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**Paper 3: ICT support for workplace learning:
eLearning in Small and Medium Enterprises (SMEs)**

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Present economic developments are characterised by globalisation and internalisation. Networks and relationships between companies from different regions are increasing in importance and are used for purposes of investments, trading and research and development. At the same time, the product demands are increasing. Customers expect a rapid availability of new products and desire that they fit their individual needs. Small and Medium Enterprises (SMEs) are relatively flexible and quickly adapted to change, and in this light, seen as key organisations for driving innovation and to promote employment. In Europe, SMEs are the backbone of regional prosperity and employment. Employees' professional development is therefore often seen as a precondition to achieve innovations and to compete with other companies. However, small enterprises are often not able to develop or finance learning initiatives independently. It is therefore not surprising that the European Commission draws a lot of attention to SMEs when issuing research grants and stimulation programmes to promote innovation and professional development (http://fp6.cordis.lu/fp6/calls.cfm).

In this contribution we investigate the possibilities of eLearning to support employees' learning in SMEs. Much of the literature available on human resources development and eLearning is concentrated on medium and large enterprises. The context of SMEs is different in various aspects: SMEs have smaller budgets for education, and due to the nature of these companies there is a different learning and working culture. This is why in this article we depart from a number of recent, mostly small-scale studies aimed at the use of eLearning in SMEs. To what extent are eLearning solutions applied? And what challenges do these enterprises face?

1. Employee's professional development in SMEs

Relation between ICT and professional development
The capacity of an organisation to learn and deal creatively with knowledge is increasingly seen as an important asset and a powerful source for added economic value (Sveiby, 2001). Professional development

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of employees is of strategic value: professional development is required to realise innovations, which at its turn is necessary condition to compete.

The employees' need to learn requires pedagogical approaches that go beyond the more traditional pedagogical methods (cf., Marsick & Watkins, 2001). There is a clear tendency towards flexible learning possibilities integrated in the daily practice of the workers, or at least as authentic arranged as possible. These developments are closely aligned with contemporary perspectives on managing knowledge and learning that influence the way education and learning is designed, such as arranging rich and flexible learning environments where complex tasks are carried out between the learners in a social context (see Jonassen & Land, 200; Simons, Van der Linden & Duffy, 2000).

ICT can be an appropriate tool to design those flexible, work-related, social-learning environments. This technology offers the possibility to stimulate (informal) learning at the workplace, independent of time and place, and tuned to individual needs. This flexibility is shown through its possibilities to keep its content up to date, and to address personal and organisational learning needs. Jonassen, Peck and Wilson (1999) present a valuable overview of the ways in which ICT can be applied to design to new forms of learning and professional development.

eLearning offers also some advantages from a practical point of view. In general, eLearning reaches more workers at the same time or in a short time span when compared to face-to-face education. Also, it reduces additional costs for providing housing or conference rooms, and travelling, and it reduces time spent on professional development.

The context of SMEs

The developments as discussed above are in some way transferable to the situation of the SMEs, but also other issues could be raised. Research on learning and professional development in SMEs is still in its infancy; little empirical research has been done and studies available are often limited in size (see Chaston, Badger, & Sadler-Smith, 1999). From these studies the following observations can be made:

- First there seems to be little time for learning available. Everyday work and pressure are often addressed in favour of structural dedicating time for workplace learning. (Bridge, O'Neil, & Cromie, 1998; Bruins & De Jong, 2000; Gibb, 1993; Ram, 2000; Seagraves, Osborne, Neal, Dockerell, and others, 1996). For SMEs, it is harder to disengage workers from their daily practices in order to attend a formal training or a course than in large enterprises. Therefore ,much of the learning and education in SMEs is spontaneous or unplanned, often focused on dealing with or solving daily work-related problems (Gibb, 1999; Westhead & Storey, 1999).
- In the design of learning environments there seems to be little consideration of issues such as learner motivation and involvement. This is often linked with the large drop-out number of participants halfway during a course or training. These participants feel that the training does not deal with the problems they encounter in their work and the issues they would have liked to address during the training (Loots, Osborne & Seagraves, 1998).
- Professional development in SMEs still has a low priority, regardless of the increasing strategic value of this sector in the economy. This is not only due to daily-work pressure , but also to the lack of knowledge about training and development by the management or the owner of the company and a related conservative attitude (Cedefop, 2002; Fulantelli & Allegra, 2003).

These problems are all characteristic but not unique to just the SMEs. Many of them can also be identified in the large enterprises as well (see, for example, Harun, 2002).

2. Experience with e-learning in SME: Results from research

It is worth exploring whether eLearning can (partially) offer a solution to the barriers mentioned earlier. Can eLearning contribute to the realisation of a 'life long learning' for each worker in small organisations?

Some researchers and (European) policy makers think that is possible. They depart from the assumption that time and money are the two most important hurdles for the lack of training and development of employees in SMEs. eLearning unfortunately does not seem to solve those problems either. It is true that managers are appealed to eLearning at the workplace, but at the same time they provide the workers with insufficient time and resources to be relieved from their daily-work pressure. "eLearning at the workplace often means learning in your own time", is a statement from an interviewed employee during a recent Cedefop research (Cedefop, 2002).

In the meantime, there are a number of electronic learning environments available that support SMEs. Some of them are specifically aimed at learning at the workplace (see for an overview www.e-learning.nl). Most of these tools, however, are designed to facilitate formal learning settings (education, training and courses). There is less attention for supporting or stimulating informal-learning situations, such as creating and facilitating learning communities amongst internal or external colleagues, or even experts.

Recently a number of studies appeared about the implementation of eLearning in SMEs, mostly focused on the European context. These studies provide more insight in the factors that are important when designing and implementing eLearning in SMEs. The most important findings of these studies will be summarized in this paper. In Table 1, we provide an overview of the studies involved. In Table 2, a more elaborate description of each study is provided.

Table 1. Overview of studies involved

	country	sector	Type of company	Aim of the study
Bitter-Rijpkema etal. (2003)	Netherlands	Training and development	Medium size (100-250 employees)	Evaluation & implementation Virtual Business Learning (case-study)
Brink etal.. (2002)	Scotland	Metal industry	Medium size (226 employees)	Evaluation on-line course (case-study)
Cedefop (2002)	England	Metal industry	Medium size (50 employees)	Evaluation eLearning (case-study)
Cedefop (2002)	Poland	ICT, construction and electrical engineering	Small and medium size (50 employees or less)	Evaluation eLearning (*survey*)
Cedefop (2002)	Spain	electrical engineering	Medium size (65 employees)	Evaluation eLearning (case-study)
Cedefop (2002)	Austria	All	Small and medium	Evaluation eLearning (*survey*)
Cedefop (2002)	Italy	All	48 medium size (50-250 employees)	Evaluation eLearning (telephone interviews)
Dagdilelis etal. (2003)	Greece	All	Small (10 employees or less)	Evaluation training programme ICT skills (*survey*)

Forcheri etal. (1998)	Italy	All	15 SMEs	Evaluation ICT skills and attitude E-learning (*survey*)
Fulantelli etal (2003)	Italy/ Sicilia	Tailor and marble	Small and medium	Evaluation attitude eLearning (*survey*)
Hay (2003)	England (South-east)	All	Small and medium	Evaluation ICT use and needs (*survey*)

Recently, a new research project was initiated through the European Leonardo da Vinci programme. Seven European countries will conduct a large-scale business survey with managers or owners of SMEs. In this survey, the focus will be on the use of ICT in the organisation, the position of formal education and training, and the attitude of the managers in relation to the use of ICT, learning and professional development of their employees. The results of this survey will be used to initiate 15 case-studies in each of the participating countries in which additional information will be collected. The aim is to collect information to be used when thinking of designing and implementing eLearning in SMEs.

Table 2. Descriptions of the results of research on eLearning in SMEs

Within the scope of the 5th framework programme of the European Commission small-scale case-studies in five countries have been conducted (Cedefop, 2002). These studies differed in ways of collecting the information, but they were all aimed at the primary experiences of managers and employees with eLearning. In this project, a few medium-size companies (150 to 250 employees) have been closely studied. During this study not only managers but also trainers and educators who are responsible for the internal professional-development policy have been interviewed. Documents have been analysed and the workers were asked to complete a survey. In some countries, only large scale surveys were conducted targeting managers in SMEs. These surveys aimed at gathering information about experiences with ICT and training and development, and its combination. Information gathered during this project scopes almost all the different sectors of SMEs, such as tourism, construction, technical engineering, training and development, and service**s**. Also within other sectors some small-scale reports about the use of eLearning have appeared. One of these is a study about the implementation of a national training programme within small companies (10 or less employees) in Greece (Dagdilelis, Satratzemi, & Evangelidis, 2003). The aim of this training was to make people more familiar with ICT and to stimulate its use. The study provided some insights about the way ICT has been adopted in small enterprises. In a similar way, Fulantelli and Allegra (2003) have studied the attitude of managers towards using ICT for consultancy and training of SMEs in the tailor and marble industry. This study was part of a larger project also funded by the European Commission under the ADAPT initiative. Studies carried out by Hay (2003) and Forcheri, Molfino and Quarati (1998) focus on the ICT skills of employees in SMEs and their need for training and development to enhance these skills. Brink, Munro and Osborne (2002) designed an online technology that was implemented and evaluated in a Scottish metallurgical company of 226 workers. These studies involves a formal-education programme where its participants could obtain a certificate in SME management during an online course. Bitter-Rijpkema, Sloep and Jansen (2003) from the Open University in the Netherlands applied their Virtual Business Learning approach (VBL) under managers in an organisation on Information Technology (Pink Roccade Training en Advies). This study is also focussed on a formal educational setting.

3. Success factors for applying e-learning in SMEs

Analysing the above mentioned studies can provide us with valuable leads about conditions for successful implementation and design of eLearning in SMEs. What are the most important 'lessons learned'?

Conditions: technology and skills

An evaluation study on online learning at the workplace (Oberski, Palomar, Noya, Ruggerio et al., 2000) shows that some workers indicated that they were unfamiliar with the Internet technology, that the connections were instable and slow, have unsuitable soft- and hardware to download files, and that there was limited technical support. These problems are not specific to implementing ICT for learning at the workplace in SMEs; also within formal educational settings these complaints are echoed. More specific for SMEs, at least in the Netherlands, it seems that not all workers have a computer and that knowledge, skills and especially the attitude required to use eLearning technology are not widely spread. This is particularly true for so-called micro companies.

Focus on informal learning

In a study of employees' engagement in a web-based learning environment, Oberski cum suis (2000) found that it seemed difficult to keep their participation at a reasonable level, due to continuous work pressure and competitive priorities. We have mentioned before in this paper that, because of time pressure, much of the learning that is present in organisations can be characterised as informal learning, aimed at solving work-related problems. This is not the only reason to argue for the importance of more attention for informal-learning processes in organisations aimed at learning around problems that really matter. Workers not only seem to be prepared to invest more of their time, the learning outcomes seem to take root more. Workers learn when they feel they need to (so-called just-in-time learning). A positive side-effect is that managers seem to be more inclined to implement eLearning when it is aimed at dealing with work-related problems. However, one should avoid that informal learning gets an ad hoc or a non-structural meaning. To address this the informal-learning environment should be aimed at developing certain competencies and skills that are necessary, but the environment should be embedded in the daily practice where urgent work related problems need to be addressed.

Who do we need to involve when implementing eLearning?

A case study conducted in Austria that appeared in a Cedefop report (2002) shows that there is little support from public bodies and branch or umbrella organisations like chambers of commerce for the implementation of eLearning in SMEs. They conclude that implementation of eLearning depends on knowledge, skills and attitudes of the managers or owners of the companies involved. The main reason for not using or implementing eLearning was due to the fact that managers had either no time or money to acquire the necessary skills and to utilize the possibilities of eLearning.

Rosenberg (2001) suggests that medium-sized organisations with a training and development staff should appoint a (part-time) staff member who is responsible for eLearning in the company. This person could then focus on the following tasks:

- Assess workers' needs when it comes to training and development;
- Determine in what way eLearning can address those needs;
- Make a selection of companies that support and facilitate eLearning;
- Study the content and pedagogical approach of different eLearning products;
- Manage the relationships with the companies that offer eLearning;
- Manage the budget available for eLearning;
- Collaborate with the system administrator within the organisation;
- Acquire necessary skills and knowledge on eLearning and share these experiences with colleagues in the company, and
- Stimulate and promote the use of eLearning.

These suggestions are less relevant for small organisations. These organisations depend more on initiatives from or between networks they are involved in, such as partnerships, co-operations, and branch organisations.

eLearning costs

Another barrier for the implementation of the more traditional ways of eLearning are the costs that comes with it. An illustration: Chapman and Nantel (2003) studied the costs of the learning-management systems (LMS). With 500 users the cheapest LMS will cost the first year almost a thousand US dollars, the most expensive system will be approximately 116 thousand US dollars. This includes maintenance by the organisation itself. When maintenance is outsourced (hosted) the costs will be much higher. Hosting of eLearning applications is likely because many SMEs lack the necessary expertise to maintain these applications. On average a LMS hosted by another company will cost a company of the size of 500 employees about 42 thousand US dollars. Per user this will be 84 US dollar. This is still without the development and purchase of the course content, and no employees did attend the course yet. However, after some time the costs will be reduced. Also SMEs have at maximum 250 employers. This will reduce the costs to some extend, but the costs per user will be higher (the more user-licenses, the lower the cost per user). Of course it is also possible for SMEs to use cheap or even free eLearning applications, but it is doubtful whether these applications meet the demands and the quality for professional use.

Partnerships with companies and institutions

From the above mentioned experiences with workplace learning in small organisations rises the argument to establish networks or partnerships to overcome some of the barriers discussed. The structure of these companies make them adaptive to change. However, this often requires a change in the way companies collaborate with each other. SMEs are increasingly dependent on relationships between other companies, larger companies, branch organisations en public bodies to be engaged in task that otherwise would be beyond their individual reach.

Partnerships between companies (also called consortia) make it possible to employ and pay for eLearning initiatives together. Rosenberg (2001) indicates that promising consortia can be established between small enterprises and academic institutions. Academic institutions not only have the knowledge and experience with using and implementing ICT and its infrastructure, they also want (or need) to establish collaborations with business organisations. However, Geertshuis, Geertshuis and Holmes (2002) express their doubts about the possible benefits for SMEs of these consortia. They question whether SMEs managers and employees want the often more theoretical approach of these institutions.

Economics provides some arguments as well for the importance of networks or partnerships between companies, organisations and institutions. Essential in this view is that the required need for innovations and economic developments in some regions is not only driven by demands of the market, efforts of multinationals, and government control. The ability to interact and communicate about innovations and investments in professional development influence future economic developments and generate employment (cf., Camagni, 1991; Porter, 1992). The ability to learn from each other is an important success factor to enforce innovations and to permanently . This ability is developed within various forms of networks and relations between companies, suppliers, branch organisations, and other institutions.

Building networks or communities of practice

Not just at organisational level but also at the level of the worker it is recommended to collaborate and establish relationships when implementing eLearning. Communities of practice seem to have a positive influence on their learning processes, especially when these communities address work-related issues or are rooted in daily-work processes. This corresponds with the previously observed dominance of informal

learning in SMEs, and aligns with the contemporary pedagogical views that learning is a social process where workers actively discuss and collaborate around issues that matter both for them as for the work they are doing. Knowledge creation depends strongly on social relationships and its accessibility (Gregersen & Johnson, 1997). Networks play a crucial role in sharing knowledge, experiences, practices and innovations. In these networks, a lot of implicit or tacit knowledge is combined and becomes part of the collective knowledge base of the employees in organisations (cf. Lefebvre, Lefebvre, & Roy, 1995). The above described studies, however, still show little evidence of this idea of stimulating communities of practice.

Rubens (2003) describes a relationship between networks and eLearning and makes a distinction between four types of learning communities: liberal, vertical, horizontal, and external. In a liberal community or network, the individual workers are responsible for what and how they learn. An important drive to become part of such a network is to strengthen your own position on the labour market, both within and outside the current organisation. The organisation supports this by providing time and money. Learning in this case can manifest itself both at the workplace and through participating in courses. This kind of networks especially fits the potential of small companies with clearly structured human resources. eLearning in general will not be applied to support learning in these kinds of networks, but is more aimed at supporting consortia of companies instead in order to stimulate employees to join these networks.

The second type of network is the vertical network. In this type, policies in training and human resource development are specified by the management or HRD-department within the organisation. They are traditionally in charge of planning, design and implement courses and training programmes. Education and training initiatives are strongly pre-structured. eLearning in these kinds of networks is characterised by online courses in which individual learning routes can be followed. In these networks, it is also possible to provide place-independent instruction at the same time.

In the third, horizontal network, working and learning are closely related. Work-related problems are the reason for workers to organise learning activities together, mostly characterised by informal or incidental learning initiatives. Workers take their own actions but can be facilitated by an expert or a coach. These networks are common where people work in teams. eLearning is manifested in virtual communities, where experiential and collaborative learning are its main characteristics.

The last type of networks that is distinguished is the external one. In this network, policies in training and human resource development are established through external professional organisations. Learning activities mostly involve attending courses on domain- or profession-specific topics. Branch organisations or labour unions create eLearning possibilities by offering online courses through their own portal. eLearning is mostly preceded or followed up by face-to-face meetings.

Given the results of various reports on experiences with eLearning in SMEs virtual communities seem to be the best option at the moment. In those communities, workers collaborate by solving problems from their daily work, possibly with people from other companies, organisations and academic institutions.

Makes e-learning learning more accessible?
A final issue in eLearning in SMEs is the accessibility of learning environments and content. The study executed by Cedefop (2002) indicates that as far as eLearning initiatives are concerned, it mostly remains limited to the white collar workers (managers and supervisors). This is especially the case in trying out or implementing new techniques in the work place. This is problematic as one of the reasons for using eLearning would be to make training and development more accessible to a wider group of people. An explanation for this might be the fact that the production of eLearning materials is in the hand of private companies. At the moment it is doubtful whether these private bodies are willing to take the risk to unclosed eLearning for blue-collar workers, who in general have little experience with learning at the workplace in combination with ICT. Perhaps academic institutions and governmental bodies can play a role in the production of eLearning applications and courses, possibly with the support of the European Commission.

4. In conclusion

Present economic developments and recent educational perspectives provide ample arguments to implement eLearning in SMEs. Attention needs to be paid in informal learning processes and the establishment of relationships or networks between workers and companies. Integrating work and learning increases the chance that employees will devote more of the working time on training and development, that the learning results will endure, and that managers and directors are inclined to include more time for learning and disengage their employees from daily work-stress. Its should be avoided that learning becomes ad hoc and unstructured. A good way to facilitate workplace learning in SMEs seems to be organising communities of practice or horizontal learning types, where workers learn together around issues or work related problem that they find important. To be able to finance such communities or networks it would be a consideration to create partnerships between various companies and organisations. At the same time, these partnerships will enrich the learning environment. Creating these partnerships is not easy, however. It requires knowledge on how to build and guide them, how ICT can make a meaningful contribution and how several economic and competitive barriers can be overcome.

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