

Kessels, J. & Keursten, P. (2002). Creating a knowledge productive work environment. *Lline, Lifelong Learning in Europe* VII, 2, p. 104-112. (ISSN 1239-6826)

Creating a knowledge productive work environment

Joseph Kessels & Paul Keursten

Prof. Dr. J.W.M. Kessels
Professor University of Twente, The Netherlands
Partner Kessels & Smit, *The Learning Company*
Email: Kessels@edte.utwente.nl

dr. P Keursten
Senior researcher, University of Twente
Partner Kessels & Smit, *The Learning Company*
Email: Keursten@kessels-smit.nl

In today's knowledge economy, the work environment is becoming the primary source for learning. This implies a fundamental change in the relationship between working and learning. We were used to view learning as a preparation for work: learning preceded working. Now, learning can be viewed as a direct consequence of working. In this article, we explore the implications of this development for organising work and learning.

1 The changing nature of work

In our knowledge economy and society, the nature of work is changing. Much routine work is becoming automated or is being outsourced. Knowledge work, in which workers have to combine and interpret information and knowledge to find solutions for new problems they encounter in their daily work, is replacing routine work more and more. Such knowledge work has the characteristics of learning processes. Knowledge workers can not get their job done and add value without learning. Of course, there still remain more routine aspects of work: work is often not 100% knowledge work, but the part that is knowledge work is growing and is becoming decisive in more and more work environments (cf. Drucker, 1993; 1999).

In this development, the work environment becomes the primary source for learning. This implies a fundamental change in the relationship between working and learning. We were used to view learning as a preparation for work: learning preceded working. Now, learning can also be viewed as a direct consequence of working: having access to meaningful work means having access to powerful learning environments. Organising work and organising learning are inseparable in this view on the nature of work. The challenge for organisations is to create an environment in which working and learning become one, in which workers can work on issues that interest and intrigue them, and that

triggers their desire to continuously learn and apply these new learnings. Such an environment is attractive for knowledge workers, and stimulates them to work to their full potential.

Before we elaborate on this, we present an example that illustrates how the nature of work is changing. To show that knowledge work is all around us and not only for the people who hold strategic positions in so called knowledge intensive companies, we chose the example of a farmer:

A Dutch farmer owns 70 cows. Together with an employee he milked the cows every day, which took them 4 hours a day. When his employee told him that he was going to leave, the farmer was faced with two options: replace the employee or innovate the way he organised the work. He chose to innovate. He searched for developments, and learned about the milking robot. He compared several suppliers and their versions of the robot, asked other farmers about their experiences, and bought one. Together with the supplier he prepared the installation and operation of his new milking robot. The robot operates 24 hours a day. When a cow wants to be milked, she walks into the robot by herself, gets cleaned and milked, and walks out again. During this process the quantity and quality of the milk is monitored constantly. These data are sent to the personal computer in the farmer's house, and the farmer analyses these data, looks for irregularities and patterns and constantly searching for the best interventions in view of the quality and quantity of the milk as well as the well being of the animals. This takes him approximately 1,5 hours per day. Together with seven other farmers, he built a small network. They meet once in a while and email regularly to exchange experiences, help each other in dealing with difficult situations. On average, the farmer realised an increase in productivity of 10% more milk per day.

When we analyse this example, it becomes apparent that the work of the farmer changed fundamentally: from milking to process control and improvement. The daily routine work decreased dramatically: only part of the 1,5 hours each day is spent on routine checks, the other part on dealing with unexpected situations and finding solutions to deal with these. The farmer realised this change through an innovation that he researched, prepared and implemented in cooperation with the supplier. In terms of productivity, this was the most important work that he did: through learning about the milk robot, creating knowledge about how to use this new equipment in his own farm and using this knowledge to make it work. His capability to add value through knowledge creation and utilization has a lasting effect on the work and productivity on his farm. This capability will probably help him to create new innovations in the future.

Another important element to note is the role of learning in this process: from the beginning a continuous learning process is taking place. However, formal training courses are absent. Learning occurs while working and in the exchange with colleagues and supplier. When one would ask the farmer about learning, he would probably say that he is just doing his work. Learning and working are inseparable.

2 The importance of knowledge productivity

One of the views underlying the knowledge economy is that the application of knowledge adds more value than the traditional factors of capital, raw materials and labour. The growing importance of knowledge has changed the role of human operations in economic transactions: the focus is shifting from appreciation of physical labour and the ability to coordinate and regulate to the ability to contribute to knowledge generation and application (Drucker, 1993; Castells, 1998).

Where knowledge is dominant (not just among upper management but at all levels of organisations), the daily operations should be designed to support *knowledge productivity* (Kessels, 1996). This process entails identifying, gathering and interpreting relevant information, using this information to develop new skills and to apply these skills to improve and radically innovate operating procedures, products and services. In the years ahead, knowledge productivity will become an increasingly critical economic factor. Understanding how knowledge productivity arises and the competence to promote knowledge productivity are becoming more important as well.

Knowledge as competence

The knowledge productivity concept is based on the view that knowledge is a personal competence: it involves a subjective skill that is inextricably linked with the individual(s) concerned (cf. Malhotra, 2000). The objective is not merely to apply rules and procedures in dealing with standard problems but also to improve the rules, analyse new situations, devise new concepts and improve understanding of the mental and learning processes underlying the capabilities stated.

For organisations, knowledge becomes productive when the creation and application of knowledge results in gradual improvements and radical innovations of operating procedures, products and services. The specific improvements and innovations, however, are not the knowledge that concerns us. A specific innovation, improvement or invention – possibly patented – may be of great economic value, but the true value lies in the *ability* to generate such improvements and innovations rather than in the actual innovation. This ability is closely linked to the ability to learn. As we saw in the first section of this article, learning plays an integral part in the knowledge work that brings about these improvements and innovations. In this respect, the speed and cleverness of learning processes directly influence productivity of knowledge workers (cf. Drucker, 1999). Therefore, increasing the learning ability of individuals and organisations is closely linked to economic success.

The view of knowledge as a personal competence necessitates a critical re-examination of familiar ideas:

- the belief that knowledge can be imparted
Competencies are not transferable. Each person needs to acquire and develop them independently. Knowledge transfer is the focus of educational and training programmes, where the instructional material is viewed as the explicit knowledge form and the didactics as the transfer medium. Accepting the view that knowledge is a competence, from the perspective of knowledge productivity, deeply affects the structure of the

surroundings where people work, schools, occupational and corporate education programmes and university education.

- the idea that knowledge can be shared
This idea has arisen chiefly in the context of the learning organisation and is often invoked to justify the immense investments in electronic knowledge systems. Even the mythical assertions that knowledge can be shared infinitely with others without diminishing the supply of knowledge, however, have only the effect of a stencil machine. Knowledge as a competence cannot be shared.
- the distinction between explicit and implicit knowledge (e.g. Nonaka and Takeuchi, 1995)
Viewing knowledge as a personal competence is incompatible with the notion of explicit knowledge. Explicit knowledge, which consists of codified, established, described, documented knowledge, is simply information about another person's competence. Gaining access to explicit knowledge, for example through ICT systems, provides me with information about somebody else's competence. Reading a book or Lotus Notes entry, however, will not provide me with another person's competence: I will need to acquire and develop that competence myself.

Linking learning and work

In the context of the knowledge economy, work is becoming the primary learning facility for workers. Research also indicates that the learning processes occurring at and around the workplace are more powerful than learning processes embodied in formal training settings (Kessels, 1993). Such learning processes take place among staff members in the course of their work. They involve learning through utilizing occupational equipment and learning by staff and supervisors alike during interactions with clients. If the learning processes from formal curricula do not receive any form of support from the powerful learning processes in the course of daily operations, their effect will be minimal. Accordingly, the role of educational curricula will arouse far more interest in the event of a clearer relationship between learning processes in the training setting and at the workplace. The abundance of programs that resemble formal, classical, and school-type settings that are a far cry from the problems encountered by the trainees in their actual work on a daily basis has tarnished the reputation of training programs.

This situation may also explain the growing interest in various forms of on-the-job training. The shift toward workplace instruction has emphasized the educational function of supervisors, managers, co-workers, and coaches (Jacobs & Jones, 1995; Rothwell & Kazanas, 1994). In addition, people are becoming increasingly aware that learning for knowledge work may be stimulated and supported through a variety of means other than formal training programs. Options include issuing special assignments, changing positions or seconding staff members, and actively participating in quality teams and discussion groups. Alternative possibilities entail organizing the work through project management and equipping the workplace with electronic performance support systems (Winslow & Bramer, 1994).

3 Promoting knowledge productivity

Knowledge productivity denotes the ability to trace relevant information and use it to develop a new competence to achieve gradual improvement and radical innovation in operating procedures, products and services. Can we cultivate this ability systematically among individuals and teams? Tracing relevant information and developing and applying new competencies is based on powerful learning processes. Can learning situations be designed that promote knowledge productivity?

3.1 The need for a corporate curriculum

The tremendous importance of learning power instigates the demand for *a corporate curriculum* that develops the competencies needed to be knowledge productive (Kessels, 1996; Kessels, Van Lakerveld & Van den Berg, 1998).

Basic principles

Based on the analysis in the previous sections, we can formulate the following basic principles for such a corporate curriculum:

- τ Knowledge productivity is too important to leave it to coincidence. A systematic approach with a clear purpose therefore appears indicated. However, the knowledge potential that is embedded in people, can not be developed and made productive by a traditional management process based on formal planning and control mechanisms. The necessary learning processes will not appear on command. These learning processes will probably be influenced more by personal motivation and affection and self regulation of individuals and groups, than by formal strategies, plans and structures. Some find the pleasure they experience from working together, keeping each other company and being part of a community important reasons to pursue a collective ambition. To them the social context is the biggest attraction to learning. Others derive their zeal for learning from substantive interest, their drive to solve a problem, their passion for a discipline, identification and elaboration of a personal life theme, expression of a special talent and enjoyment of an exceptional achievement. Here, content is the driving force. Learning environments need to be designed according to these varied motives and need to make use of these.
- τ The demand for knowledge productivity and the importance of continuous learning are two sides of the same coin. Organising educational provisions that promote learning to increase the knowledge productivity of individuals and teams becomes part of the day to day business policy. The corporate curriculum provides a framework for the learning functions that promote the ability to signal relevant information, to create new knowledge and to apply this knowledge to step by step improvement and radical innovation of work processes, products and services.
- τ The type of learning outcomes and the learning processes leading to knowledge productivity require a curriculum that takes a different form than the traditional catalogue

of isolated training programs. The work environment is the primary source for learning and therefore the primary focus of a corporate curriculum. The corporate curriculum should be viewed as a rich landscape where individuals and teams find their way and construct knowledge while working.

- τ To maximize knowledge productivity, it is important not to limit learning facilities of the corporate curriculum to a small and privileged group. Knowledge work is not a privilege for the higher educated or the top. It is beneficial to find and stimulate possibilities for knowledge work throughout the organisation. The corporate curriculum should give people at all levels of the organisation opportunities to organise their work as knowledge work, and engage them in learning processes that enhance knowledge productivity.

The learning functions of a corporate curriculum

An organisation that tries to improve its knowledge productivity will focus on the analysis and support of the following learning functions (Kessels, 1996):

1. build subject matter expertise in the content areas that are important to the business;
2. learn to solve problems, using this subject matter expertise;
3. develop reflective skills and meta-cognitions that help to find new ways to look for and acquire knowledge, and make this knowledge productive;
4. develop the social and communication skills that give access to the knowledge of others and that enhance a climate that stimulates learning;
5. develop skills that help workers to regulate their motivation and affections;
6. create periods/places with peace and stability, needed for deepening understanding, creating synergy, and integrating new knowledge in processes and procedures;
7. create creative turmoil, that stimulates improvement and innovation.

The policy and the activities that an organisation develops to promote these seven learning functions form its *corporate curriculum*. A recent and large scale Dutch study in the healthcare and welfare sector, provides support for these seven learning functions (Van Lakerveld, Van den Berg, De Brabander & Kessels, 2000). This research shows a clear relationship between the power of the learning environment (the elaboration of the corporate curriculum) and the ability of an organisation to improve and innovate (knowledge productivity).

Below we will describe each learning function some more.

Subject matter expertise

This learning function supports the development of subject matter expertise directly related to the goals of the organisation. Important questions to address are:

- τ Is all the subject matter expertise we need now and in the near future available in our organisation?
- τ Do we know who knows what, and do we use the subject matter expertise of everyone in our organisation?
- τ How can we develop the content expertise we need?

Traditionally, subject matter expertise has been the main focus of formal training and development programs. Also, when organisations engage in knowledge management activities, the focus often is on content. Yet, a highly specialized work force does not make a learning organisation that becomes knowledge productive.

Problem solving

It is important to develop the competency to use domain specific knowledge in solving problems. This combination enables the organisation to operate effectively in new and unfamiliar problem areas, which is becoming increasingly important in many organisations.

Relevant questions are:

- τ What are the problems we will be facing? What are new problems for which we need new approaches?
- τ Why is it that we are good at solving certain problems, while we are constantly struggling with other problems?
- τ How can we stimulate people to experiment with new approaches to solving ill defined problems?

Developing problem solving skills calls for creativity and experimentation. Also, it often helps to stimulate cooperation between people from various backgrounds (e.g. positions, subject matter expertise, work style). The development of problem solving skills benefits from personal involvement and shared ambition within the team working together to solve new problems.

Reflective skills and meta-cognitions

Developing reflective skills and meta-cognitions is needed for locating paths leading to new knowledge and means for acquiring and applying this asset. Meta-cognitions enable people to steer and improve their learning processes. Main questions that we should answer here are:

- τ Where is our intelligence located?
- τ What are our preferred ways to develop and share knowledge? How can we broaden our repertoire in building knowledge?
- τ How come that we are making progress in this field, but lagging behind in other domains?

Reflection is crucial in developing meta-cognitions. Individuals and teams need to reflect regularly on their work and on their development. Time to look back and open communication between people are important to make reflection possible.

Social and communication skills

This learning function builds the communication skills that provide access to the knowledge network of others and that enrich the learning climate within a workplace. Knowledge productivity requires easy access to relevant sources of information and competence. Getting access to these networks relies heavily on the proficiency in communication and social skills. It is not only a matter of polite behaviour. Main question here are:

- τ How do I make myself attractive in order to participate in the network of interesting knowledge workers?
- τ What can I offer and how am I accepted?

τ How can I get to the heart of the matter when communicating with an expert?

Highly developed social and communication skills promote a favourable learning climate.

Self regulation of motivation and affection

Affections, affinities, and emotions play an important role in knowledge work. I can not be inventive in a domain for which I am not motivated. Therefore it is important to develop skills that regulate the motivation and affections related to learning. In a traditional economy a manager could say: work harder, or run faster. In a knowledge economy it is useless when a manager says: be smarter or show more creativity! Being smart and being creative depend heavily on personal interest. Questions that are import here are:

τ Why do you get up so early to avoid the traffic jams? What is it that makes you move? What is your main drive?

τ What is meaningful work for me and how can I create this work?

τ How can I stay motivated, even in times that things are not working out?

Finding out what emotional and affective drives employees have and how they can regulate these will probably be an important aspect of human resource development in a knowledge economy.

Peace and stability

Promoting peace and stability enables specialization, synergy, cohesion, and integration. Peace and stability are necessary for gradual improvement. Key questions are:

τ How can we learn form the past and how can we apply this to our actual work?

τ How can I share my learning with others in the organisation?

τ How can we integrate newly developed knowledge in the way we are working, in work processes, in systems?

Unfortunately, many employees work in an environment that is permanently disturbed by reorganisations, business process redesign projects or fast moving managers. Lack of redundancy and time to reflect exploit existing (intellectual) resources, and consume these without generating new knowledge. Lack of peace and stability results in impoverishment of intellectual assets.

Creative turmoil

Causing creative turmoil is needed for innovation. Creative turmoil brings the dynamics that push towards radical innovation and leaving traditional paths behind. Creative turmoil requires a certain amount of existential threat. It should really matter, to surmount or to lose. Key questions are:

τ What are crucial issues we are facing, that need new approaches?

τ Who in the organisation is motivated for and affected by these issues?

τ How can we support them in developing new knowledge and finding new ways to deal with these issues?

In a sense peace and stability, and creative turmoil are two contrasting learning functions. Some employees will do better in an environment that is reigned by peace and stability, others feel spurred by creative turmoil. We think that both are necessary, but in a balanced way.

3.2 Principles for developing a corporate curriculum

The next question is: how to can design a workplace to provide powerful support for the learning functions of the corporate curriculum? Such a design would benefit knowledge productivity and thus lead to improvement and innovation.

Knowledge productive workplaces

Recent research projects provide important foundations for planning and designing knowledge productive workplaces (Baumard, 1999; Dutrénit, 2000; Huysman and De Wit, 2000):

- Formal knowledge management systems seem to add little to an organisation, while socialization of experiences and development of collective competence are essential for resolving crises. Personal networks appear to be especially important for designing knowledge productive workplaces. Mutual concern, trust, curiosity and inspiration by a common mission benefit knowledge sharing.
- Knowledge workers are likely to judge their workplace according to the career development opportunities and the invitation to engage in an inspiring working relationship with like-minded spirits. Employees have reason to seek out workplaces where they can enrich, innovate and expand their repertoire of competencies. They are becoming increasingly aware that they need to maintain their reciprocal appeal.
- Content is an important factor: Why do some people learn about new information before others do? How do they find the energy to continue when others have given up? An environment in which workers can work on issues that interest and intrigue them, and that triggers their desire to continuously learn and apply these new learnings is attractive for knowledge workers, and stimulates them to work to their full potential.

Development principles

These considerations allow us to formulate three provisional development principles for the knowledge-intensive organisation's curriculum:

- *Enhancing reciprocal appeal (the social context)*

Knowledge-productive workplaces are rich learning environments in which the social context fosters collaborative efforts. No single manager, instructor or trainer, however, is exclusively responsible. Participants work hard to maintain their reciprocal appeal, which means that they do their best to provide each other with a fruitful learning environment. Important characteristics of this social context for learning seem to be: reciprocal respect, appreciation and integrity, sufficient safety and openness for constructive feedback and confrontations. The communicative and interactive skills of the participants are required to meet high standards. The need for reciprocal appeal is a keenly understood self-interest. Knowledge workers who are dissatisfied with the learning ambience cannot hold

others responsible for improving it. If they are unable to improve the interactive setting, they have no choice but to seek out more appropriate surroundings. Helpless teams may lose valuable colleagues this way, while overly eager job hoppers fail to cultivate their own appeal.

- *Searching for a passion (the content component)*

People are clever only if they want to be. Nobody can talk somebody else into curiosity, motivation, interest and ambition. Discipline, loyalty and obedience may be welcome and valuable support systems for overcoming a hurdle or an impasse. Without any substantive drive, however, they are likely to lead to mediocrity at best. Knowledge-productive environments encourage cultivation of a personal, substantive theme. Such an individual theme inspires curiosity and enables information to be traced more quickly. It facilitates establishing connections with attractive, professional networks and stimulates exceptional achievements where others might give up. Designers and knowledge workers need to become competent to navigate through the diffuse arena of affinity, motivation, passion and ambition to be able to apply their competence systematically.

- *Tempting towards knowledge productivity*

Cultivating reciprocal appeal serves primarily to create a favourable social context. Searching for a passion establishes the foundation for substance. Promoting knowledge productivity also requires the competence to work systematically on the social context and the substantive component. The desire to guide, manage, control and monitor is becoming increasingly difficult to fulfil. The growing interest in self-guidance is apparent in both work and learning contexts. This leads us to ask how we can tempt each other towards knowledge productivity. The main objective is to acquire the competence to design a workplace that develops sustainable instruments, useful for dealing with future issues: the competence to become cleverer, learning to learn, organising reflection, increasing reflexivity and basically applying knowledge to knowledge development.

4 Conclusion

In a knowledge economy, individuals, teams and companies need to develop the necessary competencies to be able to participate in a working life that is mainly based on knowledge productivity. The traditional approaches to management, training and development will not provide the learning environment that is required for knowledge work. Therefore, each company should consciously develop a corporate curriculum that turns the day to day work environment into a powerful learning environment.

The knowledge economy may bring prosperity to those who can join the new elite of knowledge workers. Inherently, it also creates new imbalances. However, the concept of the corporate curriculum may offer new opportunities for those whose school carrier was not very successful and who are at risk in a knowledge society. The various learning functions help individuals, irrespective of their formal education, to develop their talents and take part in various forms of knowledge work.

The concepts of knowledge productivity and the corporate curriculum raise also the question in how far knowledge productivity can be managed. These concepts may even question the role of managers in a knowledge economy. Their ability to develop strategies, procedures and work processes turned top management into the ruling business class of the 20th century, the power that they inherited from the company owners. In exchange for security and material support employees did their jobs disciplined and in obedience. When in the 21st century knowledge productivity becomes the driving force, and as this knowledge production will be found at every level of economic activity, the knowledge workers will take charge. The corporate curriculum might become the binding force of knowledge networks, smart communities that heavily depend on shared intrinsic motivation and personal affection with the content of the job.

In our contribution, we have tried to touch upon the ingredients of work and learning environments that promote knowledge productivity. Based on the notions presented in this article, we recently started a research programme to further investigate these ingredients. Through this research we hope to provide researchers and practitioners with valuable insights in the dynamics of knowledge productivity. We welcome your reflections and comments, which could help us in our knowledge creation journey.

References

- τ Baumard, Ph. (1999). *Tacit knowledge in organisations*. Londen: Sage.
- τ Carnevale, A.P., Gainer, L.J. & Meltzer, A.S. (1991). *Workplace basics. The essential skills employers want*. San Francisco, CA: Jossey-Bass.
- τ Castells, M. (1998). *End of millennium: The information age – Economy, society and culture*. Vol. 3. Oxford, Blackwell.
- τ Drucker, P.F. (1993). *The Post-capitalist Society*. Oxford: Butterworth Heinemann.
- τ Drucker, P.F. (1999). *Management challenges for the 21st century*. New York: Harper Business.
- τ Dutrénit, G. (2000). *Learning and knowledge management in the firm. From knowledge accumulation to strategic capabilities*. Cheltenham: Edward Elgar.
- τ Huysman, M. & Wit, D. de (2000). *Kennis delen in de praktijk (Knowledge sharing in practice; in Dutch)*. Assen: Van Gorcum/Stichting Management Studies.
- τ Jacobs, R.L. & Jones, M.J. (1995). *Structured on-the-job-training*. San Francisco: Berrett-Koehler.
- τ Kessels, J.W.M. (1993). *Towards design standards for curriculum consistency in corporate education*. Enschede: Twente University.
- τ Kessels, J.W.M. (1996). Knowledge productivity and the corporate curriculum. In: J. F. Schreinemakers (Ed.) *Knowledge management, Organisation, competence and methodology*. pp. 168-174. Würzburg: Ergon Verlag.
- τ Kessels, J.W.M., Lakerveld, J. van & Van den Berg, J. (1998). *Knowledge productivity and the corporate curriculum*. Paper AERA, San Diego CA..
- τ Lakerveld, J., J. van den Berg, C. de Brabander & J. Kessels (2000). *The Corporate Curriculum: a Working-Learning Environment*. Paper AHRD, Raleigh-Durham NC.

- τ Malhotra, Y. (2000). Role of organizational controls in knowledge management: is knowledge management really an “oxymoron”? In: Y. Malhotra (red.) *Knowledge management and virtual organizations*. Hershey: Idea Group Publishing.
- τ Nonaka, I. & Takeuchi, H. (1995). *The knowledge-creating company*. New York: Oxford University Press.
- τ Rothwell, W. J. & Kazanas, H. (1994). *Improving on-the-job-training* San Francisco: Jossey-Bass.
- τ Winslow, Ch. & Bramer, W.L. (1994). *Future work. Putting knowledge to work in the knowledge economy*. New York: The Free Press.

Abstract

The nature of work is changing. Much routine work is becoming automated or is being outsourced. Knowledge work, in which workers have to combine and interpret information and knowledge to find solutions for new problems they encounter in their daily work, is replacing routine work more and more. Such knowledge work has the characteristics of learning processes: actively generate and apply knowledge.

The work environment becomes the primary source for learning. This implies a fundamental change in the relationship between working and learning. We were used to view learning as a preparation for work: learning preceded working. Now, learning can be viewed as a direct consequence of working: having access to meaningful work means having access to powerful learning environments.

The challenge for organisations is to create an environment in which working and learning become one, in which workers can work on issues that interest and intrigue them, and that triggers their desire to continuously learn and apply these new learnings. Such an environment is attractive for knowledge workers, and stimulates them to work to their full potential. Such an environment helps an organisation to become knowledge productive: able to trace relevant information and use it to develop a new competence to achieve gradual improvement and radical innovation in operating procedures, products and services.

In this article, we explore the implications from this development for organising work and learning.