both in the first and later parts of the implementation. Of the three units that made changes in the default implementation plan, two units decided to make only the most relevant e-learning modules compulsory. Despite this, relevance to work was still identified as

one of six important problem areas during this period (see chapter 7). During exploitation, the focus on business relevant content became even stronger. At this time this issue was even used as a criterion for whether a module was going to be produced or not. It should be pointed out, however, that the ongoing recession that characterized this latter period, also influenced these decisions.

It was not only the e-learning content that was aligned with the production. Three of the four units also modified the delivery of e-learning (e.g., the number of compulsory modules, the proposed support structures and the division of implementation tasks) in the relocation phase. The learning statistics computed by the LMS at the end of this period are revealing in this regard. All the units that had adjusted the implementation plan to their internal work processes achieved remarkably higher completion rates (see chapter 3) than the unit with a large discrepancy between the work and the implementation process. A further adaptation of the e-learning delivery to local business needs took place in one of the units during exploitation. Only in this unit, characterized as the “Factory” in Telenor, was LMS-delivered e-learning sustained. In the three other units, characterized by teamwork and networked learning, e-learning was not sustained and instead contracted. Whether e-learning, with an LMS with enhanced opportunities for communication and knowledge building would have survived in these units, however, is difficult to say. The category ‘adaptation to local production’ that has been ignored in the corporate e-learning literature, requires, from my point of view, a follow-up study. Such a study is not at least of interest since similar thoughts during the last years have been presented in research on workplace learning. For instance Lahn (2005, p. 69) argues for a differentiated learning strategy in large business organizations that takes the different types of work processes into account. According to him, it is not only the intentional and organized learning that calls for such a differentiated strategy, but the learning environment as a whole. Similarly, Virkkunen and Pihlaja (2004) propose, from a developmental work perspective, that an organization’s learning system should be equivalent to the organization’s production system (see section 8.5).

Thus, mass production-like e-learning in Telenor survived first of all when it was used for mass production-like tasks and/or in mass production like units. In units with quite different working and learning traditions, e-learning activity was not sustainable and disappeared. This

may indicate that matching logic between the work processes and the e-learning system⁹⁴ can be an advantage, or also a pre-condition for the sustainability of e-learning. This finding can help to explain the previous contrasting research about competence development in times of recession (see section 2.1.3). While Nordhaug (1993a) claims that corporate education budgets in such periods are often used as a balancing item, and that it is the most vulnerable units that are first to remove this expenditure, Ellström and Nilsson (1997) instead suggest that downturns will result in a number of new training initiatives. Empirical data in my study does not clearly support any of these conclusions. Instead, the findings indicate that e-learning contracted in both units with a bad economy and in units with a good economy. In some of the latter type of units, e-learning even contracted despite a continuous focus on development of new products and services. It should also be noted that the total number of new modules created in the company as a whole was not exceptionally high, although these years represented one of the hardest times in Telenor's history. However, as pointed to above, in the mass production-like unit e-learning survived and new modules were developed, although the financial situation in this unit was also demanding. This indicates that the survival of educational initiatives in periods of recession, probably are far more complicated than initially suggested by the two authors above (Ellström & Nilsson, 1997; Nordhaug, 1993a). The data I report gives reason to believe that the content itself (when relevant to task at hand) is a decisive factor for whether or not the educational initiatives will survive. However, this is still an open issue since I do not have conclusive evidence to support it. For workplace e-learning to be sustainable in a large heterogeneous organization, I propose that:

- E-learning content should be adaptable to *local needs*
- Implementation plans must give room for a *differentiated approach*
- Implementation of e-learning should be carried out in accordance with the prevailing *production process* in the respective units
- The e-learning system should, as an integrated whole, be arranged to match the current or future *learning system* in the different units
- *Relevance of content* is a decisive factor

More research is, however, needed. With empirical data from the two most heterogeneous Telenor units as a departure point, I suggest that a differentiated approach can also be of

⁹⁴ The term 'e-learning system' is here used according to section 8.4.3. It includes e.g., the LMS, the e-learning content, the way the modules are implemented, how they are used and how they are integrated with other traditional learning events.

relevance for smaller companies with a heterogeneous production. This aspect is further discussed in section 10.4.

10.3 Implications

This research has practical implications. The following implications are elaborated on in this section:

- The importance of context
- Comprehensive planning
- A checklist for implementation of work-integrated e-learning

10.3.1 The importance of context

From a socio-cultural perspective a view on context is crucial. This means that e-learning is seen as part of the work activity and cannot be seen in isolation. Thus, success factors and barriers in the implementation of e-learning will be tied to the situation in which e-learning is implemented and takes place, that is, to the workers in their everyday practice in their workplace. However, little research exists on how the e-learning activity emerges in different working contexts, e.g. in contexts with different learning traditions, different strategies for competence development and different individual expertise. *Based on this, I claim that there is a need for studying e-learning in different contexts/settings where e-learning is implemented with the goal of transforming work.*

The activity-theoretical analysis in chapter 7 identified a set of tensions and potential contradictions that underlay the problems that were manifested as disturbances in the network of activity systems. By viewing the interacting activity systems as the context, three specific contextual issues have been addressed in this chapter: the complexity of the e-learning artefact; the roles of the Introduction Coordinator and the Exploitation Coordinator; and, e-learning as part of work. The activity-theoretical discussion makes visible how contextual factors such as work, learning traditions and individual characteristics came to be decisive for the number of disturbances that emerged, how e-learning was perceived and adapted, and for whether e-learning was completed and/or sustained or not. For instance the completion rates in the second move were miles ahead of those in the first move, despite the support and

follow up being rather limited in both cases. One unit, TM, also had an essentially higher e-learning activity than one of the other units, despite the TA's engagement in the first unit being far more intense than that in the second one. I claim that these results were mainly a consequence of the large span in ICT literacy, technological curiosity, working traditions and knowledge acquisition in the two units. Besides, the e-learning activity was influenced by the unit's external challenges. It is also evident that the TA role in the first phase, when large parts of the e-learning activity was planned for by the project groups, was less critical than in the post-project period when the responsibility was handed over to the business area (see chapter 8 and section 10.2.2).

Despite the corporate e-literature seldom emphasising that the working context is of importance when e-learning is implemented in the workplace, this issue has been dealt with within the field of strategic competence development. This research has underlined that the situated nature of work and learning practice will require different types of implementation processes, different types of learning solutions, and different types of learning environment (Solheim, 2005). It is also well known that, at least within a large company, there are large variations in competence needs, competence strategies and internal constraints for learning (Lahn, 2005). Therefore, it should not be surprising when I suggest that personal characteristics of the employees, the implementation team and the management (e.g., computer literacy, capacities and previous experiences), will be of importance for the adoption of e-learning (see Star & Ruhleder, 1996) as well as for the outcome of the implementation process (Orlikowski & Iacono, 2001).

With this as a background, I argue that the research into workplace e-learning implementations needs a broader approach that takes the context into account when looking at critical factors, success factors and barriers. I also recommend a more differentiated implementation strategy when e-learning is put into use in the workplace, and especially when it is introduced enterprise-wide in a large heterogeneous company.

10.3.2 Comprehensive planning

As described in chapter 4, e-learning was introduced in Telenor as one of four strategic elements to build a modern and efficient organization. Measured in the form of completed e-

learning modules per employee (in the moving phase) and in the number of new modules (in the exploitation phase), there are grounds for saying that the implementation was less successful than planned. Although there are promising exceptions in some business areas and sub-units, and among some of the employees, the conclusion is that the goal to train the employees to handle the new working environment and transform the company into a learning organization, was only partly achieved. By identifying critical factors at four different levels, the aim of this section is to explain why the ambitious goal not was reached, and argue for a comprehensive planning of large-scale implementations of e-learning. Four types of factors are addressed:

- Factors related to the planning and completion of the enterprise-wide implementation
- Factors related to the specific business area
- Factors related to the e-learning system
- Factors related to the specific individual

First, the implementation of e-learning in Telenor spanned over multiple organizational levels, multiple project groups and a long period of time. To conduct this process and deploy e-learning from the top of the organization to the single end-user, a set of critical transitions had to be carried out, each of them with an opportunity for success or failure. The result in Telenor was, as pointed to in previous chapters (3, 6 and 7), a partial success. From my point of view, the complexity of the implementation process was underestimated in large parts of the organization, not least the final critical transition from project level to business area level (see chapter 6, 7 and 8). To manage the direction of the many critical transitions and ensure that the outcome was in alignment with the original e-learning idea, a far more detailed implementation plan, a better integrated project organization, enhanced information sharing and a much stronger involvement of key actors at different organizational levels would have been required. It should be pointed out, however, that a complete divide between plans and implementation, as claimed by Ciborra (1994), is dangerous. As he claims, no initial analytical formula will be able to address beforehand all events occurring during the implementation (see also chapter 6).

Second, the default implementation plan did not sufficiently take into account or leave room for business specific identities and business specific traditions. Contextual factors at business area level were, to a large extent, a non-issue in the planning. Despite a focus on flexible learning and the slogan ‘the right learning to the right people at the right time and in the right

way', the implementation rather became an attempt to make the main units conform and build a common Telenor identity. The fact that local challenges and potential conflicts between local and central needs seldom, if ever, were put on the agenda for discussion, contributed to a centralized approach, and consequently to a large span in e-learning activities in the different parts of the organization.

Third, the implementation plan did not address that an e-learning system is something more and something different than a strategic Information System (as an enterprise resource system). The plan underestimated that e-learning also represented a technological innovation and an initiative for learning and strategic competence building. Drawing on research from these three fields, the plan should have: 1) underlined the need for new working procedures (e.g., Solheim, 2005), 2) focused on elements of system attraction, motivation and reward (e.g., Gottschalk, 2004), and 3) taken into account that innovation takes time and requires interaction and learning (e.g., Bannon & Bødker, 1991; Lee & Kraye, 2003). This only partially happened. Instead, current work procedures mainly continued without any modification; the number of new e-learning modules was low and led to an uninteresting and static e-learning platform; and, the required process to teach the units how to produce their own content was carried out too late and was given too little resources.

Four, as it is well known from research on traditional learning, e-learning must also prepare and arrange for different learning styles, different learning strategies, competencies and technological literacy. Furthermore, it must be taken into account that different content can require different pedagogical approaches, dependent on whether the content has a more basic character, is near to work or is related to a specific situation. As referred to in this study, the implementation at Fornebu was planned as a standardized approach, irrespective of user needs, user competencies, previous experiences and the subject matter. Due to this, the same eight modules were defined as compulsory for all employees, without any opportunity for determination for need/ relevance and/or for extra support to those who needed it (see chapter 3). This might explain why relevance to previous experience (part of the category 'relevance to work and previous experience') emerged as one of the six problem areas in the first phase of the implementation (see chapter 7).

Hence, looking at the implementation process from four different levels, this study has identified four different types of factors for why e-learning in Telenor did not become the

planned success. These are: *general implementation* factors; *business specific* factors; *learning technology* factors; and, factors related to the *individuals' competencies*.

With this as a background, I claim that only by considering each of these issues in turn and as an integrated whole in the planning phase, will it be possible to handle this kind of complex implementation. *The study underlines the need for a comprehensive planning that handles the potential dilemmas between central and local level, integrates the local needs and challenges with the overall organizational ambitions and principles, reflects the specific characteristics of the e-learning system and takes into consideration individual learning styles, competencies and capacities.*

10.3.3 Checklist for implementation of work-integrated e-learning

Inspired by Victor and Boynton's five typologies of work (Victor & Boynton, 1998), Activity Theory's emphasis on internal and external factors (Engeström, 1987), Kaptelinin et al.'s (1999) checklist intending to elucidate the most important contextual factors of HCI, and the key findings made in this study, this section presents a Checklist aimed at assisting large-scale implementations of work integrated e-learning. As departure point for this list that primarily is meant as a tool for reflection, is a generalization of Victor and Boynton's suggestions ((that learning (e-learning) should match the production)), and an understanding that 'one size does not fit all' when e-learning is put into use in the workplace. The list also reflects an attitude that some 'new' contextual factors, beyond those that have dominated the corporate e-learning literature in the last years, should be given more attention. Although the checklist is mainly based on research in a large Norwegian telecom organization, I suggest that the questions also can be useful for smaller companies and for companies in other branches. By answering these questions, the ambition is to contextualize e-learning and encourage the different parts of the organization to reflect on what type of e-learning (and LMS) is needed, how the new learning technology can best be implemented, and what role e-learning is going to play in the company's and unit's competence strategy in the long run. The checklist does not identify those who should be responsible for reconciling the answers at company level and local level. This can not be decided a priori, only in relation to practice. It should be emphasized that the

checklist has not been thoroughly tested. This is still an open issue, and identifies an area for further research.

Table 10.2: Checklist for large-scale, enterprise-wide implementations of e-learning

Main focus	Company level	Local level
Work	What type of work dominates the different parts of the company?	What type of work dominates the unit or sub-units?
Learning	What type of learning traditions dominate and have dominated the company driven competence development?	What type of learning dominates and has dominated the unit or sub-units?
Information	What type of information / communication strategy is developed at company level?	What type of information / communication strategy is required at unit level?
Information Systems and technologies	Which Information Systems and technologies are integrated with the e-learning system?	Which local Information Systems and technologies are integrated with the e-learning system?
Support structures	What type of general support for e-learning is needed?	What types of support structures are required at unit level?
Development of work	How will cross-organizational work tasks be changed after the implementation of e-learning?	How will local work tasks be changed after the implementation of e-learning?
Object/purpose	What is the purpose of the implementation for the company as a whole?	Are there additional conflicting purposes at unit level?
Roles	Which implementation roles will be required?	Which additional roles will be necessary at unit level?
Implementation tasks	How will the implementation tasks be divided between central and local level?	How will the implementation tasks be divided at local level?
Success-criterion	What are the criteria for success at company level?	What are the criteria for success at unit or sub-unit level?
Conflicts	What are the potential conflicts between central and local ambitions?	What are the potential conflicts between central and local ambitions?
Challenges	What are the most important challenges and what type of development is necessary to cope with these?	Are there additional important challenges and what type of development is necessary to cope with these?
Changes	What changes are required for the company as a whole?	What changes are required at unit level?
Time	How much time is dedicated to the e-learning activity and the implementation tasks?	How much additional time will be allocated for the e-learning activity and the local implementation tasks?
Sustainability	How will the company prepare to ensure the survival of e-learning?	How will the unit organize for the sustainability of e-learning?

10.4 Further research

Several aspects of this work call for further research, for instance the two categories ‘Management Control’ and ‘Allocation of Time’. Four domains are, however, of specific interest from my perspective. *First*, to try out the checklist as a tool for reflection within a working environment that is going to apply e-learning as a strategy for change. The aim is to gain experience with this kind of tool and assess how the checklist can be used to make ‘better’ decisions with regard to the selection of an e-learning system and the development of an implementation plan. Domain two is first of all connected to the question of ‘generalization’ of my findings. Although, from a socio-cultural perspective, the context is always crucial and the implementation and use of e-learning will always depend on the actual context, the aim would be to study how the findings in this dissertation can be of relevance when studying other instances of e-learning implementations in large, heterogeneous business organizations or even also in smaller business organizations with a large span in production and services. This type of research opens the way for more knowledge about the importance of context in the implementation of work-integrated e-learning. This can contribute to the growing body of workplace e-learning literature with a more differentiated view on workplace e-learning implementations and a better grounding for this literature’s advice and recommendations about success factors, barriers and critical factors. Domain *three* takes as a starting point my proposal that the e-learning environment as a whole has to match the work processes if e-learning in the long run is to be sustainable. To be able to measure this kind of correspondence, a set of criteria for measurement is required. To develop such a set should be an area for further research. Finally, domain *four* takes departure in the fact that a successful implementation does not necessarily mean that the actual topic is learnt and/or the desired change is effectuated. The aim is to study just this, to identify how e-learning can contribute to a successful change and development, beyond a successful implementation.

10.5 Final remarks

Knowledge exchange and learning have always been important parts of developmental processes in the workplace. In general such processes are organized as projects and, mostly, they are supported by new digital information systems and new ICT technology. During the last years many of these change processes have, in addition, been assisted by different types

of e-learning initiatives. The experiences with this new learning technology, however, are rather diverse. The results, to a large extent, are reflected in the workplace e-learning literature as lists of success factors or barriers, and as recipes or recommendations for making the implementation and use of e-learning a success. The suggestions and prescriptions are mostly normative, in accordance with a management tradition focusing on the principle 'centrality of control' (see e.g., Ciborra, 2001).

However, studies of large-scale enterprise-wide implementations in the workplace are few and far between. A main aim of this dissertation has been to contribute to this research, and first of all, from a socio-cultural perspective, to identify critical factors when e-learning is implemented enterprise-wide in a large heterogeneous organization. From my point of view this type of study should be given more attention, not least as organizations in these post-modern times are growing, becoming more multifaceted and global. Another aspect is that e-learning has generally been used in large companies. Although this study has mainly focused on problems and opportunities in the *implementation* of e-learning, from the stage of adaptation to the stage of routinization (see chapter 2), it has also discussed factors that tend to influence the *use* of e-learning in different working contexts.

In contrast to the workplace e-learning literature, which mainly recommends a standardized implementation process, a crucial finding of this dissertation is that large, multilevel, complex organizations instead should prepare for a differentiated implementation process which takes the work in the different parts of the organization into account. Since organizations and their environment are in constant development, the implemented e-learning system should be prepared to give room for rapid changes in work. This means that the e-learning technology, as well as the implementation process, must be open for plurality and bear in mind that learning and development are always restricted by contextual factors. The study also makes visible that the implementation of e-learning is not "linear", as described in most implementation models. The process should rather be viewed as iterative, and with the different stages of the implementation partly overlapping. This is especially relevant when the adopter organization is large, the e-learning implementation is organized as a project, and the lower units are later expected to continue to pursue a principal learning initiative. Furthermore, with a centralized decision about an enterprise-wide implementation as a starting point, I suggest that all the six stages in Cooper and Zmud's model should be carried out not only at company level, but also at main unit levels, and maybe also at lower levels. From my point of view, a repetition of the implementation stages seems to be especially

critical when the responsibility for the implementation is transferred from the project group to the line organization.

As a technology, e-learning is neither cheap nor static. With a growing demand on return on investment, the demands for profitable e-learning investments will most probably increase during the next few years. It is therefore of great importance to have more research based knowledge about how a successful implementation of e-learning can be achieved, not least in organizations with a heterogeneous production, and given the realities of both financial and time investments. Through this work I have tried to contribute to this knowledge. It is my hope that the dissertation can be a useful supplement to the many normative suggestions and prescriptions that so far have characterized large parts of the workplace e-learning literature.

An important goal of an implementation of e-learning is that the individual employee and the organization as a whole shall learn. From a socio-cultural perspective, however, learning is synonymous with collective development and meaning making. The main focus is therefore on collective processes and individual's interactions with people and artefacts in the context of everyday practical activity. Individual learning outcomes and their effect on the company's production and services have only been discussed in this work to a small extent. This area calls for new research. The results of this type of research, in Telenor or in other organizations, will be crucial for whether e-learning in the long run will be sustainable and develop.

An enterprise-wide implementation of e-learning in a large organization represents a great challenge. Carrying out this implementation in parallel with the relocation to a new headquarters presents, maybe, an even greater challenge. Although this study shows that the implementation of e-learning in Telenor was less successful than planned, and, the organization as a whole, never reached the ambition 'to become a learning organization', the company deserves praise for having taken this job on board. And, from my point of view, they have carried out an impressive piece of work. The hope is that others can learn from their efforts.

Chapter 1 presented e-learning as an "idea on a journey". This dissertation has shown how this idea, that around the millennium was regarded as one of the most optimal and efficient tools for future-oriented modern organizations, also flowed into Telenor, where it was reinterpreted and reconstructed several times. According to Røvik, who introduced the concept, these ideas can either disappear, pursue to exist as a ritual in a few units within a

company, or they can become part of the routinized activity within an organization. They can also be stored for a period of time to be retrieved and re-vitalized at a later date. These different lines of development are, as a whole, reflected in the journey of e-learning in Telenor. Today, six years after the first e-learning module was introduced, e-learning is still in use in parts of the organization. In others units, it has fully disappeared. From a global perspective, however, e-learning, continuously, flows into new organizations, private as well as public, where it is applied as a more or less significant part of the internal competence development of the employees. However, despite this and despite a growing body of literature in the e-learning field, e-learning is no longer the hype it was in the beginning of the millennium. Instead of being a characteristic of future-oriented, cutting edge organizations, e-learning is now, to a smaller or larger extent, applied by rather mainstream organizations as part of their daily activities. Furthermore, workplace e-learning is still changing – in accordance with new technological opportunities, the anticipated ICT competence among employees and new organizational requirements, and also, hopefully, new research-based knowledge about implementation and use of technology enhanced learning. Thus, the journey of e-learning is not yet complete.

Appendix A

Some examples of interview guides used during different parts of the implementation process

A1: Interview guide for the interview with the TA in TN 2002.

- Can you describe the TA's responsibility and tasks?
- Where is the TA positioned in the implementation process?
- Who did you collaborate with?
- Why were just you appointed as TA – and what was your previous position in the business area?
- But when were you hired as a TA?
- How were you prepared for the TA role before and after moving and how could you influence the introduction and implementation of e-learning?
- How did you organize the implementation of e-learning?
- Can you describe some aspects that you assess as important?
- For how long have you been engaged as TA?
- How do you collaborate with the representatives of the e-learning projects, the management level, people responsible for organizational development, and parallel projects?
- How is the responsibility divided between the project organization and the business areas?
- Can you describe how the learning platform is going to be used?
- Who is going to decide which modules will be launched from the LMS
- What support structures are arranged to ensure that the e-learning modules/the use of the LMS succeed?
- How is the e-learning activity going to be measured and administrated?
- What are the short-term expectations to e-learning at company and business area level?
- Who is responsible to provide for that the expectations of e-learning being realised?

- You have told me a bit about how you were involved in the implementation of e-learning - how were you prepared for this job before the relocation?
- Has there been any exchange of experience between you and the first-moving business areas?
- I have heard that there have been some changes and improvements in the implementation process compared to the first moves. Can you tell me about this?
- Can you carry out some of the modules as part of a virtual class or in the learning centre at Fornebu - and how does this work?
- Why is the LMS now referred to as Learn@Telenor and not as Saba LMS?
- What is your own opinion about the e-learning modules?
- What modules have you carried out?
- How many modules were compulsory in this wave – before and after relocation?
- What do you mean about the arrangement with compulsory and optional modules?
- Do you have any sanctions available?
- Are you of the opinion that the modules that you have completed have been useful and relevant?
- How are the modules carried out – are some of them completed in collaboration with others?
- Who participated in these workshops?
- Do you think that the implementation process and the use of e-learning could have been carried out in another way, for instance with respect to the pedagogic approach, the organization and the technology?
- You appointed local TAs – how did you follow up these local TAs?
- For how long will you follow up these people?
- How are the leaders prepared for e-learning and how is e-learning anchored at management level?
- Do the leaders get some extra support – beyond the support given to ordinary employees?
- Do the leaders carry out the compulsory modules?
- You produce learning statistics – at what detail level do you produce this statistics and how do you use them?
- How did your business area measure that you succeeded with e-learning?
- How did you involve the Floor Managers in the e-learning activity?

- How will your unit use e-learning as part of the internal competence development?
- Now, fourteen days after relocation, how do you think that your business area has succeeded in the implementation of e-learning?
- Are there any differences in the completion rates before and after moving?
- Do the employees carry out the modules that they need?
- Do you give any response if they do not complete the e-learning modules?
- Do you think that e-learning in the long run will affect the ways of working in the organization?
- Has e-learning contributed to increased collaboration among the employees – and if so, how?
- In what ways do the leaders engage in e-learning?
- How do you assess the side-effects of e-learning?
- Can you, as for yourselves, describe the most important learning during the implementation process?
- Representatives of the project group have told me that you have done a quite good job. Have you made any reflections and why?
- Are you satisfied with the follow-up from eRAF?
- Now, as the e-learning activity related to the relocation is nearly finished, do you think that you would have been able to run the implementation process quite on your own?
- Thanks for the interview.

A2: Interview guide for the interview with the person responsible for e-learning at company level - 2002

- What position, responsibility and work tasks do you have?
- For how long have you been employed in Telenor – and as part of the group management?
- Has your work changed after the moving to Fornebu - what about mobility and flexibility?
- You have been the project owner for eRAF Læring - what does that job imply?
- Can you tell me about the organization of the project, the mandate, the aim of the project and why it was started?
- Can you also explain why Telenor chose to carry out the project as they did (process, technology, pedagogy) and what assessments were made when the members of the implementation teams were appointed?
- What criteria were specified in order to measure the success of the project?
- With these criteria as a departure point, to what extent do you mean that the project has succeeded?
- As for yourself, what criteria did you have to measure the project success?
- Can you say something about the project costs?
- With whom do you collaborate in this project with respect to the learning activities – who is the most important person that you collaborate with?
- Who is the most critical person to make the project succeed?
- Can you, dependent on your experiences in this project, describe the most critical factors for learning in the organization?
- How do you, as part of the management group, understand the term e-learning?
- Why did you choose to use e-learning as you did in Telenor – the process in advance – how did you believe that the modules should be applied – why did you decide to use e-learning just in this way – why did you think about collaboration or lack of collaboration – new ways of working etc. – in other words, what was the goal of e-learning in Telenor in the short and long run?

- I visited Telenor one week after the first relocation. Now- eight months later – is the implementation process changed- why did you change the implementation process- what have you changed - is this change a result of organizational learning – and has this change introduced new dilemmas?
- How has the management group anchored the project in the organization – what initiatives have been taken to ensure anchoring at different management levels – examples- sanctions and incentives?
- How has the demand for high completion rates affected the e-learning activity among leaders and employees?
- Can you describe how you, yourself, have used the LMS – what modules – good/bad aspects – what makes the modules good or bad – relevant – useful - navigation – how much time have you set aside – and how do you assess them?
- What have you learnt from the e-learning modules – how did you carry out this learning – together with others or alone- difficulties?
- From your point of view, what is the largest effect of the implementation for Telenor as a company?
- Would you have been able to do just the same work without the e-learning modules?
- When you look back, what elements would you have changed – pedagogy – organization – technology?
- What is the most important thing that you, as a person, have learnt from this implementation process?
- And what is the most important organizational learning of the e-learning activity and the moving to Fornebu – learning as a result of collaboration – learning about collaboration – what has the organization learnt from this way of working?
- What are the most important side effects of the eRAF project?
- As far as I know, has it been important for the organization to coordinate projects and processes – why – how – and what effects?
- The eRAF Læring project is now about to close – how will the company use the knowledge and competence that has been achieved during the process – can you illustrate this?
- How will you arrange for this to happen?

- Can you tell me something about how Telenor think about competence development - how will the learning activities continue – what are the plans- and are they manifested in strategies?
- New ways of working have been an important aspect of the relocation to Fornebu – why and how – what are the results of this policy – new patterns of collaboration – new work communities – employee workshops – have you seen any effects of this initiative?
- Telenor has invested much in this project – not only money but also prestige – how will this project be used inside and outside the organization – how do you think about commercialization of the e-learning activities, the processes and so on?
- Thank you for the interview.

A3: Interview guide for the interview with the project leader of eRAF Læring - 2002

- What position, responsibility and work tasks do you have?
- For how long have you been employed in Telenor – and as part of the group management?
- What is your role in eRAF Læring - what implies this role and why were you engaged?
- Can you tell me in brief about the project?
- The project eRAF Læring has a mandate and a steering committee – can you tell me about the mandate and how the people were appointed?
- Are there any connections between this project and other projects?
- What is the meaning of e-learning in Telenor – what is the role of e-learning – and how do you and other employees understand the idea of e-learning?
- Why was e-learning chosen instead of more traditional classroom courses – what were the desired effects?
- What did you achieve with this implementation – and what did you not achieve?
- What was decisive for the chosen learning platform and who made the decision?
- Why were the opportunities for collaboration functionalities in the platform not purchased?
- What reflections were made about pedagogical approach beforehand?
- What are the experiences related to the chosen pedagogy – improvements?
- Why were just the chosen twelve modules developed?
- The dilemma flexibility and collaborative e-learning.
- On what principles, from your point of view, should forthcoming e-learning modules be developed – pedagogical- organizational – technological?
- How were the users involved in the development of the current e-learning modules – user anchoring in the implementation process?
- How was the leader involvement and leader anchoring in the different business areas?
- Why compulsory learning – why were some modules compulsory and others optional – what changes happened with respect to this from the 2nd to the 3rd move?
- Afterwards – was the idea of compulsory learning a good idea?

- Telenor argues strongly for new ways of working – at the same time are those e-learning modules optional – why?
- What changes were made in the implementation process from the second to third wave and why?
- Now, how do you evaluate the result of the implementation process – would another approach have been better – if so, how should the process have been organized?
- Did the same process of implementation give different results in different units - if so, how do you explain this?
- Why were completion rates chosen as measurement – why do you not measure what they have learnt?
- I see that the four business areas give different attention to hardskills/softskills?
- How is e-learning reflected in Telenors overall strategy and in the business area strategies?
- What did this implementation cost?
- Strategy for competence development – what are the plans with e-learning in Telenor?
- How will the organization use the e-learning project inside and outside the organization?
- From your point of view, would it have been possible to relocate without having the e-learning modules?
- Were potential success criteria specified in advance?
- To what extent has e-learning in Telenor been a success?
- From your point of view, how will e-learning be a part of the further competence development and learning strategy in Telenor?
- Which actors are critical for the further implementation and development of e-learning?
- Which processes are from your point of view important to stimulate?
- Will similar implementation models as the one used to implement e-learning be applied in the future?
- Do you believe that completion rates are an adequate measure to measure e-learning in the future – what alternative approaches would you recommend?
- What has been the largest problem in this large-scale e-learning implementation?
- What aspects need to be improved to enable a large-scale use of e-learning?

A4: Interview guide for the interview with the responsible for design and development of e-learning in the Customer Support unit in TM – 2003

- Refer to the previous interview in April 2002.
- Describe what I have done in this period.
- What position do you hold now?

Main issues:

- Primarily look at different e-learning modules - get information about how they are used (a blended or an e-learning approach) – were the implementations of the modules organized as projects or not?
- Strategy document.
- What modules have been successful – why?
- What are the goals in TM with respect to e-learning - what is done to achieve these goals?
- What activities support the e-learning – at different organizational levels – and towards different actors?
- Has the unit managed to reach these goals through these activities – what is achieved – why – why not – what were the critical factors?
- You told me last time I met you that the success of e-learning is measured against the customer's assessment of the consultants - can you tell me some more about this assessment?
- Does your unit focus on change when e-learning/blended learning is implemented?
- Has the e-learning activity resulted in changes at unit level – why – why not?
- What factors are the most critical when the aim is to use e-learning as a tool for change?
- Has the e-learning activity affected the units in some ways – how and why?
- What are the critical factors for making e-learning into a success?
- I have identified six critical factors in the implementation of e-learning in a large organization – how do these factors match your own opinion of critical factors in the implementation process – have you observed other critical factors - can you describe how you assess the relations between these critical factors?

- What aspects do you assess as the most critical when the implementation of e-learning is handed over from a project organization to the line organization?
- What has happened to e-learning in this unit since April 2002?
- Can you describe some e-learning modules that have appeared to be a success – and some modules that not have become a success? Can you reflect on why?

Appendix B

In the period 2002-2005, a lot of e-learning modules, beyond those developed for the relocation, were developed and delivered via the LMS. The following list describes the information that was collected about these modules:

- The name of the module.
- The content of the module.
- When was the module launched?
- The purpose of the module.
- Was the module developed as part of a project?
- Other reasons for why the module was developed?
- The target group of the module (who – number of persons – distributed or co-located target group).
- Who owns the module?
- What type of technology was used (audio - video – animation – only PowerPoint).
- Who/which unit decided that exactly this module was to be developed?
- How was the target group informed about the new e-learning module (e-mail - intranet - other types of information)
- Compulsory – or optional?
- How was the module introduced/carried out (alone or together with others - combined with and before a classroom course – combined with and after a classroom course – in combination with workshops – other ways)
- Where was the module carried out (alone at the desk – in plenary sessions – from home – from other locations)
- Was the module spread to the whole target group at the same time – or gradually?
- Time limits – no time limits.

- Language (English – Norwegian) – why?
- How much of the modules had to be finished to be approved – 80% or 100%?
- By whom or where was the module anchored – by the top management – middle management – nearest leader - others?
- How was the module anchored?
- Who was responsible for following up (nearest leader – Training Administrator – Floor Manager - others)?
- Were the LMS reports used for follow-up?
- Who reminded the employees to complete the module?
- How was this reminder sent (face-to-face – e-mail – intranet – no reminders)?
- Were incentives used to encourage the e-learning? If so, what kind of incentives?
- The completion rate of the target group.
- Experiences – how successful was this e-learning module – can you explain why – why not?

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