Tempting knowledge productivity

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"Gelido in ogni vena
Scorrer mi sento il sangue,
L'ombra del figlio esangue
M'ingombra di terror."

"I feel my icy blood
course through every vein,
The shadow of my lifeless son
overwhelms me with horror."

Although we can read the eighteenth-century Italian text by Pietro Metastasio (1698-1782), Vivaldi's music enhances the expressive power of the words.

Cecilia Bartoli's rendition of this aria *d'ombra* epitomizes the exceptional dramatic quality of this moment. Farnace believes he is standing at his only son's grave. His fear resounds from the glassy timbre of the strings, which at the word terror suddenly burst into a *forte* with the intensity of a scream from biting pain.[i]

I long wondered why this piece of music made such a strong impression on me. The same question applies to why I opened my speech with this piece. While reading it, I was suddenly overwhelmed by its intensity. Why does it move me, while another reader might not even notice it? In drafting this text, why do I sense that this piece of music can help me convey a point that I have brooded over extensively? Bringing you along on my quest is a risky challenge. Hopefully, my motives will be convincing.

A knowledge economy

Staff participation in developing the knowledge of a firm, institution or institute is an important theme in Human Resource Development operations. The dramatically increased interest in knowledge over the past decade has given rise to the concepts knowledge-intensive organizations, knowledge workers, knowledge systems, knowledge centres, knowledge creation, knowledge management and citizens in a knowledge society.[ii] Educated professionals continue to figure prominently in the explorations of the emerging knowledge economy. The government report *Kennis in Beweging* greatly encouraged scholarly publications, PhD theses and new technology.[iii] In the *Hoger Onderwijs en Onderzoek Plan 2000* (Ministry of Education, Culture and Science, 1999 and 2000) the awareness that the Netherlands is becoming a knowledge country is the foundation for support for higher education as a source of educated workers.[iv]

The knowledge economy is not restricted to well-educated staff at knowledge-intensive organizations. The implications are apparent all around us. I live on a farm in the Gelderland valley area. Our next-door neighbours are young, enterprising farmers who deal with questions such as: How can farming be economically profitable in an

agricultural area with landscape value? Should we raise free-range chickens? With the growing concern for food safety, can we allow free-range animals to roam about in their excrement, or should we invest in sophisticated technology for battery cages that keep eggs separate from excrement? Which combination of clover and grass should we plant to get the soil to retain nitrogen? What should we do with kids that are unsuitable for dairy or meat?
These young entrepreneurs ponder such questions seriously. They establish informal networks to share their experiences and to analyze new information.

In his policy memorandum *Groen Onderwijs 2010*,[v] the minister of Agriculture, Nature Management and Fisheries advocates transforming traditional agriculture and livestock breeding into a knowledge-intensive agro-food complex dedicated to quality education about food, green areas, nature and landscape. Here, a sector that we would not immediately identify as a knowledge producer is based on learning in a knowledge society.

Conventional perceptions about knowledge, in which technology and computer science prevail, coincide with the growing awareness that knowledge economies serve primarily to improve our understanding of design, development, learning, creation, cooperation and experience.[vi] Once the focus shifts from rules, procedures, systems, methods and techniques to the operators that value enrichment, exploration of opportunities, involvement, respect, integrity, reciprocal appeal, care and sustainability, critical reconsideration of our views on knowledge and knowledge development becomes inevitable.

Because knowledge development and knowledge application are closely related to learning processes, a golden opportunity has arisen for educators, consultants and researchers able to define a clear relationship between the quality of certain learning situations, the proceeds of knowledge and an organization's prosperity. Ideas from the 1960s and 70s about continuous education and educational leave are quickly resurfacing in action plans for lifelong learning,[vii] in clauses on training facilities in collective labour agreement negotiations and in measures to make people more employable. Learning organizations are especially likely to thrive in a knowledge economy. The crucial nature of knowledge means that this commodity needs to be managed wisely. When we discovered the importance of the production process at the dawn of the production era, we appointed production managers; when finance required special consideration, we recruited financial managers; when staff members needed care, we found personnel managers; our growing awareness of the importance of quality led to quality managers; upon discovering the client, we designated account managers. Our present focus on knowledge makes knowledge management the next obvious step.[viii]

The question is whether the current interest in knowledge, the complex underlying dynamics and the economic significance that we attribute to it might augur the end of the management era. Our origins lie in a period of economic activity in which we tried to plan, steer, manage, measure, verify, monitor, assess and evaluate everything we considered important. I expect that in a while we will view knowledge management as an

anachronism, as the link between two units from different eras.[ix] While knowledge has been important throughout economic history,[x] our desire to manage everything of value to us arose mainly in the previous century. The question is whether the successful management approach from the past is fully applicable to the desire to promote knowledge development.[xi] Admittedly, the stereotype of the authoritarian and controlling manager has been replaced by the coaching, stimulating, facilitating and inspiring manager. They also seem like important adjectives in the context of knowledge development. Most likely, however, we will need to abandon the idea that people who help others think deserve to be managers.

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.[xii]

Where knowledge is dominant (not just among upper management but at all levels of organizations), the daily operations should be designed support *knowledge productivity*.[xiii] This process entails identifying, gathering and interpreting relevant information, using this information to develop new skills and radically innovating operating procedures, products and services. It chiefly concerns the way that staff, teams and departments achieve knowledge-based improvements and innovations.

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

The knowledge productivity concept is based on the view that knowledge is an individual competence: it involves a subjective skill that is inextricably linked with the individual concerned.[xiv] The objective is not merely to apply rules and procedures in dealing with standard problems but also to improve the rules, analyze new situations, devise new concepts and improve understanding of the mental and learning processes underlying the skills stated. This view refutes a common distinction between explicit and implicit knowledge.[xv] Explicit knowledge, which consists of codified, established, described, documented knowledge, is thus 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 myself. Cecilia Bartoli made a spectacular CD recording of her Vivaldi rendition. If, however, she were to succumb to a serious illness in the near future, her competence would be lost. The recording will preserve the information about her special talent, but her actual competence will be gone forever.

We manifest this competence by gradually improving and radically innovating operating procedures, products and services. The improvement and innovation, however, are not the knowledge that concerns us. The ability to achieve such improvements and innovations matters most. 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 innovations and improvements rather than in the actual innovation.[xvi]

Such a view of knowledge – knowledge as an individual competence – necessitates a critical re-examination of several familiar ideas. One is 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 the explicit knowledge form and the didactics the transfer medium. Accepting the view that knowledge is an individual 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.

Another view that merits further exploration is the idea that knowledge can be shared.[xvii] This idea has arisen chiefly in the context of the learning organization and is often invoked to justify the immense investments in electronic knowledge systems.[xviii] 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. No matter how many times I listen to the aria *Gelido in ogni vena*, I will never be able to sing it like Bartoli. If I were as talented and spent some time with Bartoli, attentive and disciplined research, study and practice would enable me to develop my own resonance. Attending lectures, however, would never work. Musicologists can show us the similarity between the beginning of Vivaldi's "Winter" from his *Four Seasons* and the icy opening bars from the aria we just heard; dramaturges can explain how the father's awareness that he may be to blame for the death of his only son heightens the suspense in the text. All this information may be interesting for those eager to learn all about opera but does not enhance the listening experience. If the aria were a faint tune and the singing mediocre, it would have no impact on us. The special competencies of Metastasio, Vivaldi, Bartoli and the performing musicians make all the difference.

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?

The corporate curriculum

At my inaugural lecture in Leiden I introduced the Corporate Curriculum concept,[xix] which is an organizational curriculum. This is not a formal curriculum prescribing the

programmes and courses that staff should attend. Rather, it involves transforming the daily workplace into an environment where learning and working overlap: the arrangement of a rich and diverse landscape that encourages and supports employees in the learning they need to do. It is based on the idea that the learning going on at and around the workplace every day is far more powerful than the learning that occurs in artificial courses, sessions and programmes. On the other hand, learning processes at and around the workplace often have unwanted side effects. Increased pressure to perform leads people to cut corners and bend safety regulations; a hierarchy of managers that take credit for successes and blame failures on others does not promote employee self-awareness and responsibility. Staff members learn to excel in mediocrity, to withdraw when the tension rises and to cover themselves to avoid being blamed for failures. These lessons achieve an impact that cannot be reversed in a two or three-day course, unless the characteristics of learning at and around the workplace are dealt with as well. The process involves seven related learning functions.

1. *acquiring material expertise* and professional knowledge directly related to the organization's core competencies; e.g. a bank's financial services or the care provided by a hospital
2. *learning to identify and deal with new problems* with the professional knowledge acquired; e.g. switching to a new tax system or introducing customer-oriented patient care
3. cultivating *reflective skills* and meta-cognitions to find ways to locate, acquire and apply new knowledge; how do we learn from our experiences? Why is it that we excel in developing sustainable energy but are unable to convince those around us of its value?
4. acquiring *communicative and social skills* that help us access the knowledge network of others and make learning at the workplace more enjoyable
5. acquiring skills *to regulate motivation, affinities, emotions and affections* concerning working and learning; people are only clever if they want to be. We need to identify important personal themes and ways to develop them.
6. promoting *peace and stability* to enable exploration, coherence, synergy and integration; employees should receive the opportunity to master and elaborate a plan, idea or operating procedure. Too much peace and stability might bring about overly one-sided specialization and an excessive internal focus, complacency or laziness.
7. causing *creative turmoil*, which leads to radical innovation. Creative turmoil also results from a powerful drive to resolve a tricky question. The cause is often an existential threat: a matter of winning or losing, surviving or going under, being in or out. Not all unrest is creative turmoil. Disturbance alone, without the drive to innovate, is irritating; too much creative turmoil may yield a thousand new ideas but leaves little opportunity to elaborate any of them. The learning functions *peace & stability* and *creative turmoil* are clearly conflicting, even though they are supposed to offset one another.[xx]

In recent years additional research has enabled us to attribute an empirical foundation to the individual learning functions and the corporate curriculum construct overall.[xxi] The next question is how we can design a workplace to provide powerful support for learning

functions. Such a design would benefit knowledge productivity and thus lead to improvement and innovation.

Knowledge productive workplaces

Recent research projects provide important substantive foundations for planning knowledge management and designing knowledge productive workplaces.[xxii] Formal knowledge management systems add little to an organization, while socialization of experiences and development of collective competence are essential for resolving crises. A unilateral focus on developing technological knowledge, as recorded in patents, often complicates understanding the underlying learning processes that represent the factual, sustainable value of an organization. A shared view of the importance of learning and developing knowledge is a condition for convening varied knowledge workers. The role of Information and Communications Technology (ICT) tends to be overestimated, especially if there is a unilateral focus on the technical approach. Personal networks appear to be especially important for managing knowledge. ICT is probably more useful for connecting people and less relevant for gathering and disseminating explicit knowledge.[xxiii] Mutual concern, trust, curiosity and inspiration by a common mission benefit knowledge sharing. A knowledge-friendly culture encourages working in teams and participating in personal and professional networks and informal gatherings.

Inspired by the findings from these recent studies, I asked my colleagues at The Learning Company the following two questions[xxiv]:

a. What do you like about your workplace?
b. What are you afraid might be lost?

Regarding a. Attractive aspects frequently mentioned are the space and freedom to choose one's professional development and the accessibility of interesting colleagues in the field, both internally and with clients. The respondents also mention concern for others, open communication, constructive feedback, a generally positive disposition, respect for and appreciation of personal differences and integrity in operating. Despite the absence of a formal mission or strategy, staff members find that the professional principles applied are coherent with the consistent design of the personal work environment based on principles such as a powerful, collective ambition.

Regarding b. The chief areas of concern regard the fear that the increasing success will raise the work pressure and bring professional development to a standstill, leaving no time for reflection. In addition, the expansion of the learning company may leave little time or opportunity for individual attention and support, the need for rules and consultation will grow, an internal hierarchy may emerge, and people may lose sight of the activities of their co-workers.

These statements about the characteristics of a desirable workplace reflect the general impression that is emerging about the new generation of knowledge workers.[xxv] They 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. Getting stuck at a workplace without any learning potential jeopardizes the market value and economic attractiveness of knowledge workers. Employees have reason to seek out

workplaces where they can enrich, innovate and expand their repertoire of competencies. They will become increasingly aware that they need to maintain their reciprocal appeal. Managers can no longer organize a hospitable work setting with like-minded spirits.[xxvi] Employees will need to create it themselves and will require competencies that are conducive to open and constructive communication, while offering interest, respect, energy and warmth as well.

Content is another factor. Why do some people learn about the new information available in their field of interest before others do? Which forces motivate them? How do they find the energy to continue when others have given up? People are clever only if they want to be. Everybody has to find his or her passion. One reason for listening to Cecilia Bartoli's rendition of the aria *Gelido in ogni vena* is to experience the passion that makes musical performance special.

Designing a learning environment for knowledge productivity

Researchers in human resource development are fascinated with the question as to which factors promote or impede knowledge productivity. In the quest for answers, one of the challenges is to design learning environments in which knowledge productivity will thrive.[xxvii] In educational science we can elaborate on the research on problem-driven learning environments where the competency aspect is important. In educational psychology the constructivist movement supports the view that people have actively constructed the competencies they apply according to the confrontation with reality.[xxviii] Educational philosophy, which is based on initiation into academia, where students, journeymen and masters spend extended periods together, provides the foundation for a knowledge-productive work environment.[xxix] Research on the design of computer simulations for higher cognitive skills[xxx] and the use of TeleTOP (the electronic learning platform on the Internet),[xxxi] are among the research projects conducted at our faculty of applied educational science and support the design of knowledge-productive learning environments in organizations. The design-oriented research developed at our curriculum technology department is an important foundation for planning such an approach.[xxxii]

The knowledge that is critical for a knowledge economy is probably not the formal knowledge codified in books, reports and knowledge systems. Moreover, this formal, explicit, codified knowledge will rapidly become obsolete.[xxxiii]

1. Such knowledge concerns the competence of individuals and teams to introduce gradual improvements and radical innovations in both technological areas and the ways we organize work and participate in collaborative arrangements.
2. Because this knowledge becomes a personal competence, it cannot be imparted. Every employee will need to reacquire and develop this competence.
3. The learning processes required cannot be imposed, guided, managed or verified. 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. 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 are designed according to these varied motives and make use of them.

4. Using the prospect of knowledge productivity to abandon the view of knowledge as an objective entity that exists outside the human mind eliminates the significance of uniform instructional material. Instructional material that is useless in the social context where I operate or fails to support my substantive questions taxes my memory and spoils my desire to learn and thrive. Even if this instructional material is from a programme's final level or careful analysis of an organization's vision, mission and strategy, I will have difficulty becoming involved and maintaining our concentration and will forget everything quickly, unless I find it appealing. Rather than prescribing instructional material, knowledge-productive learning practice encourages individual examination of the motives and facilitates the course of development selected.[xxxiv]
5. If the economic value of knowledge derives less from its formal, explicit, objective or material manifestation than from the ability and competence to generate it, then this offers another foundation for designing knowledge-productive workplaces.[xxxv]

Development principles for knowledge productivity

The above considerations allow us to formulate three provisional development principles for the knowledge-intensive organization's curriculum: enhancing reciprocal appeal, searching for a passion and tempting knowledge productivity.

1. Enhancing reciprocal appeal

Knowledge-productive workplaces are pleasant learning environments. 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. A consumer attitude, nurtured by a desire for entertainment, will impede any learning work company from developing.[xxxvi] Nor is a knowledge-productive environment a pink haze where the sweet smile is part of the architecture. Reciprocal respect, appreciation and integrity provide sufficient safety and openness for constructive feedback and painful confrontations in some cases. 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.

2. Searching for a passion

In the past, bosses could tell their employees: “Work harder!” or “Get a move on!” But the knowledge economy can hardly tell me: “Joseph, be smarter!” People are clever only if they want to be. A knowledge-productive environment encourages me to seek out my passion. Nobody can talk somebody else into curiosity, motivation, interest and ambition. Instructional objectives, final levels, a competence profile, the mission statement and the strategic plan may be the explicit passion of the Ministry, the programme or the members of the Board of Management, but they are not *my* passion. Discipline, loyalty and obedience may be welcome and valuable support systems for overcoming a hurdle or an impasse. Without any substantive drive, however, they will merely foster stupidity and lead to mediocrity at best.

Knowledge-productive environments encourage cultivation of a personal, substantive theme.[xxxvii] 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. Vocation and occupation converge in knowledge economies. 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.

3. Tempting knowledge productivity

Cultivating reciprocal appeal serves primarily to create a favourable social context. Searching for a passion establishes the foundation for substance. The passion must be based on something. Promoting knowledge productivity also requires the competence to work systematically on the social context and the substantive component. Previously, this was the chief responsibility of instructors, trainers and managers. Over time, these roles have become those of mentors, coaches, facilitators and inspirers. The desire to guide, manage, verify and monitor is becoming increasingly difficult to fulfil. Many curricula, schedules and operating styles cannot avert transfer problems. Many knowledge workers function without their manager and arrange for support independently. The growing interest in self-guidance is apparent in both work and learning contexts.[xxxviii] This leads us to ask how we can tempt each other toward 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, organizing reflection, increasing reflexivity and basically applying knowledge to knowledge development.[xxxix]

Employees are becoming increasingly aware that their economic appeal depends primarily on the power of knowledge productivity. They will tempt each other and the surroundings they select to cultivate these competencies. This temptation does not result from power, coercion, status or position.[xl] Instead, it arises from the perceived need to work, design and learn together.[xli] This process is not automatic. Temptation is inviting rather than imposing. Such competence encourages reciprocal attractiveness and makes judicious use of the energy contained in everybody’s passion.

[i] I have copied this information from the text booklet accompanying the CD recording *Cecilia Bartoli. The Vivaldi Album.* Decca 466 569-2. (Osele, 2000, p. 11)

[ii] Economic globalization has led to heightened competition, strategic alliances and mega-mergers. Computerization and technological innovation have changed the nature of conventional labour. The unilateral emphasis on cutting costs has made way for a strong focus on knowledge development. Size and affluence are no longer a sustainable foundation. The power of cleverness – at all levels rather than only at the top – is manifested by frequent desperate efforts to manage knowledge. At the same time, there is a growing awareness that economic prosperity requires demanding consumers in addition to well-trained staff. A knowledge-intensive market economy will not thrive in a society rife with social contradictions and instability. Knowledge development characterizes not only the post-capitalist society (Drucker, 1993; Jacobs, 1996; Den Hertog & Huizenga, 1997) but also the learning society. In 1995 the European Commission presented the white paper *Teaching and Learning. Towards the Learning Society*, which highlights five objectives: 1. Encouraging general knowledge development, 2. Strengthening the ties between regular education and companies and institutions, 3. Preventing social exclusion, 4. Promoting and managing several languages, 5. Promoting continuing education (*Le Magazine*, 1996, 5). In keeping with these ideas, 1996 was designated the *European Year of Lifelong Learning*. The Organization for Economic Co-operation and Development (OECD) supports a similar policy in its reports *Lifelong Learning for All* (1996), *Literacy Skills for the Knowledge Society* (1997) and *Knowledge Management in the Learning Society* (2000).

The Dutch government is also interested in these changes, as apparent from its memorandum *Kennis in Beweging* (Wijers, Ritzen & Van Aartsen, 1995), followed by a broad knowledge debate in 1996, a remarkable conference on employability in 1997 (Wijers, 1997) and a plan for the future government policy for lifelong learning in 1998. The current Minister of Economic Affairs Wijers clearly emerged as the champion of the education and knowledge development objectives and not the ministers of Education or Social Affairs. Economic considerations appear to prevail, with little regard for the social ramifications of the increasing pressure to acquire a position in a labour system that constantly demands higher qualifications and competencies. In 1996 the Wetenschappelijke Raad voor het Regeringsbeleid initiated the report *Tweedeling in perspectief*. The council concluded that "[...] contrary to general opinion, opportunities for harmonious social-cultural development over the medium term have improved in the mid 1990s. Policymakers now face the challenge of ensuring that the improvements for the population as a whole also benefit unskilled workers with little to offer the labour market. Given the growing integrative importance of labour, increasing the supply of entry-level employment is the best way to bridge the gap in a society of progressive individualization" (WRR, 1996, p. 3). See also Katus, Kessels & Schedler (1998, pp. 11-12).

[iii] Wijers, Ritzen and Van Aartsen (1995). *Kennis in beweging. Over kennis en kunde in de Nederlandse economie*.

[iv] In the *Ontwerp Hoger Onderwijs en Onderzoek Plan 2000* (Hoop 2000, Ministry of Education, Culture and Science, 1999), the prospect of the emerging knowledge economy clearly underlies the policy measures designed to broaden the scope of higher education. This knowledge perspective is hardly discernible in the responses from the Lower House, the VSNU, the HBO council, NCW and MKB-Nederland (Ministry of Education, Culture and Science, 2000).

[v] In the policy memorandum *Groen Onderwijs* (2000), the minister of Agriculture, Nature Management and Fisheries argues that important themes such as sustainability, food safety, agrobiodiversity, biotechnology and integral water management should not be considered exclusively from an agricultural perspective. Education about natural resources should cover the entire chain from consumers to producers. It will therefore need to involve relevant knowledge and expertise from adjacent disciplines, such as social sciences, medicine and ICT-related fields. Mulder (2000) describes the consequences of the principles in the policy memorandum *Groen Onderwijs* for planning education and research. Establishing a scholarly foundation for education in professional skills is important in this effort.

[vi] Jacob (1996) argues that as technology becomes more prominent, knowledge about people and their social relationships grows more important. He notes that technology institutes are especially sensitive to this trend and invest heavily in promoting expertise in social sciences.

[vii] The national action programme *Een Leven Lang Leren* (1996) provides tax incentives for training and grants for employability consultants. Small and medium enterprises, the elderly and unskilled individuals receive special consideration. Companies that invest in ongoing staff training receive a certificate. Unorthodox types of learning are under development, as many staff have trouble with conventional programmes and drop out. Appreciation is growing for competencies acquired outside the educational system. Assessment centres enable professionals to demonstrate their skills and obtain certificates. Combining working and learning is becoming more popular, and the skill to learn independently – learning to learn – is deeply valued. Information and communications technology is used to support learning to learn. The state is trying to help young children keep up with their peers. Starting compulsory schooling at four rather than five is one example. Reducing class sizes and coaching less gifted students are other efforts in this direction. The Ministry of Education, Culture and Science has commissioned exploratory research on how the knowledge society has affected the educational system. See also Kessels (1998, p. 155).

[viii] Several recent Dutch publications address knowledge management: Boekhoff (1997), Boersma (1995), Den Hertog and Huizenga (1997), De Hoog (2000), Van der Spek and Spijkervet (n.d.). Tissen, Lekanne Deprez and Andriessen (1998), Weggeman (1997, 2000) and Van Duivenboden, Lips and Frissen (1999). The last publication on this list specifically concerns knowledge management in the public sector. The desire to steer the knowledge factor is a recurring theme. In some cases this process is based on strategic considerations, in other cases it arises from the opportunities provided by information and communications technology, and in still other cases it reinforces the organization's specific competencies.

[ix] See e.g. Kessels, 2000a and 2000b.

[x] Drucker (1993) argues that the initial application of knowledge to production means and methods gave rise to the industrial revolution. The owners of the production means were the main players; access to the capital factor ruled economic transactions. Subsequently, the application of knowledge to labour brought about the revolution in productivity. Here, a new category of managers has emerged. They cultivate specific knowledge concerning the deployment of production means, use of funds, employee guidance and management of quality and logistics and external markets, clients and the surroundings. The dominant position of the owner-capital provider has shifted to the upper management. In the current knowledge revolution, knowledge is applied increasingly to knowledge itself. The capacity to develop and apply knowledge rests mainly with knowledge workers. These generally highly educated professionals are beginning to prevail over managers. The transition from the productivity revolution to a knowledge revolution might mark the end of the management era.

[xi] I am not alone in my criticism of knowledge management (Kessels 1996a). Van Aken (1996) quickly noted the paradox that the term knowledge *management* means that there will be no knowledge. After all, managers are not paid for development work but for their short-term successes achieved through management. The aim is not to manage but to develop and not to control but to innovate (Van Aken, 1998). Kemperman (1998) has noted the knowledge management trend, the brainchild of the "nomads in the consulting business," who assigned learning organizations a memory that had to be filled with knowledge that they could then manage at their discretion.
Huysman and De Wit (2000) criticize the use of the knowledge management concept and reveal the dangers of a unilateral management perspective based on their survey of eleven organizations with little regard for the true need for sharing knowledge. They also criticize a one-sided individual learning perspective with little regard for organizational learning and a one-sided ICT perspective that reflects little concern for social interaction. In the recent publication by Von Krogh, Ichijo and Nonaka (2000), the authors are similarly reticent about knowledge management and prefer to promote knowledge development without an imperative steering perspective.
Malhotra (2000) deals extensively with the question as to whether knowledge management is an oxymoron. He concludes that the management perspective is ineffective with knowledge development. Nonetheless, he

has high hopes for the self-steering "knowledge intrapreneur," although this insight does not lead him to abandon the knowledge management concept.
Rondeel and Wagenaar (2001) conducted an inventory of recent literature in which authors are increasingly critical of the desire to manage knowledge.

[xii] Drucker (1993), Giddens (1994) and Castells (1998) list many reasons why the traditional economy of goods, capital and labour has made way for a knowledge-based economy. The rapidly growing service sector, the declining role of physical labour, the ever-faster processes of collective engineering and the omnipresent information and communications technology attest to the competition between the traditional economic factors and the importance of applied knowledge.

[xiii] The knowledge productivity concept is central in previous publications by Kessels (1995 and 1996b), Van Aken (1998) and Harrison (2000). Keursten's elaboration of the theme elicited a heated debate in the journal *Opleiding en Ontwikkeling*. The question arises as to whether the knowledge productivity approach is compatible with the quest for Human Performance Technology and Human Performance Improvement, or whether it plays no role in this process at all (Keursten, 1999, 2000; Overduin & Schramade, 2000; Schramade, 2000).
In recent years the knowledge productivity theme figured prominently in the series of conferences at Leiden University (1997) and Durham University Business School (1999) and subsequently at the Vanwoodman conferences in the Netherlands (2000) and Durham (2001). Ton Bruining (2000) compiled an elaborate theme pamphlet about the knowledge productivity concept.

[xiv] I first explored the concept of knowledge competence in my study of successful educational programmes (Kessels, 1993; Kessels & Harrison, 1998 and Kessels & Plomp, 1999). I have elaborated this concept in the discussion about competencies and their operationalization in competency profiles (Kessels, 1999). Malhotra supports the view of knowledge as a competence: "Even procedural knowledge, when translated into symbols that are later processed by another human, does not ensure that the outcome of his knowledge will rival that of the original *carrier*. Knowledge needs to be understood as the *potential for action* that doesn't only depend upon the stored information but also on the individual interacting with it" (Malhotra, 2000, p. 249).

[xv] The influential work of Nonaka (1991), Nonaka and Takeuchi (1995) and Von Krogh, Ichijo and Nonaka (2000) is based on the distinction between implicit and explicit knowledge. The knowledge productivity concept revolves around the distinction by the ancient Greek philosophers between *episteme* as scientific, explicit, universal knowledge, *techne* as the competence to perform a certain task and *phronesis* as a reflection of personal experiences and the ability to sense and anticipate situations. On this subject, see the work of Baumard (1999) and J.P. Kessels (1994, 1997).
The concept of knowledge as an individual competence is very much based on the *techne* and *phronesis* concepts. Although authors on knowledge management readily use the ancient Greek philosophical concepts *episteme*, *techne*, *phronesis* and *mètis* (Baumard, 1999), their interpretations are far from unanimous. Procee (2001, p. 8) describes *episteme* as wisdom, which indicates insight into the nature and boundaries of knowledge, as well as the inclination to reflect. *Techne* refers to cleverness or shrewdness, which is very similar to our current idea of searching for rational solutions. *Phronesis* would then mean prudence and approximate a practical overview of what is socially appropriate or inappropriate. According to this description, these intellectual virtues all concern individual competencies and are in no way related to what we presently consider objective scientific knowledge.

A fascinating discussion of the distinction between explicit and implicit (i.e. tacit) knowledge appears in the report by Baumard (1999) about the extensive investigation of knowledge management among organizations in serious crises.
Weggeman (2000) provides an enlightening example of the distinctive perceptions about knowledge. The stock approach to knowledge supports the perception of knowledge as an objective unit that can exist independently of people and may be contained in knowledge systems. The flow approach to knowledge emphasizes experiences, skills and attitude and views knowledge as a competence.

Gibbons, Limoges, Nowotny, Schwartzman, Scott & Trow (1994) and Gibbons (1998) have identified *Mode I* knowledge, which refers to classical scientific knowledge structured in disciplines regulating its elaboration, and *Mode II* knowledge, which is application-oriented and derives its significance from its specific originating context. *Mode I* knowledge is the knowledge traditionally developed at universities. In a knowledge economy, interest in more contextual knowledge (i.e. *Mode II*) is likely to prevail and to bring universities and the workplace closer together (Gibbons, 1998; Gray, 1999; Robertson, 1999).

[xvi] Hansen, Nohria and Tierney (1999) illustrate the application of the knowledge concept in the sense of a codified, objective knowledge on the one hand and personalized knowledge on the other hand. Consulting firms, which reuse codified knowledge extensively, often manage knowledge through electronic databases. Organizations that systematically develop very personalized contextual expertise focus on forming personal networks, in which information technology primarily supports communication and network establishment.

[xvii] Huysman and De Wit (2000) describe the concept of sharing knowledge as a type of organizational learning and identify three core components:
- supporting knowledge gathering, focused on individual learning
- supporting knowledge exchange with a view toward bringing knowledge carriers together faster to make the disseminated knowledge more accessible
- supporting knowledge development by creating situations where people combine new insights to bridge gaps.

This description of organizational learning provides powerful support to the knowledge productivity concept. The question is whether the knowledge-sharing concept is used appropriately here, if knowledge is perceived as a personal competence.

[xviii] Van Vught (2000) disagrees with the idea of imparting knowledge through modern university education and objects to the use of modern information and communications technology for this purpose. “The knowledge transfer vision repudiates what may be the most important aspect of academic education, which is to encourage and nurture curiosity” (Van Vught, 2000, p. 7).

[xix] Kessels, J.W.M. (1996). *Het corporate curriculum*. Lecture delivered upon accepting an appointment to an endowed chair for educational studies in corporate education at Leiden University on Friday, 23 February 1996. An edited version of the text appeared as: Kessels, J.W.M. (1996). Kennisproductiviteit en het corporate curriculum. In J.W.M. Kessels & C.A. Smit (eds), *Opleiders in Organisaties/Capita Selecta*, Issue 26, March (pp. 29-49). Deventer: Kluwer Bedrijfswetenschappen.

[xx] The interest in peace & stability versus creative turmoil is inspired by the work of Walz & Bertels (1995). These authors distinguish gradual improvement from radical innovation of operating procedures. Gradual improvement elaborates on what is already present and leads to additional refinement and specialization. Radical innovation is based on breaking with the past and creating new opportunities by deviating from tradition. Gradual improvement requires peace and stability. Radical innovation becomes more likely amid creative turmoil, often incited by an existential threat. Some employees thrive amid peace and stability, while others are more comfortable in a setting that inspires creative turmoil. I have included the distinction between gradual improvement and radical innovation in my description of the knowledge productivity concept. The supportive learning functions *peace & stability* and *creative turmoil* have therefore become part of the corporate curriculum.

[xxi] The ambitious study in the Health and Welfare sector has yielded an empirical substantiation for the corporate curriculum concept (Kessels, Van Lakerveld & Van den Berg, 1998; Lakerveld, Van den Berg, de Brabander & Kessels, 2000). This study has revealed a correlation between certain features of workplace learning (the learning functions of the corporate curriculum) and the ability of institutions to improve and innovate (engage in knowledge productivity).

[xxii] The studies by Baumard (1999), Dutrénit (2000), and Huysman and De Wit (2000) indicate ways to enhance our understanding of the dynamics of knowledge management within organizations.

The study by Philippe Baumard (1999) highlights the role of tacit knowledge. He has investigated how companies such as the airline Quantas, the aluminium manufacturer Pechiney, the computer company Indigo and the financial institution Indousuez used their implicit knowledge to cope with the existential threat in times of crisis following mergers, political turmoil and bureaucratic quagmires. Formal knowledge management systems were of little use and were counterproductive in most cases. Socializing implicit knowledge to form a collective competence contributes far more toward an organization's development and sustainability than an information surplus.

Gabriela Dutrénit (2000) describes a detailed case study of the Mexican company Vitro Glass Containers. She investigates how an organization can apply individual learning to help the entire organization learn. How can the power to achieve successful technical innovation be transformed into the ability to perform strategic innovation? Her recommendations include: working on a shared view of how individual curricula and knowledge development in the organization as a whole can support one another. She also advises against viewing learning processes as distinct from efforts to establish knowledge systems; focusing too much on the proceeds of knowledge development through patents will compromise our understanding of the underlying learning processes that embody the sustainable value. A one-sided focus on technological innovations will affect the development of strategic competence, which is intended to promote organizational continuity.

The study by Marleen Huysman and Dirk de Wit (2000) has been conducted in the Netherlands with organizations such as Cap Gemini, ING Barings, KPN, Nationale Nederlanden, NS, Postbank, Schiphol, Stork, Unilever and the Ministry of Housing, Planning and the Environment and targets structured forms of knowledge sharing within the firm. The study reveals a few important considerations for designing knowledge-productive workplaces: the individual perspective of employees is a major factor in sharing knowledge. Employees are more willing to share knowledge if such action benefits their daily activities and figures integrally in the way they work together. Efforts to share knowledge must be based on a collectively accepted knowledge perspective. The role of ICT tends to be overestimated, especially if there is a unilateral focus on the technical approach. In practice, personal networks are more important for sharing knowledge. ICT is probably more useful for connecting people and less relevant for gathering and disseminating knowledge. Mutual concern and trust, curiosity and inspiration based on a common mission benefit knowledge sharing. A knowledge-friendly culture encourages working in teams and participating in personal and professional networks and informal gatherings.

[xxiii] The extensive study by Neilson (1997) about *collaborative technologies & organizational learning* (especially the use of Lotus Notes) indicates that material is more likely to be provided through the knowledge system if employees notice that others are using it and contribute relevant information as well. Once the ICT system becomes an integral part of the daily operating procedure, it will be used more intensively.

[xxiv] Kessels & Smit, *The Learning Company* is a specialized consulting firm. Since 1977 the firm has addressed issues concerning the design of learning environments and the promotion of organizational knowledge productivity. The consulting firm's systematic approach to internal knowledge development reflects what Hansen, Nohria and Tierney (1999) call a *personalization strategy*. Standard operating procedures are hardly ever recycled, and ICT investments are designed primarily to establish and maintain personal networks. www.kessels-smit.nl

[xxv] The following features make a workplace desirable for knowledge workers:
It represents clear values with respect to the interaction with people, the surroundings and other organizations, including competitors. Periodic consultations take place about ethical aspects, integrity and work-related dilemmas. The products and services are worthwhile causes. The organization respects all input and acknowledges everybody's talents and ambitions. It offers trust and safety and extensive responsibility in planning the work. It encourages co-operation, team spirit and participation in professional networks. The organization is also open about revenue, salaries and expenses and allows employees to influence salaries and expenses. It is deeply dedicated to reflection, study and research and is cautious about imposing a strategy regarding products, services revenue objectives and market share. Its managers

do not feel exclusively responsible for regulating, steering, checking and evaluating the work of others without providing a substantive, professional contribution.

These lists and recommendations have recently appeared in literature and interviews about the structure of knowledge-intensive organizations. Twan van de Kerkhof's discussion with Stephen Covey published in *Management Scope* (2001) is a case in point. Interest is growing in themes such as concerned entrepreneurship (Rinnooy Kan, Schouw & De Vries, 2000) and social entrepreneurship (McIntosh & Jonker, 2000), which greatly appeal to knowledge workers.

[xxvi] In this context, Pieper (2000) shares some fascinating views on the e-mentality. He argues that sharing knowledge requires a personal change in mentality. Only individuals able to reveal their own strengths and weaknesses will know the fields where they can add value. This revelation of personal qualities serves to enrich the human relations network. The relations network is based on trust, flexibility and openness. Together they constitute the e-mentality. Those amply endowed with these elements will derive full benefit from the information society (Pieper, 2000, p. 50).

[xxvii] In recent decades impressions have emerged of professional educators, education departments and external suppliers of programmes and learning environments for acquiring necessary knowledge, skills and attitudes to boost employee performance. Although the impact of formal curricula on the everyday performance of people and organizations is difficult to assess, views about the effect are less than encouraging. The transfer problem has yet to be resolved. The current emphasis of working in a knowledge economy on knowledge productivity is cause to reconsider the role of educating and learning (Keursten, 1999). Both the desired learning achievements and the underlying processes need to be examined (Wagenaar & Keursten, 2000). Knowledge workers cannot perform their duties without learning. The pace and cleverness of their learning directly influence their productivity (cf. Drucker, 1999). From this perspective, the development of individual learning ability is closely related to economic success.

[xxviii] For texts concerning constructivism, see Duffy and Jonassen (1992), Duffy, Lowyck and Jonassen (1993), Elen and Lowyck (1995) and Van der Sanden (2001).

[xxix] Initiation to academia, as described by Verhagen (2000), means that students acquire their knowledge and skills through tasks and operating methods that reflect the occupational culture. The educational plan requires that students receive guidance as prospective colleagues or junior colleagues so that they may become designers, researchers and consultants (2000, pp. 17-18).

[xxx] Descriptions of the research on computer simulations to enhance higher cognitive skills appear in the works of De Jong, Limbach, Gellevij, Kuyper, Pieters and Van Joolingen (1999) and De Hoog (2000).

[xxxi] TeleTOP was developed by a team of researchers supervised by Professor Betty Collis (Collis & De Boer, 1999). At present we are investigating ways to apply TeleTOP in an HRD environment, in conjunction with Heineken, the Philips Technisch Opleidings Centrum, Shell Opleidingen and BOSNO.

[xxxii] Design-oriented research is focused on gradually improving learning environments through systematic exchange of active design, evaluation, reflection and improvement. The pioneers in this field are Van den Akker (1999) and Richey and Nelson (1996).

[xxxiii] Cf. the views of Weggeman (2000) on the dwindling half-life of knowledge.

[xxxiv] I use the learning practice concept according to its description in the study by Sprenger (2000) as the achievement of a style of operation that combines learning and working, where people convene to share knowledge and generate new knowledge, and where learning occurs continuously. A similar view about work-related curricula appears in the thesis by Poell (1998). Kwakman (1999) examined the factors that promote and impede learning by instructors at their workplaces in her thesis. Her research findings suggest that workplace instructors do not make optimal use of acknowledged learning resources, such as feedback, co-operation and contact with groups of clients, for their own professionalization.

[xxxv] Peter Drucker's pioneering work *Post-capitalist society* (1993) notes an aspect that is frequently overlooked, namely that knowledge has been crucial throughout economic history and is thus hardly unusual in a knowledge economy. The industrial revolution would have been inconceivable without applying knowledge in developing modern production devices. The productivity revolution, which may be nearing its end, would have been impossible without using knowledge to design smart production methods, procedures and management systems. The knowledge revolution specifically involves applying knowledge to make it productive and to the reproductive process that generates new knowledge.

[xxxvi] The learning work company idea figures in the work of Wenger (1998) and Wenger and Snyder (2000). A *community of practice* is usually intended to develop competencies together and promote sharing of information. Participants each choose their community based on passion, involvement and identification with each other's expertise. The authors distinguish a *community of practice* from an *informal network* according to the reduced personal involvement of the members in an informal network and the absence of a shared passion.

[xxxvii] Meijers (1995, 2000), Kuijpers (2000a and 2000b) and Ostenk (2000) explore the relation of individual life themes to meaningful work. Reflective skills are crucial in this process.

[xxxviii] Onstenk (1997) and Tjepkema (1999) have described the learning opportunities and learning blockades in a workplace. Often time is lacking for learning tasks and reflection, and communicative competencies are insufficient for individuals to devote more attention to learning. Malhotra (2000) describes the necessary transition from *control by compliance* to *self-control*, which is a condition for planning how organizations manage their knowledge.

[xxxix] *Reflexivity* and *reflection* are important concepts in the work of Beck (1994) and Van der Zee (1997). Van der Zee aptly summarizes: "Three concepts help firms get and remain on track: core competencies, market intelligence and reflective competence. Core competencies – the combined structure of skills that distinguishes one work setting from another – are a firm's most powerful resource. This distinctive competence, however, is incomplete without some market intelligence, meaning that firms must be able to establish relations with clients and serve their needs. Both forms of expertise – core competencies and market intelligence – require systematic and continuous attention. We call the common sense required *reflective competence* (1997, p. 206).

[xl] "Temptation" also figures in Van Bruggen's article "Studeerbaarheid: de kunst van het verleiden" (1996). It focuses on how instructors coax students to develop study skills, especially communicative skills, cognitive processing skills and problem-solving skills. Here, the art of temptation chiefly concerns designing an attractive learning environment compatible with the objectives and final levels selected. These attractive, powerful, rich and challenging learning environments closely resemble the situation and conditions in which the new skills are subsequently applied. Van Bruggen's ideas are very compatible with the views of Lodewijks (1995) about designing powerful learning environments.

[xli] Viewing design as a learning process for the target group intended derives from the principle that learning processes result from social-communicative activities by the learning individuals. Learning networks such as the ones described by Poell (1998) offer a conceptual foundation. Corporate education programmes are not the only context where people are interested in learning by designing. The idea that self-driven design courses can be very powerful and significant curricula is also gaining ground with learning by children of all ages (Pieters, 2000). Even in fields not directly associated with educating and learning (e.g. technical design), researchers are discovering surprising links between collaborative design and collaborative learning (Heitor, 2000).

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