

A New Management Role – A Precondition for Successful E-Learning Implementations

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1. Introduction

Over the past 15 years there has been a significant increase in e-learning implementations – in schools, in academia and in the workplace. The scope of the initiatives has varied, from embracing only one single unit (e.g. a class, course or department) to covering a whole organization. In common for most of the implementations, however, is that they are arranged as projects, are introduced as a tool for change, and are accompanied by expectations of rapid success.

High-quality implementations of e-learning of course exist, but many initiatives fail, and so far only a few projects have contributed to broader institutional changes (Collis, 2002; Lepori, 2003). This is the case, according to Attwell (2004), because the adoption and especially the sustainability of e-learning represent a large organizational challenge. To aid in the introduction of e-learning, the e-learning literature therefore has identified a lot of barriers, success factors and critical factors that should be attended to in the implementation process (e.g. culture (Cross & Dublin, 2002; Rosenberg, 2001), champions (Rosenberg, 2001), ICT-management (Broadley, 2007) and motivation (van Dam, 2004)). Unfortunately, the terms mentioned have mostly been specified without reference to contextual factors, e.g. the aim of the implementation, the size and type of organization, the type of e-learning technology, ways of working, the organization of the implementation and whether it was enterprise-wide or limited to only one or a few units. This is also the case when the e-learning literature refers to the *role of management* as a critical factor, using terms like ‘top leadership commitment’ (Jones & Laffey, 2002), ‘top management support’ (van Dam, 2004) or ‘sound leadership’ (Rosenberg, 2001).

The aim of this chapter is to illuminate this management role when e-learning is put into use in an organization. By presenting three different e-learning implementations and discussing the role of management in each of them more closely, the objective is to capture the essence of how the manager can affect more specifically the outcome of the implementation process, to make e-learning sustainable, and to utilize it as a catalyst for institutional change. To achieve this, two different perspectives are integrated in the analysis: a general perspective, focused on e-learning as a means for organizational development and learning, and an individual perspective, focused on how e-learning is adopted and experienced by individual learners. In this way, this chapter intends to contribute to the e-learning literature in a field in which until now, according to Hauge & Erstad (2011), there has been little research.

In order to examine the complex landscape in which e-learning is to be implemented and integrated, be it a school, a university college, or a business organization, Activity Theory (Engeström, 1987) is introduced as an analytical resource. Instead of directing attention towards problem-solving at the individual and group levels, which is typical in many theories about organizational learning and change, a characteristic of this theory is that it directs attention instead towards *the objects* of the activities and how these are created through interaction, contradictions and tensions between social, material and cultural forces within the organization and/or between the organization and its environment (Engeström, 2008).

The first part of this chapter gives a brief overview of the development of e-learning in organizations (1.1), how the research and literature dealing with e-learning implementations in work organizations and educational organizations emphasise and refer to the role of management in the implementation process (1.2), and relevant aspects of Activity Theory (1.3). In the second part of the chapter, three empirical cases are presented and more broadly discussed (2.1, 2.2. and 2.3). Section 3 closes the chapter by giving concluding remarks and a brief overview of further implications.

1.1 E-learning in organizations

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

- Learners can access the materials at their convenience (educational accessibility),¹ and
- Learning has the potential for employee-employee interaction and communication (social interaction).²

These two dimensions have given rise to two essentially different approaches to e-learning – e-learning as a tool for instruction and e-learning as a tool for information and knowledge sharing (Netteland, 2008). Both approaches were present among the countless definitions of e-learning that emerged during the first part of the new millennium, a period by VanDam (2004) referred to as the first wave of e-learning. Nonetheless, a review of large parts of the e-learning literature from 2000-2002 indicated that at first it was a narrow view on learning that dominated the definitions, especially when talking about workplace e-learning. The main focus was on individual learning, online delivery of content, opportunities for skill development, and, to some degree, on information sharing as well (Netteland, 2003). A similar focus also existed to a large extent in the educational sector, but in this case the definitions had a larger emphasis on dialogue, interaction and collaborative activities, and focused less on content. This distinction was also reflected in practical work; while e-learning in schools was often combined with classroom teaching, social learning forms were nearly absent in the workplace. This was probably the reason why, beginning in 2001, many work organizations introduced so called *blended learning* (Kishore, 2002), i.e. e-learning combined with face-to-face learning activities (Netteland, 2003). Another

¹ This type of learning is reflected in the terms ‘just-in-time learning’ (see Davenport & Glaser, 2002) and ‘learning on demand’ (see Fischer, 2001).

² This type of learning, with the 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, generally describes web-based services managed by participants.

characteristic of this first wave of e-learning that is of interest in this context, was, that the implementations mainly were restricted to one or a few units. At this time, enterprise-wide implementations were nearly non-existent.

From 2004, e-learning was gradually enhanced with tools for online interaction and collaboration, and little by little also with Web 2.0 applications and services, especially in educational settings. Despite the fact that some work organizations gradually have put web collaboration tools and 2.0 applications into use (e.g. in the form of wikis, social media and web-based conference systems), 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. Or, as Rosenberg (2006) formulated it, workplace e-learning is limited to e-training or courseware online, mostly with a relatively static content. Although the situation is slowly starting to change, so far tools for collaboration and knowledge-building have mainly been applied as a resource for learning in educational institutions. But pedagogical change takes time, and according to Karasavvidis (2010), typical e-learning approaches—at least in higher education—still tend to replicate traditional transmissionist practices, which are mostly based on behaviorist conceptions of learning (Karasavvidis, 2010).

1.2 The manager in e-learning implementations

While to a large extent the literature about e-learning implementations in educational institutions has directed attention to the *use* of digital technologies, the workplace e-learning literature has focused primarily on the *implementation*³ of these technologies. Looking at the role of management in the two different contexts is therefore rather challenging; the analytical units will necessarily differ. Since the main goal of this chapter is to examine how the role of management affects implementation and contributes to making e-learning sustainable and catalytic for institutional development, this research overview mainly *focuses on the management role when organizations put e-learning into use—not on the potential learning outcome of these implementations.*

Taking as a point of departure a review of forty publications⁴ in the workplace e-learning field, Netteland (2008) identified the following set of management/leader-related barriers, success factors, and/or critical factors:

- Barriers: weak sponsorship; no governance (Rosenberg, 2006)
- Success factors: commitment to leadership (Ely, 1990, 1999a); top leadership commitment, involvement and support (Jones & Laffey, 2002)
- Critical factors: gaining top management support (van Dam, 2004); making senior management own e-learning (Rosenberg, 2001); sound leadership at all organizational levels (Rosenberg, 2001)

In other words, management related-dimensions were discussed in merely six of forty workplace e-learning publications and by only four of the authors. As the bullet points

³ The term 'implementation' is used here in the Information System meaning of the word, that is: how to put the system into use (see Munkvold et al. (2003)).

⁴ It should be noted that the review is not exhaustive, and several other studies could have been included as well.

indicate, however, a variety of terms are applied, sometimes without supplementary information. Despite this, the authors use many of the same reasons for why they underline the role of management in different situations: e.g. the top management's authority to allocate resources and its power to execute reward systems (Jones & Laffey, 2002; Ely, 1999a, 1999b); the top management's opportunity to allocate incentives and time (Ely, 1999a, 1999b); and the top management's ability to lend credibility to the initiative and thereby institute a new learning culture (Rosenberg, 2001). Another argument, mentioned by van Dam (2004), is that the e-learning project, when it involves the management, is more likely to be linked to the firm's strategy and thus be elevated to a strategic level of evaluation. When it comes to which parts of the top management the new e-learning initiative should preferably be anchored in, the recommendations are more diverse. While Jones & Laffey (2002) and Rosenberg (2001) suggest that the responsibility should be anchored to at least one top leader in the organization, principally to assure that one specific person will act as a sponsor for the new initiative, the ITU-report (ITU, 2007) argues instead for involving an enthusiast, either in the management or in the staff, mainly to keep "the plan warm" and have a continuous focus on the degree of goal achievement within the time frame in the strategy plan. Ely (1999b) goes one step further. He claims that this key person should be identical to the executive officer of the organization (e.g. a principal of a school); sometimes the executive officer of a board (e.g. a board of directors) should also be engaged. His/her (their) responsibility is to demonstrate firm and visible evidence and to state that there is endorsement and continuing support for the implementation. Rosenberg (2001) agrees and strengthens this statement; in fact, he makes it clear that this aspect is an absolute condition for making workplace e-learning sustainable. Erstad (2004), in his evaluation of one of the largest ICT-school projects in Norway (the PLUTO project), also agrees with Ely and his emphasis on involving the executive officer. He advocates a holistic approach and recommends that the headmaster himself must go into a learning position in order to succeed. His explanation is that the use of ICT and e-learning will challenge the whole organization's concept of knowledge. A similar argument is used by Laurillard et al. (2009), referring to 'senior management support' as a precondition for e-learning implementations in higher education, not least because this kind of implementation requires a fundamental rethinking of the institution's organization of teaching and learning. In Laurillard's words, the implementation of e-learning does not just affect the transaction between teachers and learners, but also the distribution of resources and support for teaching. As a consequence, the use of educational technology requires high-quality leadership as well as embedment of the new technology within a wider strategy for teaching and learning (Bates, 2002; Bates & Sangra, 2011), or as Brown (2002) expresses: "Institutional change, to be effective, needs to be led from the top, starting with a vision of what a new organization is to be like."

The review above indicates that the role of management is of importance when the aim of the implementation is a permanent change and enterprise-wide integration of e-learning in the organization. This view seems to dominate regardless of whether the organization is educational or business-oriented. Whether the role of management is also of importance when e-learning is introduced in only one or a few units (e.g. in a school class or in one of more departments), seems so far, however, to require more research. As indicated above, many questions still remain, for instance: which parts of management should be involved; when, why and how should the management be included; how many persons are required; what type of personal characteristics are crucial; when should the organizational board be

engaged and when is a representative from the operational organization sufficient, etc. In the following, by exploring three rather different implementations with these questions as a backdrop, we hope to contribute to what is known through previous research in the field.

1.3 Theoretical foundations

In this chapter, implementations of e-learning are viewed from a socio-cultural perspective (Säljö, 2000). This implies that interactions and forms of social practices are mediated by intellectual and physical artefacts and are influenced by cultural circumstances. Applying this perspective means that the implementations all are regarded as situated and dynamic practices. Furthermore, the human ability to act, reason and solve problems is viewed as relational to the context and the artefacts that are available, for instance, the available e-learning technologies, the infrastructure, support resources and the management.

The implementations of e-learning presented in the following took place in three rather large, multifaceted and complex organizations: one business organization, one school and one university college. In order to analyse these implementations, we require an analytic tool that can handle this complexity and aid in analysing and making sense of the empirical data. Working within the framework of third-generation Activity Theory (Engeström, 1987), which views activities as dynamic processes and non-isolated units continuously influenced by other multi-organizational activities and changes, the aim is to understand the network of interacting activity systems and identify the underlying causes of the problems, obstacles, and frustrations that arose during the implementations.

In simple terms, we can say that the problems that emerged represent types of disturbances that show up as errors, ruptures of communication etc. in the implementations. In order to address the underlying causes of these disturbances, we need to look at their sources, or in Engeström's words, their tensions (Engeström, 1987). This can be done, as in this study, by using the activity-theoretical triangle, mostly referred to as an activity system. Such an activity system comprises the following six components as a dynamic whole: the subject, the community, instruments, rules, division of labour and the object. A simplified illustration of an activity system that describes the implementation of e-learning in an organization, here referred to as the Implementation Activity System (the IAS), is depicted in Fig. 1. Mind that this example is arbitrary and that it does not put any limitations on the description of the IAS in other organizations (for instance those organizations in part 2). It should be noted that the IAS is regarded from the point of view of the one responsible for the implementation (the subject), or here, the project leader. The object of this IAS is to implement e-learning. To contribute to this, the project leader encourages the learners, the outcome of which is educated learners (e.g. employees, workers, teachers and students) who are able to master the new learning technology and use it for knowledge building. A number of instruments (tools) are available for the IAS, such as, in these cases, a project mandate, e-learning technologies and information. The community is made up of the management, the project group, workers, students, etc. Rules, which define norms and conventions, are specified in an implementation plan, and the division of labour component specifies how the necessary implementation tasks should be divided. In accordance with Engeström (1987), disturbances can emerge between all six components. It is these disturbances that will be used as a point of departure for a study of potential underlying tensions.

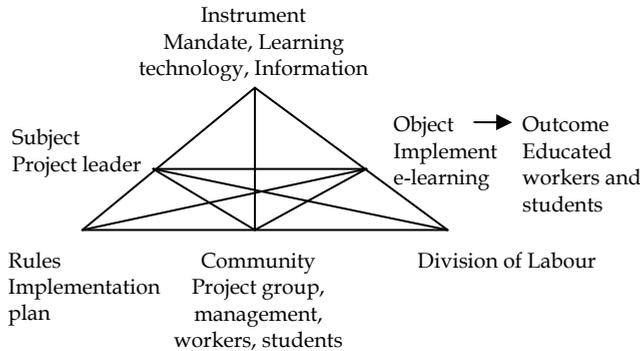


Fig. 1. An example of an Implementation Activity System (IAS)

Pursuant to Engeström (1987), no activity system exists in a vacuum, but rather they are part of a network of other activity systems. In general, they participate in many networks. Taking the IAS as a point of departure, this activity system exists in interaction with a lot of other activity systems (Engeström, 1987). Two of these that are of specific interest in this context, are: 1) the Work Learning Activity System (the WLAS), and 2) the Management Activity System (the MAS). As illustrated in Fig. 2, the MAS in this situation produces both the plan for e-learning and the implicit and explicit rules and regulations that constrain this activity for the IAS (dotted line 1), e-learning technologies, information and a project mandate for the IAS (dotted line 2), e-learning technologies for the WLAS (dotted line 3), as well as new rules

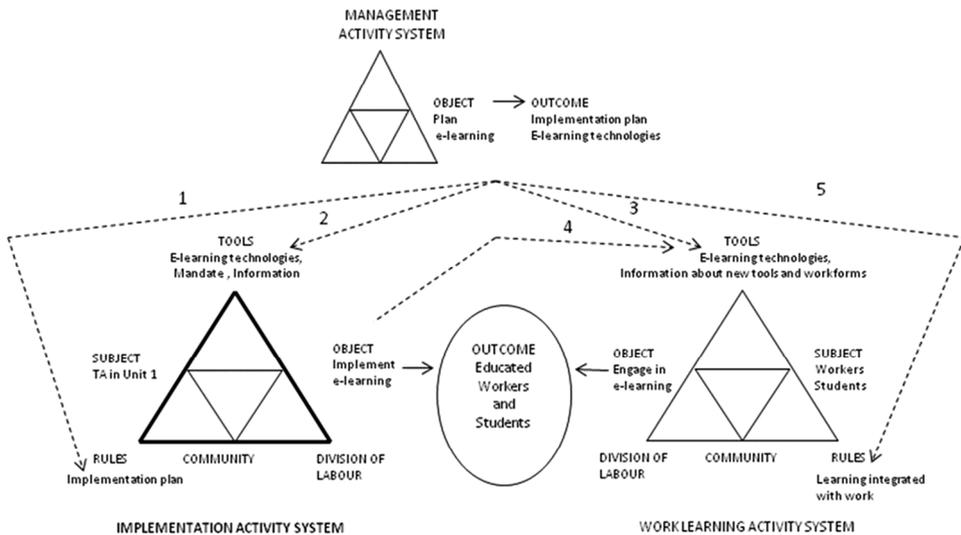


Fig. 2. An example of a network of activity systems involved in e-learning (adapted from Netteland et al., 2007)

focusing on integration of learning and work for the WLAS (dotted line 5). Finally, the IAS produces information about new tools and work forms, which becomes a new tool for the WLAS (dotted line 4). By beginning with this kind of simplified network of activity systems when examining the many disturbances that arise when e-learning is implemented in an organization, potential tensions related to the role of management can be identified. As a starting point for the identification of such tensions, Hasu (2001) suggests using improvisations introduced in order to deal with the many disturbances.

2. Empirical studies of e-learning implementations

As mentioned in section 1.2, there is a need for more research in order to reveal how management can influence the implementation of e-learning when the goal is sustainability and development of the whole organization. This part of the chapter aims to fill this gap by focusing on the role of management in three rather different e-learning implementations (cases 1-3): 1) an implementation of wiki in a vocational upper secondary school; 2) an implementation of LMS-delivered workplace e-learning in a large business organization; and, 3) an implementation of digital technologies and services in a university college. By giving a broad presentation of the three cases (e.g. how the management approached and was involved in the implementation, what problems emerged during the implementation, and what initiatives had to be taken to overcome emerging problems) and discussing them from an activity-theoretical perspective, we hope to uncover what type of manager role is required in order to understand the organizational complexity and create a development strategy.

Implementations of e-learning actually cover a broad range of scales. A common feature of the three implementations that are referred to in this chapter is that they are all organized as (more or less structured) projects. While the goal of two of them was to implement an organization-wide change (cases 1 and 3), the ambition of the other case (case 2) was to try out a new e-learning technology (the wiki technology) in a restricted setting (in one or a few classes in vocational education), but with an agreement about extended use if the wiki technology showed to be successful. In this way, all three implementations can be assessed as change or development processes, with the aim of renewing the organization and increasing the repertoire of potential learning technologies among the staff. The presentation of the three cases is structured as follows: first, there is a description of the case (content, e-learning technology, pedagogical approach), followed by a brief description of the applied method, and finally, an activity-theoretical discussion is offered.

2.1 Case 1 – E-learning in a workplace context

The example of an e-learning implementation in a workplace context comes from Telenor, the largest telecom company in Norway. In 2001/2002 it moved its more than 6000 employees to a new headquarters. For the organization as a whole, the relocation represented a large change: open-office areas, a lot of new technology (e.g. handheld and portable PCs, IP-telephony, mobile phones, advanced AV-equipment, and multi-function machines), new ICT-mediated work practices (e.g. new ICT systems for document management and booking of meeting rooms), new work principles and new leader roles. To aid this transition and enable the employees to operate in the restructured work environments, e-learning was introduced as a standardized 'one-size-fits-all' approach

across the whole organization (Unit 1 through Unit 4). But the implementation was also strategic: e-learning was expected to be a tool for long-term competence development and organizational change (Telenor, 2000). Furthermore, it was expected to make learning cheaper and more effective and to make Telenor appear to be a modern and efficient organization (Netteland et al., 2007).

To address the technological and organizational aspects of implementing e-learning across the large company, the E-learning project was launched. This project, with the slogan “to give the right training to the right people at the right time and in the right way” (Telenor, 2001), was owned by the company’s top management and managed by a group consisting of the CEO and the directors of the four units. A default implementation plan was developed, which was expected to be followed in all units. The plan addressed explicit and implicit rules for the learning activity as well as different roles and tasks in the e-learning team. Training administrators (TAs), most of whom were recruited from the human resources staff, were appointed in each of the units (TA1-TA4), and it was their responsibility to execute the plan, coordinate the training in their unit, produce learning statistics and especially keep their leaders informed about the e-learning activity. The main responsibility for the implementation and the control of the individual e-learning activity was held, however, by the unit’s top manager.

To support training of specific skills, the E-learning project developed twelve multimedia-based e-learning modules that were accessible through a new enterprise-wide Learning Management System (LMS). The web-based learning packages were designed as individual tutoring programmes, and were, in accordance with the implementation plan, expected to be integrated with work and take place at the employee’s own desk without help from colleagues or tutors. Interaction with the user was offered through different built-in tests and work tasks. The modules, eight of which were compulsory and each with an expected completion time of 20 to 45 minutes, were classified as “ICT solutions,” “Physical workplace,” and “New ways of working.” To be counted as completed, between 80 and 100% of the programme had to be finished. Despite these rules, the modules were all marketed by the project as an opportunity for flexible and mobile learning, with respect to navigation, time, as well as space (Netteland, 2003). The statistics, based on completed LMS-delivered modules four weeks after the relocation, illustrate a large span in e-learning across the four units; for example, the completion rates of the same compulsory module could vary by more than 50 percentage points. Unit 1 had the lowest rates. In this unit, the completion rates of the eight compulsory modules ranged from 5 to 37% (Netteland, 2008).

This analysis is based on data collected during a four-year doctoral research project using a variety of methods, such as interviews, participant observation, observation, field notes, textual analysis of archived historical documents and quantitative analysis of LMS-delivered reports. The 48 transcribed interviews formed the basis of the analysis. When evaluating the implementation, Netteland (2008) identified six categories of problem: management control, hardware and software resources, execution of implementation tasks, information sharing, allocation of time and relevance to work, and previous knowledge. Indeed, most of the categories showed up in each of the four units, but as noted in Netteland (2008), which gives a detailed analysis of four of the six categories, they varied remarkably in scope and intensity across and within the units. The same type of problem was also handled in different ways in various contexts. In some groups or units the problems 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 in after the module was completed (Netteland, 2010). Notwithstanding, all six categories of problem were definitely mentioned most frequently in Unit 1, where they not only led to frustrations and breakdowns, but also hampered and even hindered the e-learning activity. 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, we argue that the *dimension of context* is of vital importance for determining whether, when, what, and how problems in enterprise-wide implementations of e-learning emerge.

2.1.1 An activity-theoretical analysis of case 1

The six problem categories emerging from the Grounded theory analysis represent, from an Activity theoretical perspective, six types of disturbances (see Netteland et al., 2007). While Netteland (2008) gives a comprehensive Activity theoretical analysis of the identified types of disturbances and determines the potential underlying tensions that might have caused the majority of problems within each type, this chapter aims to give an overview of those tensions that in different ways are induced, caused by, or related to management. Since the interview data show that the most frequent problems turned up in Unit 1 (the unit that had the lowest rates of completion), the focus in the Activity theoretical analysis will be placed on Unit 1.

To carry out the implementation and training tasks, the TA1 had to improvise, e.g.: 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 secretaries in the sub-units to support e-learning at the local level; 3) she furnished some vacant offices in the old locations with an e-learning PC for joint use; 4) she distributed a document with appropriate routines before moving; 5) she negotiated with the management to get looser rules; 6) she tried to influence how and when the information about the new e-learning initiative was communicated; and 7) she permitted employees to drop some of the modules because they were irrelevant.

From an Activity theoretical point of view, the e-learning implementation in Unit 1 can be described as a network of three different activity systems: an Implementation Activity System (IAS), a Work Learning Activity System (WLAS) and a Management Activity System (MAS) (see Fig. 3⁵). We will begin with the MAS, whose object it is to plan e-learning. The outcome of this activity is an implementation plan, e-learning modules, a mandate and a Learning Management System (LMS). Some of these tools are delivered to the IAS. By drawing on these tools (e-learning modules, the LMS, the mandate and information), the aim of the TA1 (the subject) is to implement e-learning (the object). The rules in this activity system are formulated in the implementation plan, which is delivered from the MAS. But the MAS also delivers tools (e-learning modules) and rules (learning integrated with work) to the WLAS, an activity system where the employees (the subject) has the object to engage in e-learning. Some of the tools (information about new tools and new work forms) are, however, delivered from the IAS. A shared outcome of the IAS and the WLAS is educated employees and business as usual.

⁵ See also section 1.3 for a broader description of a similar issue.

As discussed above, the TA had to make improvisations during implementation. As a whole, initiatives 1, 2 and 6 reflect tensions between the MAS and the rule-based components in the IAS (arrow 2) and in the WLAS (arrow 1). The MAS neither offered the TA a sufficiently detailed specification of rules and roles, nor had it given the TA the necessary authority to take on her role as coordinator. Moreover, the MAS ignored the key actors' and the employees' workload, as well as the local unit's need for support, once resources had been allocated. The first initiative, however, indicates a further tension between the rules and the division of labour components within the IAS (arrow 5), mainly due to rules saying it was the top manager's responsibility to follow up on the e-learning activity, and the TA's experience was that this did not happen. Improvisations 3 and 4 reflect tensions between the tool-producing MAS and the tools components in both the IAS (arrow 3) and the WLAS (arrow 6). The MAS did not produce the tools that were a precondition for the TA to carry out her job or the tools that the employees needed to carry out e-learning integrated with work. Initiative 5 points to a tension between the MAS and the object of the IAS (arrow 7), mainly due to a strict division of the planning activities within the MAS. Finally, initiative 7 indicates a tension between the rules and the division of labour component within the WLAS, chiefly since the old division of labour was maintained without utilizing the new e-learning technology (arrow 4).

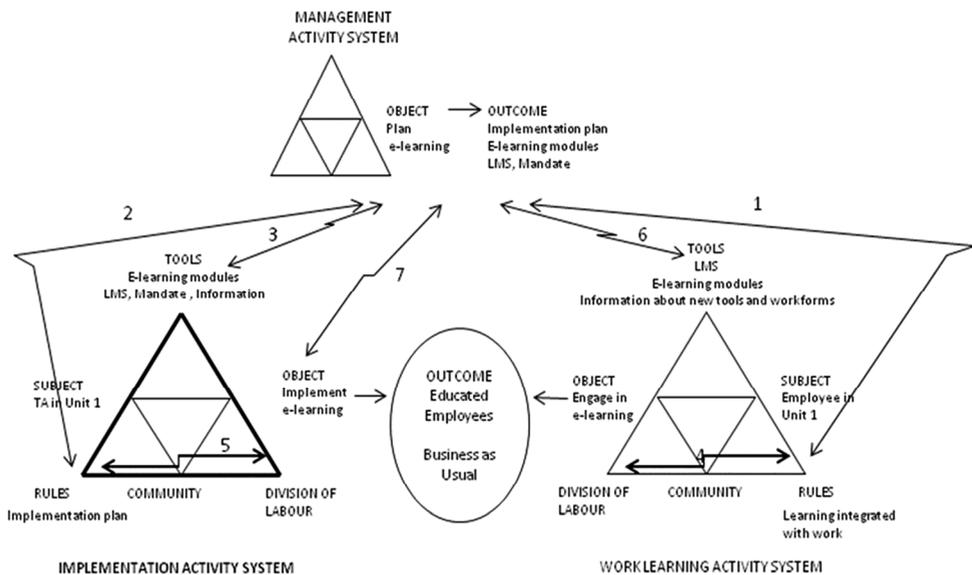


Fig. 3. Management-related tensions underlying the six types of disturbances in case 1

Based on the Activity theoretical analysis of the different types of disturbances, Netteland (2008) reveals the following causes, where the MAS is involved:

- The MAS did not offer the TA a sufficiently detailed specifications of rules and roles, or the necessary authority to take on the role as coordinator.
- The MAS did not offer a sufficiently detailed specification of the role of top management.

- The MAS avoided taking the key actors' workloads 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).
- The MAS underestimated the need for human resources in the implementation process in general, and the need for local support in particular.
- The MAS did not offer the employees any opportunity for dedicated e-learning support in their own working environment.
- The MAS did not produce the tools (e.g. infrastructure) that were a precondition for the TA to carry out her job.
- The MAS seldom involved the TA in the project planning.
- The learning rules given by the MAS did not take local work practices into account.
- The MAS underestimated how difficult the transformation of work really is. Rules that could have contributed to such a transformation were, however, fully absent.

When the E-learning project closed, Telenor launched a new project. Its aim was to expand the e-learning activity at the unit level as well as at the company level. This project began in June 2002, at a time when there was a global recession in the telecom industry and, as a consequence, restructuring as well as cost and workforce reductions in Telenor. Partly due to this and partly due to other circumstances, LMS-delivered e-learning gradually faded over the next three years in three of Telenor's four units (Unit 1-Unit 3). In one unit (Unit 4) and at the company level, however, new modules were continuously launched.

2.2 Case 2 – E-learning in vocational training

To illustrate e-learning in schools, this chapter presents a micro-implementation of wiki in an upper secondary school in Western Norway. Having heard about Wikipedia and the wiki technology's embedded opportunities for accumulation of information and knowledge-building, Øyrane Upper Secondary School (ØUSS) decided to initiate a wiki project, the Byggwiki project, directed at first-year students in the "Building and Construction" (B&C) Programme. The aim was to offer an illustrated digital resource, or a digital dictionary, to the many students in this programme with reading and writing difficulties, which would explain the most relevant and frequently used B&C terms in a short, simple and precise way. In this way, the school hoped to impede the large number of drop outs, especially in the first year, in vocational training (Netteland & Øien, 2010).⁶

The Byggwiki project was launched in January 2009. The project, which originally was initiated as a one-year development project, ran until June 2010. It was anchored at the headmaster level at ØUSS and had a project team consisting of one teacher from ØUSS (the project leader) and two invited researchers from Sogn og Fjordane University College (SFUC), one of whom is the author of this chapter. Together with the headmaster, the project leader, who was also the form teacher of one of the four first-year B&C classes, decided that two of the B&C classes, as well as all the teachers involved in these classes, should participate. In addition, a member of the ICT staff (at ØUSS) voluntarily joined the project. The project activities were divided between the two institutions; while SFUC was

⁶ All Norwegians (15-18 years old) have the right to three-year upper secondary school. Statistics show that one in three Norwegian teenagers disappears during the three-year Upper Secondary Education. Students in vocational occupations are especially at risk, in particular the students in the first year.

responsible for setting up and maintaining the wiki, organizing training and being an active partner, the project leader was responsible for motivating the in-house participants as well as anchoring and managing the project.

Although the main objective was to develop an online dictionary, an additional project aim was to improve the B&C students' concept-building by forcing them to integrate literacies in writing, questioning, reading, commenting and collaborating. In this way, it was hoped that the project would utilize the wiki's potential to support collective cognition and practices (Pierroux et al., 2008). An important premise, therefore, was to involve both teachers and students in the content production (of wiki articles). A further premise was that the resulting artefact, the Byggwiki, was to be used in practical school tasks as well as in theoretical training. The project also addressed a demand for the pedagogical use of the many laptops that the school owner had recently acquired (one laptop for each first-year student). Based on workshop negotiations between the project team and the teachers, a set of rules was established. For instance, the rules could be about what type of student accounts should be used (individual or group-based), whether the teachers should be allowed to produce wiki articles, and whether the wiki should be open for external reading and writing). However, the rules could be changed during the project period. Such changes also took place (see Fig. 4).

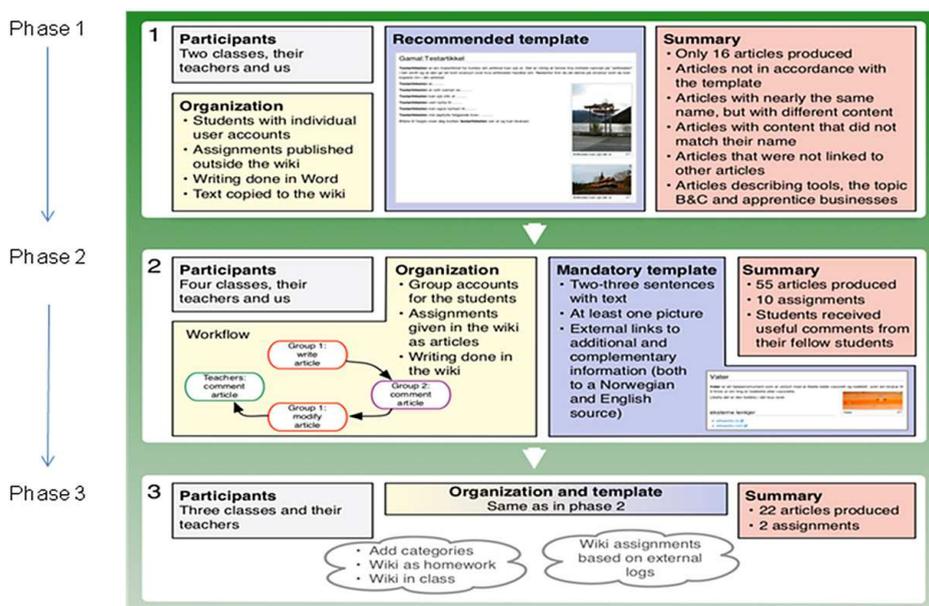


Fig. 4. The main phases in the project (adapted from Nettelund & Øien, 2010)

Through a series of interventions, the Byggwiki project aimed to develop practices and activities conducive to learning and in which digital and network technologies would play an integral part (see Nettelund & Øien, 2010). The project can be described in three (distinct) phases, all of which are unique when it comes to participants, goals, organization of

learning activities and so on (see Fig. 4). While two B&C classes and eight teachers were involved in the first phase, the wiki in phase 2 was introduced to all first-year students in the B&C programme as well as their teachers (in total eighteen). In phase 3, however, only three of the B&C-classes and their form teachers took part. A brief summary of the wiki activity shows that the number of produced wiki articles during the three phases varied from 16 (in phase 1) to 65 (in phase 2) and 24 (in phase 3). A survey carried out in spring 2010 showed that 50% of the students had used the Byggwiki for writing, 75% for reading and 25% for commenting. About 30% of the students were of the opinion that the wiki project was fun, 25% would have preferred broader wiki use in daily education, and about 20% would have liked to continue with the Byggwiki the next school year as well. It should be noted that when the two SFUC researchers were heavily engaged in the learning activities in phases 1 and 2, they were only engaged upon request and as project members in phase 3. In this latter phase, the main responsibility for the wiki activity was left to the teachers.

The analysis presented in this chapter is based on qualitative and quantitative data collected during the 18-month project period using observations, participatory observations, field notes, meeting reports, interviews, a survey, wiki articles and wiki logs. The project as a whole is used as an analytical unit in the Activity theoretical analysis, and the focus is on underlying tensions related to management.

2.2.1 An activity-theoretical analysis of case 2

In accordance with Hasu (2001), we begin with the improvisations that the project leader made: 1) he frequently had to change preplanned project meetings because non-planned internal meetings turned up and were given priority; 2) he asked the headmaster to allocate some time resources so that he could take on his role as project leader; 3) he asked the headmaster whether all of the first-year B&C teachers could have permission to use one of the school planning sessions for the wiki project; 4) he asked the involved teachers whether the project meetings could be arranged after school time; 5) he invited the headmaster to an evaluation meeting at the end of phase 1 in order to increase the anchoring of the project; 6) he asked to talk to the headmaster about how he should handle the teachers that withdrew from the project or did not turn up at the project meetings; 7) he suggested stronger project rules to keep the pressure on the involved teachers, and 8) he appealed to the involved teachers to prepare for the project sessions and contribute in the production (e.g. produce assignments). It should be noted that some of these initiatives happened at the request of the researchers.

As in the previous case, the implementation of e-learning at ØUSS can be described as a network of three activity systems: an Implementation Activity System (IAS), a Work Learning Activity System (WLAS) and a Management Activity System (MAS) (see Fig. 5). Also, in this case the object of the MAS was to plan e-learning. The outcome of this activity was, however, somewhat different from the outcome in case 1, namely project approval, an implementation plan, as well as free reign for the project leader⁷ (PL). These tools, combined with tools that the PL had developed together with the project group (e.g. information about the project, a wiki-installation and wiki articles) were used as instruments to reach the object

⁷ According to the headmaster, this meant that the project leader had the ability to make the decisions that he found necessary.

of the IAS: to implement e-learning (wiki). Also in this case, the rules of the IAS were formulated in the implementation plan that was developed by the MAS. But in contrast to the previous case, the community component in this IAS also involved the management (in addition to fellowships and researchers) in the project group. Also, in this network of activity systems, the MAS did deliver tools and rules to the WLAS (information and rules saying that e-learning (wiki) should be integrated with work). Some of the WLAS tools were, however, delivered from the IAS. The object of the WLAS was the same as in case 1: to engage in e-learning. While the subject in the WLAS was viewed from the teachers' perspective, the subject in the IAS was regarded from the PL's point of view. The shared outcome of the IAS and the WLAS in this case consists of two parts: educated teachers and students as well as a wiki dictionary.

The project leader initiatives 2, 5, 6 and 7 reflect a tension between the MAS and the rules in the IAS (arrow 2) and in the WLAS (arrow 1), where the management gives free reign to the PL without giving him the necessary authority (e.g. to command the teachers to participate) or sufficient time resources for project management. Due to this "free reign" policy and the lack of engagement from the headmaster, the anchoring of the project at management level was nearly fully absent. The PL did not get the opportunity to put pressure on his colleagues when motivating them to take part in the project. Another consequence of the uninvolved headmaster was that the management never became acquainted with the new e-learning tool represented by the wiki technology. As a result, the headmaster was not prepared for the challenges that emerged and the opportunities that the new technology offered. Furthermore, when examining the PL's improvisation numbers 1, 3, 4 and 8, these illuminate a tension between the MAS and the tools in the IAS (arrow 3) and in the WLAS (arrow 6). Although the MAS, through national education plans, is supposed to carry out developmental work and increase the digital competence among teachers and students (as e-learning (e.g. wiki)), the management did not put at its disposal the necessary tools that this type of work requires, e.g. a flexible but firm project mandate, incentives, compensation for the increased workload, and a detailed and long-term implementation plan (e.g. with specified dates for meetings, collective competence development and time for preparation of work). The non-compensated work overload therefore induced tensions between the rules and the division of labour in the IAS (arrow 5), as well as in the WLAS (arrow 4) (see Fig. 5).

The Activity theoretical analysis identified the following set of causes related to the MAS:

- The MAS did not give rules saying that the project participation of B&C teachers was compulsory.
- The MAS did not understand that this type of wiki project was dependent on collective participation of at least all first-year B&C classes.
- The MAS did not give the project leader the tools to handle the situation when some teachers refused to take part.
- The MAS avoided taking the workload of the project leader and the B&C teachers into account when approving the project, when defining rules and when allocating the required resources (e.g. time) for participation and project management.
- The MAS underestimated the role of visible management in the project and the need for a close connection with the project leader.

- The MAS regarded the project as important, but did not plan for integrating the project activities into the scheduling of meetings or give priority to the wiki project activities.
- The MAS did not understand that the loose project mandate was insufficient for a developmental project.
- The MAS did not distribute any information in the organization to inform the group leader and the staff about the new initiative and how it could be applied to development.

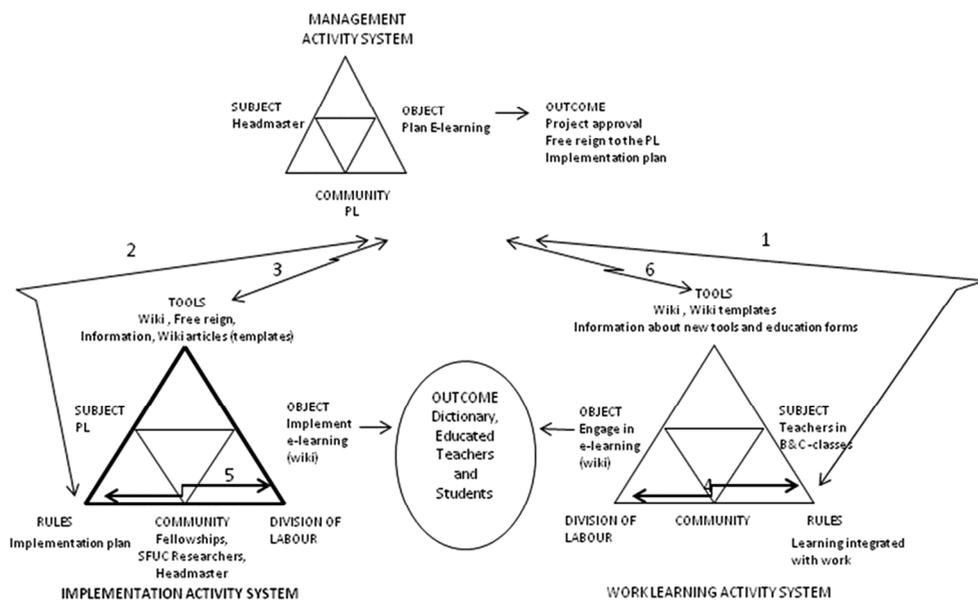


Fig. 5. Management-related tensions underlying the disturbances in case 2

Since the main aim of this wiki project was to build a dictionary with B&C terms for daily use, there was a need for rapid production of a critical mass of wiki articles. This could only be achieved through a collective effort in which both the B&C teachers and their students were involved. When the project closed in summer 2010, this had not been achieved.

2.3 Case 3 – E-learning in a university college

While Norwegian authorities have put pressure on schools to integrate e-learning technologies in all subjects, similar instructions are so far not given in higher education. These institutions (universities and university colleges), therefore, still have the opportunity to decide whether they will pay attention to the emergent digital learning technologies and whether they will integrate them into teaching and learning activities, and if so, how. During the past few years, however, the pressure has increased, first of all due to expectations from current and future students, but also from national reports examining the use of Technology Enhanced Learning (TEL) in higher education and a general focus on digital competence. This section reports on an ongoing implementation of e-learning in higher education, or more specifically, the implementation of digital technologies in Sogn og

Fjordane University College (SFUC), an institution with about 2.100 on-campus students and 1.400 off-campus students. Since the project will last until June 2012, only a limited Activity theoretical analysis can be carried out in this chapter.

In the beginning of 2010, the Rector at SFUC appointed a work group with the mandate to develop a strategy for digital competence. The task consisted of three elements: 1) to develop a vision and superior ambitions for the use and integration of digital technologies and media in all subjects, and identify the consequences for infrastructure, equipment, organization and responsibilities; 2) to identify goals for student training in these technologies, define support structures, necessary equipment and tools, methods for digital assessment and the desirable level of digital competence level among students in different study programmes, and 3) to define the desired level of digital competence for all employees (and especially for lecturers) and specify the goals for how to use ICT for teaching in different subjects, requirements for teacher training and support structures.

Half a year later, the recommendations from the work group, referred to as the Strategy for digital competence (Netteland et al., 2010), were approved by the SFUC board. Based on this strategy and an increasing internal focus on digital competence, the same board set aside money for a new project. The aim was to increase digital competence at SFUC and gain experience with how digital technology could be used in an efficient way (HSF, 2010). One month later, in January 2011, the Digital Competence project was launched. A project group and a steering group were appointed, the former with representatives from the study department (project leader), the ICT-group, the library and the academic staff, the latter consisting of the study director, one of the deans and the ICT-manager. The following topics were given priority in the mandate: digitalization of the new part-time study programme in teacher training, transformation of an existing SFUC course into a high-quality *digital* course; rolling out of an annual course wheel with a set of courses to increase digital competence (e.g. e-learning) and extended use of the Learning Management System.

The following restricted Activity theoretical analysis is based on data collected through the first six months of the project using document studies (including websites) and participatory observations.⁸ It begins with the following three improvisations that the project leader found it necessary to make during this period: 1) he requested more money from the steering group; 2) he asked the teacher education department for co-funding in order to digitalize the new part-time teacher study programme; and 3) he was challenged to ask the steering group to expand the current project mandate in accordance with the new evaluation criteria of the study programmes that had recently been approved by the SFUC board (e.g. that the curricula show sufficient learning outcomes in digital competence).

2.3.1 An activity-theoretical analysis of case 3

As in cases 1 and 2, the implementation of e-learning in SFUC can be described as a network of three activity systems: an Implementation Activity System (IAS), a Work Learning Activity System (WLAS) and a Management Activity System (MAS) (see Fig. 6). Also in this

⁸ It should be noted that the author was engaged in the Digital Competence project (as an ordinary project member). She was also the main person responsible for the approved Strategy for digital competence, which is referred to in the text.

case, the object of the MAS was to plan e-learning, but here the outcome was a strategy, an implementation plan (mandate), an LMS and evaluation criteria. While the rules and the objects of the IAS and the WLAS were identical with regard to the respective rules and objects as the two previous cases, the tools in the IAS and the WLAS differed. In the IAS, the tools component consisted of e-learning modules, an LMS, a budget, information and digital technologies and services (DTS); the tools component in the WLAS received, in addition, information about new tools and education forms from the IAS. While the subject in the WLAS was viewed from the lecturers' point of view, the subject in the IAS was regarded from the PL's perspective. The shared outcome of the IAS and the WLAS here, as well, consisted of two parts: educated lecturers and students as well as a changed praxis.

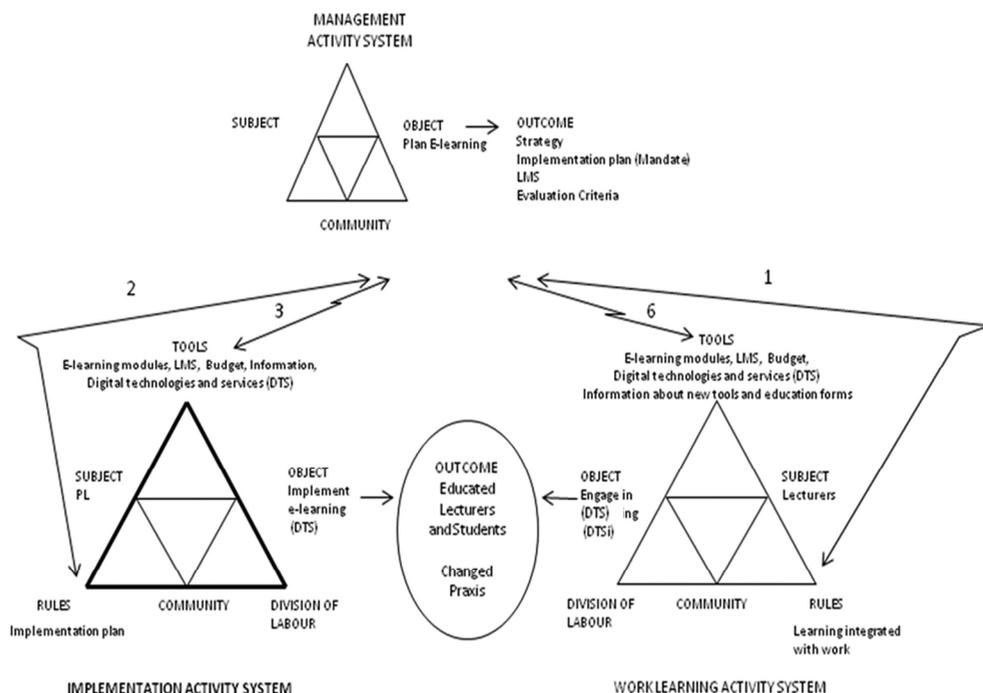


Fig. 6. Management-related tensions underlying the disturbances in case 3

The first and second improvisations indicate a tension between the MAS and the rules in the IAS (arrow 2) and the WLAS (arrow 1). While the SFUC board had set aside a specified amount to carry out the project, the project group, when looking at the mandate, realized that only 1/16 of the budget would be at their disposal for new digital initiatives. Due to this rule, the major part of the budget was tied to LMS activities (to fund current tasks of the responsible for the LMS), which previously had been funded outside the project, and to co-funding of the PL's salary. Moreover, the mandate made clear that the project was expected to give priority to one concrete study programme (the part-time teacher education study programme), at the expense of a lot of other study programmes that would have required the same type of digital support. This happened despite the new teacher education programme already having received funding from the SFUC board. The initiatives from the PL had two results: an increased budget and a co-funding of the training education study programme beyond the project. The free amount from then on amounted to $\frac{1}{4}$ of the total budget. However, the mandate rules just referred to also induced tensions between the rules and the division of labour components within the IAS and the WAS, mainly because the given allocation of resources restricted the involvement of project members in further digital activities; the majority of the project members would still have to combine their daily work with engagement in project activities. Improvisations 1 and 2 further reveal tensions between the MAS and the tools component in the IAS (arrow 3) and the WLAS (arrow 6). The MAS had not given the project leader sufficient tools (e.g. budget) to fulfill the specified object (implement e-learning (digital technologies and services)), nor did the tools (e.g. the small budget combined with the available digital capacities that were funded (e.g. video-conferencing capacities)) fully match and respond to the embedded expectations in the organization (e.g. expectations from students and lecturers about extended support in a variety of digital technologies and services). With respect to the third initiative, which was advanced in discussions within the project group, the project leader so far has decided to take a wait-and-see attitude. Whether the potential tensions within the tool component in the IAS (indicated by the lack of a match between the evaluation criteria and the project mandate) will come to a head, is difficult to say. So far, no management-related tensions have been identified between the rules and division of labour components within the IAS and the WLAS. This may change when the project activity gradually scales up.

According to the Activity theoretical analysis, the following causes related to the MAS were unveiled:

- The MAS did not allocate sufficient resources to the project to make it able to carry out the specified duties.
- The MAS seems to have underestimated the complex digital transformations of new and current study programmes when launching the project.
- The MAS, represented by the steering group, has, so far, not been able to anchor the project in the top management group.
- The MAS seems not to have equipped the PL with sufficient tools, assistance and support in order to make him able to produce a successful project outcome.
- The MAS defined a project mandate without taking the evolution of new study programme evaluation criteria into account.
- The MAS seems to have underestimated the required capacities at the project level.

- The MAS seems so far to have underestimated the role of visible top management engagement in the project and the need for a close connection with the project leader.
- The MAS seems to have underestimated the requirement for a more precise project mandate when implementing a developmental project of this type.
- The MAS has so far not distributed any information to the leader group or the staff to inform them about the expected outcome of the new initiative.

3. Conclusions

The aim of this chapter has been to uncover how the management can affect the outcome of an e-learning implementation so that e-learning becomes sustainable and contributes to change, irrespective of whether the organization is educational or business-oriented, and, whether the implementation is institutional or departmental. By viewing three rather different implementations from a sociocultural perspective and applying Activity Theory as an analytical tool to make sense of the empirical data, the aim was to contribute to the growing body of research on the role of management in e-learning implementations.

Characteristic of the e-learning literature is that the management, first of all, is regarded as important because of its authority to allocate resources, funding, time, incentives and support. Beyond this, involvement of the management is seen as crucial, due to its power to execute reward systems, lend credibility to the e-learning initiative, link the implementation to the organizational strategy, and contribute to instituting a new learning culture (see 1.3). These issues are indirectly supported by the Activity-theoretical studies presented in this chapter. A common feature of these analyses is that the Management Activity System (MAS) avoided taking the current workload in the organization into account (e.g. by management, project leaders, training assistants, employees, teachers and lecturers) and underestimated the requirements for dedicated e-learning support, sufficient tools (e.g. infrastructure) and a visible management. The Activity-theoretical studies (see 2.1.1, 2.2.1 and 2.3.1) also repeatedly underline the importance of *clear rules* (e.g. whether participation in e-learning is optional or compulsory and for which user groups), *explicit roles* (e.g. responsibilities, authorities and expectations of the implementation coordinator and the different levels of management), and *a distinct project mandate in alignment with institutional policy and strategy* (e.g. specification of resources, delegation of authority, goals and timeframes). These types of aspect are so far nearly absent when discussing the role of management in the e-learning literature (see 1.3). It should also be noted that the same literature rather seldom calls attention to the need for a *close connection between top management (institutional and departmental) and the implementation coordinator* when a new e-learning initiative is planned and/or put into use. This issue was underlined in all the cases referred to above. The lack of this type of communication and collaboration, e.g. between the headmaster and project leader in case 2, made it difficult to integrate the e-learning activity into daily routines and work, as well as into more strategic activities. By neither understanding the wiki technology nor the ongoing activities, the headmaster did not realize why the project leader argued for the collective participation of all first-year B&C classes, an initiative that he also rejected. As the project leader said, "The headmaster gave me free reign, but he was not willing to command the form teachers to stay in the project throughout the project period." Sustainable e-learning and new forms of learning and teaching were therefore not obtained.

According to Pearson (2005), this presupposes a whole-organization approach both in planning and implementation.

The Activity-theoretical analyses carried out in this chapter further indicate that management must engage in new ways when e-learning is implemented with the aim of institutional or departmental change. According to Erstad (2004), this means that the management must understand and master the new technology, the need for competence development, and, not least, how the introduction of digital technologies and e-learning challenges the organization. In particular, Cruz (2010) identifies the requirement for management training in two of her ten key success factors when e-learning is implemented. She therefore suggests that training should start with firm leaders and that management should be in charge of and be involved in the training. Based on the Activity-theoretical analyses, we claim that training of management is absolutely necessary in order to make them realize how to use digital learning technologies for institutional change and development. This will make it easier for them to take part and contribute to a discussion about project goals, control and follow up-activities, and, if desired, elevate the project to a strategic level of evaluation, as recommended by van Dam (2004). As the technologies are gradually becoming ubiquitous and the boundaries between computer-supported collaboration and other forms of collaboration are vanishing, this aspect is even more important (Dillenbourg et al., 2009), not only for the management, but also for the staff, their students (e.g. in schools and universities), and sometimes also for specific customers, if this is relevant. It must be emphasized that implementation of e-learning and digital technologies will always, either directly or indirectly, put demands and restrictions on the organization where it is put into use, its activities and its learning environment. Since employees as well as management will have to deal with this change in any case, we suggest, in accordance with Qvortrup (2011), that collective competence development strategies should be worked out. Involvement of the executive officer of the board, as suggested by Ely (1999b), should also be assessed.

To succeed, when e-learning is implemented with the aim of contributing to institutional change, the analysis has pointed to the following aspects related to the role of management:

- The implementation approach should be holistic and systemic, whether it is institutional or departmental.
- A project mandate in alignment with the organizational strategy and with explicit rules and roles is critical, but not sufficient.
- Management requires training in order to be able to understand the opportunities and challenges that are embedded in the new learning technology.
- A close connection between the top management and the main person responsible for the implementation (throughout the implementation, including the planning phase) is decisive for a successful outcome.
- Continuous evaluation, support from all levels of management, and an active follow-up are required if the aim of the implementation is institutional change.
- Project leadership should be assessed as critical – understanding of and experience with the new technology as well as a broad knowledge about internal organizational challenges, work activities, and collaboration activities with the environment, is necessary.

The role of management is, however, only one of multiple factors that affect the implementation of e-learning. However, by drawing on previous research about e-learning implementations from three different 'worlds,' business organizations, schools and higher educational institutions, as well as our own empirical studies from the same three contexts, the aim is to contribute to more informed e-learning implementations in the future, in which large parts of the management will be able to take a more active and informed role. The hope is that corporate as well as educational institutions can learn *from each other* and *with one another* to enhance the body of research in this specific field.

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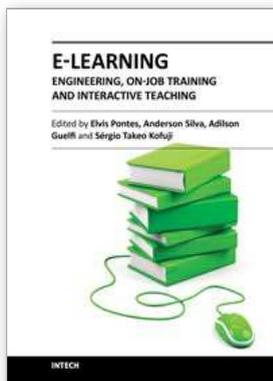
5. References

- Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for Learning: Methods and Development*, Allyn and Bacon, ISBN 0-205-27691-1, Boston
- Attwell, G. (2004). E-learning and Sustainability, 01.08.2011, Available from: <<http://www.guidance-research.org/knownet/writing/papers/sustainabilitypaper/attach/sustainability4.doc.pdf>>
- Bates, A.W. (2002). *Managing Technological Change. Strategies for College and University Leaders*, Jossey-Bass Publishers, San Fransisco
- Bates, A. W., & Sangra, A. (2011). *Managing Technology in Higher Education: Strategies for Transforming Teaching and Learning*, Jossey-Bass Publishers, ISBN: 978-0-470-58472-9, San Fransisco
- Broadley, T. (2007). Implementation of e-learning: a case study of three schools, AARE 2007 Fremantle: International Education Research Conference, 26/11/2007. Fremantle: AARE Inc. 01.08. 2011, Available from: <<http://www.aare.edu.au/07pap/bro07340.pdf>>
- Brown, S. (2002). The University, In: *Handbook of Information Technologies for Education and Training*, H.H. Adelsberger, Collis, B., Pawlowski, & Jan, M. Berlin, pp. 577-598, Springer, Heidelberg
- Collis, B., & van der Wende, M. (2002). *Models of Technology and Change in Higher Education*, Center for Higher Education Policy Studies (CHEPS), Twente
- Cross, J., & Dublin, L. (2002). *Implementing E-Learning*, ASTD, ISBN: 1-56286-333-9, Alexandria

- Cruz, A. (2010). Key success factors for eLearning implementation resulting from proper planning, 01.08.2011, Available from: < <http://www.shiftelearning.com/key-success-factors-for-elearning-implementation-resulting-from-proper-planning/>>
- Davenport, T. H., & Glaser, J. (2002). Just-in-time delivery comes to knowledge management. *Harvard Business Review*, Vol. 80, No. 7, (July 2002), pp. 107-111
- Dillenbourg, P.; Järvelä, S., & Fischer, F. (2009). The evolution of research on computer-supported collaborative learning. From design to orchestration, In: *Technology-Enhanced Learning: Principles and Products*, N.Balacheff; S. Ludvigsen; T. De Jong; A. Lazonder, & S. Barnes, eds., pp. 3-19 Springer, ISBN 978-1-4020-9826-0, Netherlands
- Ely, D. P. (1990). Conditions that facilitate the implementation of educational technology innovations. *Journal of Research on Computing in Education*, 23, pp. 298-305
- Ely, D. P. (1999a). Conditions that facilitate the implementation of educational technology innovations. *Educational Technology*, 39, pp. 23-27
- Ely, D. P. (1999b). New perspectives on the implementation of educational technology innovations, report. 1.8.2011, Available from: <<http://www.eric.ed.gov/PDFS/ED427775.pdf>>
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*, Helsingin Yliopisto, Helsinki
- Engeström, Y. (2008). *From teams to knots. Activity-theoretical studies of collaboration and learning at work*, Cambridge University Press, ISBN 978-0-521-86576-8, Cambridge
- Erstad, O. (2004). *Piloter for skuleutvikling. Samlerapport for forskningen 2000-2003*, ITU, Oslo, Skriftserie 28, 2004
- Fischer, G. (2001). Lifelong learning and its support with new media, In: *International Encyclopedia of Social and Behavioural Sciences*, Smelser, N. J., & Baltes, P. B., eds., pp. 1-7, Elsevier, Amsterdam
- Hauge, T. E., & Erstad, O. (2011). Analytiske posisjoner om teknologi og skoleutvikling, In: *Skoleutvikling og digitale medier – kompleksitet, mangfold og ekspansiv læring*, Erstad, O., & Hauge, T. E., pp. 31-46, Gyldendal Norsk Forlag AS, Gyldendal Akademisk, ISBN 978-82-05-36115-7, Oslo
- Hasu, M. (2001). Critical transition from developers to users: Activity-theoretical studies of interaction and learning in the innovation process, *Department of Education*, University of Helsinki, Helsinki
- HSF (2010). Styresak 70/2010:Budsjett 2011, Available from: <<http://www.hisf.no/no/content/download/23433/154605/file/VS1070+budsjett+2011.pdf>>
- ITU (2007). Når kunnskap gir resultater. Evaluering av skolelederprogrammet IKT-ABC. Sluttrapport, Oslo. 08.02.2011, Available from: <http://www.ituarkiv.no/filearchive/IKT-ABC_Evaluering.pdf >
- Jones, N. B., & Laffey, J. (2002). How to facilitate e-collaboration and e-learning in organizations, In: *The ASTD E-Learning Handbook*, Rosset, A., ed., pp. 251-262, McGraw-Hill, New York
- Karasaviddis, I. (2010). Integrating Web 2.0 technologies in undergraduate teaching: experiences with a wiki implementation, In: *Technological Development in Education*

- and Automation*, Iskander, M. et al., eds., pp. 449-454, Springer Science + Business Media B.V., DOI 10.1007/978-90-481-3656-8_81, Netherlands
- Kishore, N. (2002). *Blended Learning: Fixing the Mix*, NIT Technologies, 03.03.2004, Available from:
<<http://www.ksb.niit.com/content/Resources/pdf/Hybrid%20Learning.pdf>>
- Laurillard, D., Oliver, M., Wasson, B., & Hoppe, U. (2009). Implementing technology-enhanced learning, In: *Technology-Enhanced Learning: Principles and Products*, Balacheff, N., Ludvigsen, S., Jong, T. de, Lazonder, A., & Barnes, S., eds., pp. 289-306. Springer, ISBN 978-1-4020-9826-0, Netherlands
- Lepori, B., & Succi, C. (2003). Elearning in higher education. *2nd report of the Educational Management in the Swiss Virtual Campus Mandate (EDUM)*, Lugano
- Munkvold, B. E., Akselsen, S., & Bostrom, R. P. (2003). *Implementing Collaboration Technologies in Industry: Case Examples and Lessons Learned*, Springer, ISBN 1-85233-418-5, London
- Netteland, G. (2003). Workplace learning - a Distance Education perspective on e-learning and blended learning, *Nail Extended 2003*, Oslo
- Netteland, G. (2008). E-learning for change in a large organization. Identifying problems and opportunities in the implementation of e-learning, *Department of Information Science and Media Studies*. University of Bergen, Bergen
- Netteland, G., Wasson, B., & Mørch, A. I. (2007). E-learning in a large organization: a study of the critical role of information sharing. *Journal of Workplace Learning*, 19, pp. 392-411
- Netteland, G. (2010). Implementation of e-learning in heterogenous organizations, In: *Norsk konferanse for organisasjoners bruk av informasjonsteknologi*, pp. 1-12, Tapir Akademisk Forlag, ISBN: 9788251927031; ISSN: 1892-074, Trondheim
- Netteland, G., & Øien, K.E. (2010). The Byggwiki experience: design and use of wiki in vocational education, *Proceedings of EDEN 2010: Media Inspirations for Learning. European Distance and E-learning Network*, Budapest, Hungary
- Netteland, G., Skjeldestad, K., Fretland, J.O., Melhus, A.T., Osland, S.E, Parmentier, D., & Øien, K.E. (2010). Digital kompetanse sett i system, HSF-rapport nr 5/10, Sogndal
- Pearson, J. (2005). Current policy priorities in ICT in education, In: *Using information and communication technologies in education*, Trinidad, S., & J. Pearson, J., eds., pp. 134-147, Prentice Hall, Singapore
- Pierroux, P., Rasmussen, I., Lund, A., & Smørdal, O. (2008). Supporting and tracking collective cognitions in wikis, *Proceedings of the 8th international conference on International conference for the learning sciences*, Vol. 3, 2008
- Qvortrup, L. (2011). Hvordan sikre kvalitet i IKT-baseret kompetenceudvikling? LP-prosjektet i Danmark. *Svalbardkonferansen 2011*, Longyearbyen, March 2011
- Rosenberg, M. C. (2001). *E-Learning: Strategies for Delivering Knowledge in the Digital Age*, McGraw-Hill, ISBN 0-07-136268-1, New York
- Rosenberg, M. C. (2006). *Beyond E-Learning*, Pfeiffer, ISBN 0-7879-7757-8, San Fransisco
- Telenor (2000). *Strategy for People and Organization - Version 5.0*. Telenor, Oslo
- Telenor (2001). *Utvidelse av mandatet for eRAF Opplæring, August 2001*, Telenor, Oslo
- Säljö, R. (2000). *Lärande i praktiken: ett sociokulturellt perspektiv*, Prisma, ISBN 91-518-3728-5, Stockholm

Van Dam, N. (2004). *The e-Learning Fieldbook*, MacGraw-Hill Companies, Inc., ISBN 0-07-141870-9, New York



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Adaptive E-learning was proposed to be suitable for students with unique profiles, particular interests, and from different domains of knowledge, so profiles may consider specific goals of the students, as well as different preferences, knowledge level, learning style, rendering psychological profile, and more. Another approach to be taken into account today is the self-directed learning. Unlike the adaptive E-learning, the Self-directed learning is related to independence or autonomy in learning; it is a logical link for readiness for E-learning, where students pace their classes according to their own needs. This book provides information on the On-Job Training and Interactive Teaching for E-learning and is divided into four sections. The first section covers motivations to be considered for E-learning while the second section presents challenges concerning E-learning in areas like Engineering, Medical education and Biological Studies. New approaches to E-learning are introduced in the third section, and the last section describes the implementation of E-learning Environments.

How to reference

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