

# Learning conditions at work: a framework to understand and assess informal learning in the workplace

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*The purpose of this article is to develop a framework to understand and assess the quality of learning environments in the workplace. It is argued that indicators used to measure and assess informal learning at work, at both the national and the enterprise level, are underdeveloped. Consequently, current frameworks to measure and benchmark learning are heavily biased towards education and formal training. A new framework is developed, based on a quantitative survey representative of the private sector in Norway. The framework consists of seven learning conditions, which have significant effects on informal learning at work. Implications for further research, policy and practice are discussed.*

## Introduction

Informal learning at the workplace increasingly forms an integral part of lifelong learning policies both at the European level and in most other countries (European Commission, 2001; OECD 2003). Along with education and formal training, informal learning is seen as a key to corporate competitiveness as well as to employment and employability, and is thus recognised as a major target area for companies' human resource policies and also for social partner policy and intervention (ETUC/UNICE/CEEP, 2002). The focus on informal learning is a fairly recent phenomenon. It is only during the last 30 years that the public policy debate on lifelong learning has moved from a unilateral focus on institutionalised education, into recognising that learning is 'lifewide', taking place at work and elsewhere (Cheallaigh,

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2001). Within the business community too, new strategies to improve organisational learning capacities increasingly favours approaches emphasising experiential, informal and self-directed learning, thus facilitating personal as well as organisational development (Dehnbostel and Dybowski, 2001).

The policy engagement with informal learning is instigated by research, which increasingly substantiates the claim that informal learning constitutes the most important way of acquiring and developing the skills and competencies required at work (Ashton, 1998; Boud and Garrick, 1999; Skule, Stuart and Nyen, 2002; Skule and Reichborn, 2002; Zambarloukos and Constantelou, 2002). The findings of Eraut *et al.* (1998) are indicative of this emerging understanding. Their broad qualitative study of learning in engineering, business and healthcare enterprises concluded that 'learning from other people and the challenge of work itself proved to be the most important dimensions of learning for the people we interviewed. Although some reported significant learning from formal education and training, this was by no means universal, and often only of secondary importance' (Eraut *et al.*, 1998: 37).

Starting off from this emerging awareness, the next section of the article discusses the lack of indicators available to measure informal learning at work, at both the national and the enterprise level. A generalised conceptualisation of the contextual and organisational factors that promote or impede informal learning at work is called for, to form the basis for such measurements. The two following sections outline the data and results from a quantitative study designed to identify the conditions that are most conducive to informal learning at work. The seven *learning conditions* that are identified through this study constitute a new framework that enables measurement and assessment of learning environments at work. In the final section, implications for policy, practice and further research are discussed.

### **The lack of frameworks for measuring informal learning**

One major problem that policy makers and enterprises encounter in their endeavours to assess and promote informal learning in the workplace is that methods for measuring the conditions that are conducive to this kind of learning are seriously underdeveloped. In terms of European policies, informal learning is defined broadly as 'learning resulting from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional, but is in most cases non-intentional' (European Commission, 2001: 32).

Scrutinising the tools most commonly employed by policy makers and companies to measure, assess and benchmark learning, however, reveals a striking gap between this broad view of informal learning, and the types of learning actually measured. National and international surveys and benchmarking studies of lifelong learning, as well as new tools developed to manage and report on intellectual capital in enterprises, clearly tend to emphasise education and formal training at the expense of informal learning. One example is the recent report on European benchmarks in education and training (European Commission, 2002). While adopting the rhetoric of lifelong learning, the report employs participation in education and training during the last four weeks as the sole indicator for benchmarking European countries in the area of adult learning. Consequently, the Commission adopts a goal of increasing the level of participation in education and training, while no similar goals are adopted in the field of informal learning. Another example is Eurostat's recent labour force survey on lifelong learning (Eurostat, 2003), which is supposed to provide comparative data on different dimensions of lifelong learning in European countries. Here, too, a range of detailed questions map out participation in education and training. In contrast, informal learning is covered with a single question on participation in self-studying and use of libraries, which hardly makes the survey sufficient to assess the extent or quality of informal learning at the workplace. Like many others, Eurostat measures learning in terms of *participation rates*, and therefore excludes any type of informal and unintended learning which is not clearly separable from work itself. Similar problems are

apparent at the enterprise level. One of the best known guidelines to report on so-called intellectual capital, The Meritum Guidelines, focuses on training expenditures, training hours, and the level of education among the employees (Nordic Industrial Fund, 2001). Other, more process-oriented frameworks for measuring and evaluating enterprise performance in learning, such as the Investors in People standard widely used in the UK (Westphalen, 2001), have a similar bias towards formal training.

When politicians and top executives are addressed, numbers tend to speak louder than words. As illustrated by the European benchmarking report, there is a danger that, in spite of the current policy attention, informal and incidental learning in the long run will escape the attention of enterprises as well as policy makers, if it does not become subject to quantified assessment and benchmarking. Thus, in order to assess policies and programmes to enhance informal learning at work, and to direct measures towards groups that have comparably poor learning conditions at work, there is an urgent need to develop new indicators.

The lack of indicators to measure informal learning is related to inadequacies in current theories of workplace learning. While major advances have been made during the last decade to conceptualise learning as informal (Eraut *et al.*, 2000), contextual (Casey, 1999; Marsick and Watkins, 1999) and situated (Lave and Wenger, 1991) these theories do not easily translate into indicators for measuring and comparing the quality of the learning environment in the workplace. A number of factors have been identified as conducive to informal learning in the specific contexts examined. Examples are:

- sufficient task variation in the job, participation in temporary groups, opportunities to consult experts inside and outside the workplace, changes in duties and work roles that stimulate learning (Eraut *et al.*, 2000)
- work roles that allow for peripheral participation in communities of practice (Lave and Wenger, 1991), and facilitation of informal communication, problem solving and innovation within such communities (Brown and Duguid, 1991)
- structures and incentives for knowledge sharing, job mobility, autonomous jobs (Marsick and Watkins, 1999).

Most of the empirical studies referred to above are, however, qualitative, and limited to specific organisations or occupations. While they provide valuable insights, the theoretical frameworks developed are short of generalised conceptualisations of the contextual and organisational factors that promote or impede informal learning at work. Accordingly, none of them are adequate to provide a comprehensive framework and method that enables quantitative and comparative studies across the economy.

To sum up the argument so far, informal learning cannot be measured by means of indicators traditionally used in the field of education and training, such as participation rates, training hours, expenditures or level of qualification. Neither can indicators to measure informal learning be extracted directly from existing theories of learning. This gap was the starting point for the research project described below. Instead of trying to measure learning directly, the overarching purpose was to identify the factors most conducive to informal learning at work, and to develop an empirically derived, generalised conceptualisation of the *learning environment* in the workplace.

## Data and methods

In order to develop the new framework, personal interviews were conducted with various occupational groups in 11 widely different private and public sector enterprises, from process operators in an aluminium plant and shop workers in a retail store, through programmers in an advanced IT consultancy firm, to tax officers in a municipal tax office. Four to eight interviews were carried out in each enterprise, comprising the occupational group itself, managers and local shop stewards. The aim of the personal interviews was to arrive at questions and indicators that could be used as the basis for a larger, explorative survey. They were followed by a survey of 1300

employees, representative of the private sector in Norway, along with a smaller survey of 200 public sector employees.<sup>1</sup>

A dependent variable measuring the *learning intensity of work* was constructed as a composite measure put together from three different variables in the survey. The variables represent different dimensions that appeared in the qualitative interviews to be distinctive of jobs marked by extensive informal learning:

1. A subjective judgement of how learning intensive/educational the job is. (In Norwegian, the term 'lærerik jobb' was used, which literally translates into 'learning-rich job', i.e. a job marked by extensive learning. The term used implies that learning is induced or required by the situation at hand, and that the resources needed for learning are sought out.)
2. The length of job-specific learning required to master the job, provided that the employee has the most suitable educational background on entering the job.
3. The durability of acquired skills, measured by how long it is possible to be away from work, and still remain professionally updated.

The first dimension makes up 50 per cent of the dependent variable, the other two variables make up 25 per cent each.<sup>2</sup> The first dimension places heavy emphasis on the subjective perception of the learning demands and learning opportunities in the job. A danger of emphasising this too much is that parts of the tacit and unconscious learning processes taking place as part of the daily work escapes the attention of the respondents, implying that their subjective judgment of learning intensity may fall below that of an outside observer. The two other questions compensate for this, by reminding the respondent of what would happen if learning acquired at work is not present. The training-time variable captures the complexity of the job, and how much experience is needed to master it satisfactorily. The durability of skills variable is designed to capture the requirements for continuous learning, and also to what extent and how quickly skills 'get rusty' if they are not maintained. Notably, the learning intensity measure assesses the characteristics of the *job*. It is not a measure of the amount of individual learning actually occurring, or the quality of the skills and competencies an employee develops, as different individuals exposed to the same learning environment will achieve different levels of skill, depending on their interests and motivations, learning skills and aptitudes.

The learning intensity measure was used to classify the learning intensity of a job, relative to other jobs in the labour market. The jobs that scored at the high end of the learning intensity measure (25% of the sample) were labelled *learning intensive jobs*, while the jobs that scored lowest on the learning intensity measure (25% of the sample) were labelled *learning deprived jobs*.

In order to explore the possible individual, organisational and situational factors influencing the learning intensity of the job, three groups of independent variables were measured: *personal characteristics* (age, sex, formal education, length of employment in current job and perception of own learning initiative), *characteristics of the company and the external environment* (size of the company, industry, level of competition, scarcity of qualified labour), and finally a number of *characteristics of the job, the human resource policies and the organisation of work* (29 factors). Together these factors

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<sup>1</sup> The data were collected by telephone survey. The questionnaire consisted of 56 questions, and the average length of each interview was 15 minutes. The sample was pre-stratified according to sector (1300 from private sector, 200 from public sector). The gross sample was drawn randomly from the telephone book. Screening was used to reach the target population, consisting of persons over 18 in permanent employment, who had held their present jobs for more than six months, and who worked more than 15 hours per week. Self-employed persons, farmers and employees in education and research were excluded. The response rate among the target group was 62%. The sample was compared with representative figures for the target population, showing that the final sample is representative of the target group as a whole in terms of age, education, sex and sector/industry, with some minor deviations.

<sup>2</sup> The three variables were measured with discrete Likert-type scales. The scales of each question were normalised, and combined to construct the learning intensity measure.

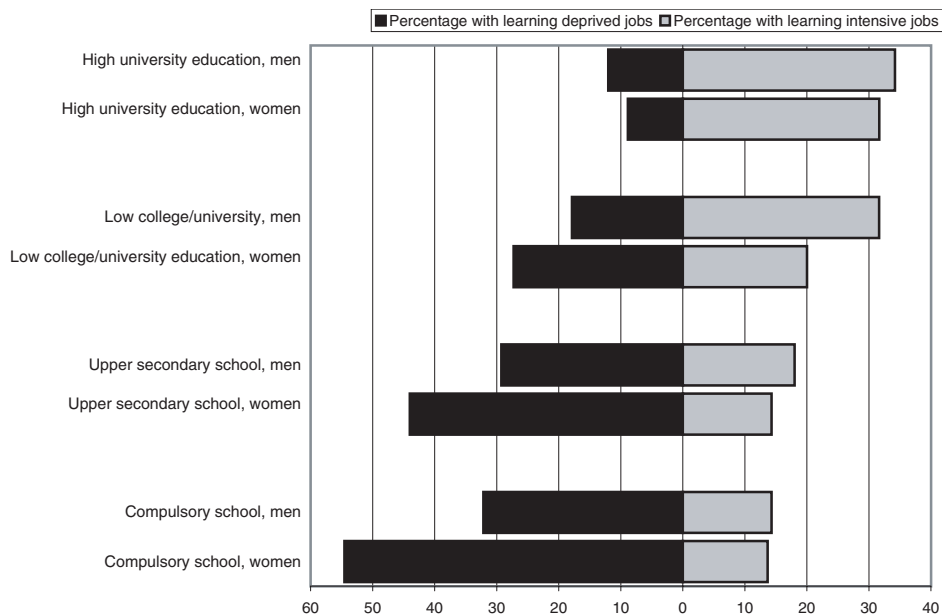


Figure 1. The distribution of learning intensive and learning deprived jobs among different educational groups ( $n = 1300$ ).

covered a range of conditions that were associated with learning conducive workplaces in the qualitative interviews.

Factor analysis combined with theoretical reasoning was used to construct composite measures that constitute a number of learning conditions described below.<sup>3</sup> Bivariate correlation analysis (Annex 1) and multivariate linear regression analysis (Annex 2) were used to explore the associations between the individual, job and organisational factors on the one hand, and the learning intensity of the job on the other.

### The distribution of learning intensive jobs in the labour market

The classification of jobs as learning intensive or learning deprived according to their score on the learning intensity measure, enabled us to investigate the distribution of such jobs in the labour market as a whole. Figure 1 shows the distribution of learning intensive and learning deprived jobs among different educational groups.

Figure 1 clearly shows that education is an important pathway to learning intensive jobs.<sup>4</sup> Among men with long university education, 34 per cent had learning intensive jobs, while only 10 per cent had learning deprived jobs. Among women with compulsory school education only, a meagre 14 per cent had learning intensive jobs, while 55 per cent were in learning deprived jobs. For all levels of education, men had more learning intensive jobs than women, but the difference is much larger at the lower educational levels.

Problematically, those who lose out in the educational system, are also the losers in the struggle for the most learning intensive jobs. This means that the workplace does not substitute efficiently as an alternative to school-based learning for early school

<sup>3</sup> Each learning condition is an index constructed from 1–8 independent variables. Before combining, all variables were normalised, and the composite measures (the learning conditions) were transformed into Z-scores.

<sup>4</sup> The bivariate correlation between educational level and learning intensity is  $r = 0.251$ , significant at 1 per cent.

leavers, as some proponents of informal learning may have envisioned. Instead those who are well equipped in terms of formal education continue to enjoy better learning opportunities at work. A learning intensive job is, however, not a matter of course, even for highly educated persons.

Similarly, the data show some differences between industries in terms of the proportion of learning intensive and learning deprived jobs. The oil industry, along with banking, insurance and commercial services have the largest proportion of learning intensive jobs (40% and 35% respectively), while wholesale and retail and hotels and restaurants have the largest proportion of learning deprived jobs (38%) and the lowest proportion of learning intensive jobs (20%). The public sector as a whole scores around 50 per cent amongst the different private sector industries included in the survey. Also, companies experiencing the keenest competition (as judged by the respondents) have the greatest proportion of learning intensive jobs, and the lowest proportion of learning deprived jobs.<sup>5</sup> The tendency for learning intensive jobs to be more abundant in companies exposed to harsh competition indicates that globalisation and trade liberalisation may imply some positive consequences seen from the employees' point of view. Under these circumstances, companies may be forced to develop and harness their knowledge and learning potentials more extensively. Caution should be taken, however, about the general validity of this finding, as it is based only on Norwegian data. The Norwegian economy is a highly developed and regulated one, marked by widespread competitive strategies based on high skill-high quality approaches, and high wages for blue-collar workers. The relation between competition and learning intensity may be different in industries and economies marked by lower wages, less regulation, and competitive strategies based on a low skill-low quality approach.

In terms of size, the largest enterprises (more than 250 employees) have a higher proportion of learning intensive jobs, but again, the differences are quite small.<sup>6</sup>

### Learning conditions at work

The main aim of the research was to identify the factors most conducive to learning at work. We wanted to find out to what extent the differences in learning intensity described above could be accounted for by identifying differences in the organisation of work, the distribution of tasks and the human resource policies. The analysis shows that most of the above-mentioned differences between labour market groups and different types of companies can be accounted for by looking at job-related factors (Annex 2). Seven distinctive characteristics of the most learning intensive jobs were identified. Since they are conducive to learning at the workplace they are labelled *learning conditions* (Table 1). Controlling for other factors, all seven learning conditions significantly affect the learning intensity of the job (Annex 1). The data also show that jobs with a high score on one learning condition tend to score highly on other learning conditions as well (Annex 2). In other words, the conditions conducive to learning tend to accumulate in some jobs, and be sparse in others.

In addition to the seven learning conditions described above, the type of tasks that the job is composed of also affects the learning intensity of the job. Notably, employees who participate in development of new products and services as part of their job (27% of the sample) have significantly more learning intensive jobs.

While the seven learning conditions do not constitute an exhaustive list of conditions that promote informal learning, they are conditions that, irrespective of industry, type of company and individual factors, are associated with learning intensive work. Taken together, they suggest how a model of learning conducive work environments may be conceptualised.

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<sup>5</sup> The bivariate correlation between competition and learning intensity is relatively weak ( $r = 0.143$ ), but significant at 1 per cent.

<sup>6</sup> The bivariate correlation between employment in large companies and learning intensity is  $r = 0.122$ , significant at 1 per cent.

Table 1: Learning conditions at work

No.	Learning condition	Explanation of the variables included in each learning condition
1	A high degree of exposure to changes	Learning intensive jobs are characterised by more frequent changes in technology (products and processes) and working methods.
2	A high degree of exposure to demands	Learning intensive jobs are characterised by more exposure to demands from customers, managers, colleagues or the group/chain that the company belongs to.
3	Managerial responsibilities	Learning intensive jobs are characterised by accompanying managerial responsibilities in the job. These are not high-level managerial responsibilities, as 40% of the responsibilities respondents claimed to have them. Rather it may typically be allocated responsibilities for decision making concerning certain tasks, project management, work group management and so forth.
4	Extensive professional contacts	Learning intensive jobs are characterised by better opportunities to participate in professional forums outside the company, professional or occupational networks, trade fairs, conferences, etc, and by more extensive learning conducive contacts with customers or suppliers.
5	Superior feedback	Learning intensive jobs are characterised by better opportunities to learn from seeing direct results of the work.
6	Management support for learning	Learning intensive jobs are characterised by a stronger feeling by the employee that management is supportive and encouraging of learning.
7	Rewarding of proficiency	Learning intensive jobs have organisational surroundings that reward proficiency by means of higher wages, allocation of more interesting tasks or improved career opportunities.

First, they are situated in demanding environments, where customers, suppliers, owners, authorities or professional communities place tough demands on the standards of work, thus stimulating learning and innovation. These contextual conditions may vary considerably between industries. Secondly, the learning intensity of each job is affected by the degree of exposure to these external pressures, which, in turn, depends on how work is organised and how managerial and other responsibilities are delegated. Broadly speaking, post-Taylorist organisations, with transparent boundaries exposing more employees to the external environment, flatter hierarchies with more widely distributed managerial responsibilities, and high involvement of employees in product and process development, would be more conducive to learning, according to these results.

While exposure to an appropriate amount of demands and responsibilities is conducive to learning, the job should also, so the results indicate, provide access to the learning resources needed to cope with such demands. If not, demands and changes may result in stress and inability to cope, rather than learning. Such resources may consist of advice and guidance from colleagues and external vocational networks,

direct contact with customers and suppliers, access to databases, literature and other relevant sources of learning, plus the time to utilise such learning resources. Feedback through work is an important resource in this context. Support and encouragement for learning from management, as well as human resource policies rewarding proficiency, will back up the learning efforts. Rewards need not be pecuniary. In our sample improved career opportunities and more interesting tasks were as strongly associated with learning intensive jobs, as were the pecuniary rewards.

Independently of the learning demands generated by the job situation, each employee has an individual interest in learning, which may vary according to age, education and situational factors outside the job. While personal learning aspirations were not a main focus of the survey, the data show that individuals who have a stronger interest in learning than their colleagues, tend to have significantly more learning intensive jobs. One interpretation may be that most jobs provide scope for some individual adaptation, allowing these individuals to get more learning out of the situation than their colleagues.

The variation in learning intensity between industries, and different types of companies, and also most of the differences between various educational groups, can be explained by taking into account the seven learning conditions described above. The learning conditions thus represent a framework that may be used to measure, compare and assess the quality of the workplace as an environment of informal learning, across industries and different types of jobs. From the sample, *learning environment profiles* showing the group scores on each learning condition, and their deviations from the average, were constructed. Figure 2 shows the learning environment profiles of two industries; transport and communication, and the oil industry.

The figure shows that the learning conditions within the transport and communications industry are generally poorer than the average for the labour market as a whole, and particularly poor in terms of management support for learning. Learning conditions in the oil industry are generally better than average, explaining the high proportion of learning intensive jobs described above.

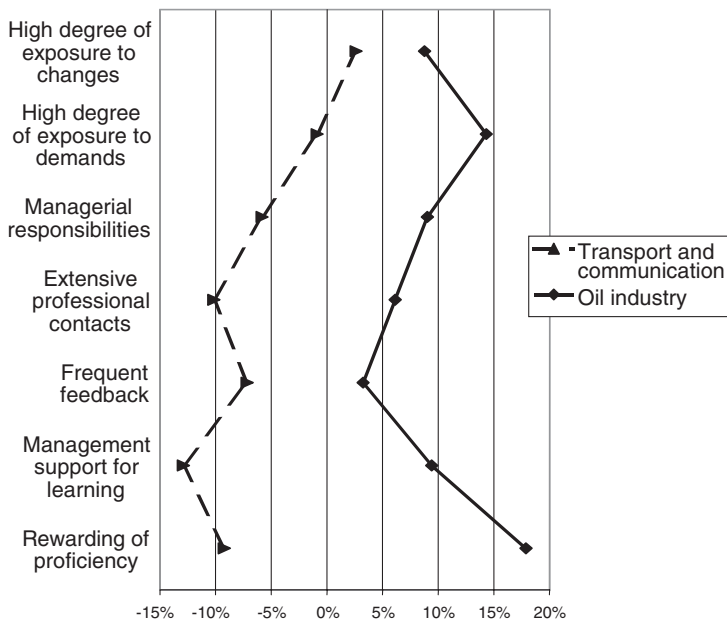


Figure 2: Learning environment profiles for two industries. Deviations from average scores ( $n = 1300$ ).

## Conclusion: implications for research and practice

While policy makers, the social partners and HRD professionals increasingly consider informal learning in the workplace a major target area for public and HRD policies and intervention, methods of measuring and assessing the conditions that are conducive to this kind of learning have so far been scarce. To fill this apparent gap, an empirically derived framework for measuring, assessing and comparing learning environments was developed. The core of the framework consists of seven key aspects of work that were identified as important learning conditions, which significantly affects the learning intensity of the job.

The framework is based on Norwegian survey data only, which may have bestowed it with a cultural bias, reflecting institutional particularities of the Norwegian working life that may not be valid in other countries. Testing the framework with cross-national data is therefore an important task for future research.

While further testing is required, a framework of this kind is applicable for a wide range of purposes. First, in terms of policy making at the national level, the framework has already been used to construct a module to measure informal learning, which is integrated into the Norwegian part of the 2003 Eurostat survey on lifelong learning (Skule, 2002). Planning for repeated annual surveys under the label of a National Learning Conditions Monitor, Norwegian policy makers will thus, in the future, be able to observe the development of learning conditions in working life on a regular basis. Secondly, in terms of HRD policies, the learning conditions framework has been used to construct a process tool that enterprises may use to measure and develop their internal learning environments (Reichborn and Gruer, 2003). Thirdly, the framework is potentially applicable in the ongoing efforts to develop new methods to validate and recognise informal learning currently taking place in many countries (Björnaväld, 2001), and to create more seamless and flexible transitions between work-based and school-based learning. As the framework may be used to measure the quality of the learning environment, it may be a supportive tool to help authorities verify the quality of work-based learning that are part of such programmes.

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*Annex 1: Bivariate correlations (n = 1300)*

	High degree of exposure to changes	High degree of exposure to demands	Managerial responsibility	Extensive professional contact	Superior feedback	Management support for learning	Rewarding of proficiency	<b>Learning intensity</b>
High degree of exposure to changes	1.000	0.480**	0.157**	0.357**	0.234**	0.195**	0.312**	0.378**
High degree of exposure to demands	0.480**	1.000	0.088*	0.335**	0.291**	0.313**	0.325**	0.407**
Managerial responsibility	0.157**	0.088*	1.000	0.239**	0.127**	0.060*	0.132**	0.334**
Extensive professional contact	0.357**	0.335**	0.239**	1.000	0.285**	0.305**	0.335**	0.400**
Superior feedback	0.234**	0.291**	0.127**	0.285**	1.000	0.212**	0.215**	0.331**
Management support for learning	0.195**	0.313**	0.060*	0.305**	0.212**	1.000	0.276**	0.236**
Rewarding of proficiency	0.312**	0.325**	0.132**	0.335**	0.215**	0.276**	1.000	0.325**

\*Significant at 0.05, \*\*Significant at 0.01.

Annex 2: Linear regression analysis (3 steps) (n = 1300)

	Step 1			Step 2			Step 3		
	B	Beta	T-value	B	Beta	T-value	B	Beta	T-value
Constant	0.366		14.701	0.266		8.865	0.174		5.716
<i>Individual factors</i>									
Education	0.106**	0.173	6.664	0.088**	0.144	5.602	0.030*	0.049	1.995
Age	0.001**	0.074	2.643	0.001*	0.064	2.378	0.001*	0.061	2.439
Sex (male = 1)	0.034**	0.096	3.825	0.030**	0.082	3.197	0.016	0.045	1.878
Length of employment	0.045**	0.069	2.519	0.036*	0.054	1.999	0.039*	0.059	2.382
Personal learning initiative	0.262**	0.336	12.808	0.205**	0.263	9.848	0.090**	0.115	4.472
<i>Enterprise and industry</i>									
Oil and mining <sup>a</sup>				0.049**	0.076	2.608	0.029	0.045	1.705
Financial and commercial services <sup>a</sup>				0.033*	0.080	2.303	0.014	0.033	1.019
Construction <sup>a</sup>				0.030	0.054	1.795	0.021	0.037	1.348
Retail, hotels & restaurants, transport <sup>a</sup>				-0.020	-0.049	-1.433	-0.015	-0.037	-1.175
Other industries <sup>a</sup>				0.013	0.029	0.868	0.005	0.011	0.352
Scarcity of labour				0.122**	0.188	7.247	0.066**	0.102	4.196
0–5 employees <sup>b</sup>				0.025	0.048	1.519	0.025	0.049	1.665
6–10 employees <sup>b</sup>				0.041*	0.076	2.438	0.027	0.049	1.712
11–20 employees <sup>b</sup>				0.028	0.057	1.770	0.025	0.050	1.683
21–50 employees <sup>b</sup>				0.019	0.042	1.263	0.014	0.030	1.007
101–250 employees <sup>b</sup>				-0.003	-0.005	-0.172	-0.003	-0.006	-0.225
Over 250 employees <sup>b</sup>				0.039**	0.087	2.556	0.022	0.050	1.614
Degree of competition				0.051**	0.095	3.795	0.021	0.039	1.676

*Job and organisational factors*

Development of new products or services as part of the job <sup>c</sup>			0.027**	0.071	2.958
Administrative tasks as part of the job <sup>c</sup>			0.020*	0.057	2.164
Service-oriented work as part of the job <sup>c</sup>			-0.006	-0.016	-0.696
Sales and marketing as part of the job <sup>c</sup>			0.000	-0.001	-0.045
High exposure to changes			0.070**	0.096	3.548
High exposure to demands			0.086**	0.107	3.763
Management responsibility			0.023**	0.066	2.599
Amount of external professional contact			0.083**	0.111	4.015
Direct feedback			0.085**	0.113	4.677
Management support for learning			0.079**	0.128	5.152
Rewarding of proficiency			0.036*	0.055	2.135
Negative consequences of incompetence			0.012	0.015	0.607
<i>R</i>	0.43	0.50		0.63	
<i>R</i> <sup>2</sup>	0.19	0.25		0.39	

<sup>a</sup>Reference category: Manufacturing

<sup>b</sup>Reference category: 51–100 employees

<sup>c</sup>Reference category: Production work

\*Significant at 0.05

\*\*Significant at 0.01

The first step shows that individual variables have only moderate explanatory force ( $R^2 = 0.19$ ), and that level of education and personal learning initiative are most important. The second step changes the effects somewhat, and moderately increases the explanatory force ( $R^2 = 0.25$ ). The third step increases  $R^2$  strongly, up to 0.39. The effect of education is weakened, and there are no longer significant differences between industries and company sizes. A regression analysis using only the learning conditions as independent variables was also carried out, which produced an explanatory force of  $R^2 = 0.33$ .