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Learning in the Learning Organization

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Abstract: Humans are not able to cope with the exponential growth of information and the increasing speed of information and business processes fostered by information and communication technologies. Technical support not only for information storage and retrieval but also for information selection, process planning, and decision support is needed. Most of the ICT investments, however, do not foster innovation or productivity. Recent studies show that ICT-based training is the main instrument of knowledge management. On-line media and self-directed learning environments are among the most effective training solutions in terms of cost, time and logistics. In the last few years, the percentage of employees participating in training courses increased. At the same time, there has been a decline of training budgets. E-Learning is able to deliver more valuable training for less money only if it is part of an integrated knowledge and skills management system. Two case studies of knowledge and meta data management systems are discussed.

Keywords: multimedia information systems, office automation, social and behavioral science
Category: H.5.1, H.4.1, J.4

1 Knowledge, Technology, Strategy

For several years, high investments in information and communication technology (ICT) were considered to guarantee increased productivity. For the last ten years, however, surveys have not been able to show a significant increase in productivity by further computerization, [Bubic/Quenter/Rupplet 2000]. The authors point out, that the banks invested "defensively": they reacted to technically induced changes by completely or partly automating processes, but neither redefined value-chains nor positioned themselves in new market segments. In fact, 70% of all ICT-investments are used to safeguard service and delivery, 20% to increase performance, and only 10% to improve the competitiveness of the enterprise. Thus, modern ICT is more like a narrowing dead-end than like a useful support for a dynamically growing and changing business.

The banking sector is leading the development and adoption of electronically supported workplace training and is now moving towards distance education and integrated multimedia learning environments to accommodate the scale of vocational training and communication requirements. Today, many distance learning projects are realized by means of conventional media, such as printed matter and telephone hotlines. There is an emerging consensus that banks must invest in and provide access to a complete range of training programs for their employees from basic skills to

high-end management and technical skills training. Electronic performance support systems (in the form of on-line media and self-directed learning environments) are among the most effective training solution in terms of cost, time and logistics.

Therefore, some German banks have already reduced their face-to-face training courses by approximately 30% p.a. and all major banks are now introducing Web-based training (WBT) as a means for cost effective training. During the same period of time, German banks experienced a considerable increase of training costs: Major German banks and bank associations spent between 88% and 136% more money on training in 1996 than in 1989. A closer look at these data reveals there was a dramatic increase of training costs between 1989 and 1993. Since 1994, there has been a decline of training budgets at the same rate as in other business sectors.

Banks are spending 6% of their personnel budgets for training but 15-30% of their administrative and operational budgets for information and communication technology (ICT). For instance, the largest of German banks, Deutsche Bank, spent 340 million German Mark (US-$ 205 million) on training and 2.3 billion German Mark (US-$ 1.3 billion) on ICT. This translates into approximately 4,200 German Mark (US-$ 2,500) for training and 6,700 German Mark (US-$ 4,000) for ICT per employee [Hasebrook 1999].

American universities which use Web-Based Training (WBT) or "electronic learning" (in short: e-learning) learned that total costs of ownership (TOC) are higher for e-learning than for on-site classroom teaching. The main reasons are added technical and tutorial services as well as considerable up-front ICT investments [Bernath/Rubin 1998]. Will there be no gains in productivity because of investments in ICT and e-learning? Naturally, ICT itself does not create values. Values are created by its goal-oriented application in enterprises. The strategic areas of application of ICT can be sketched as in figure 1:

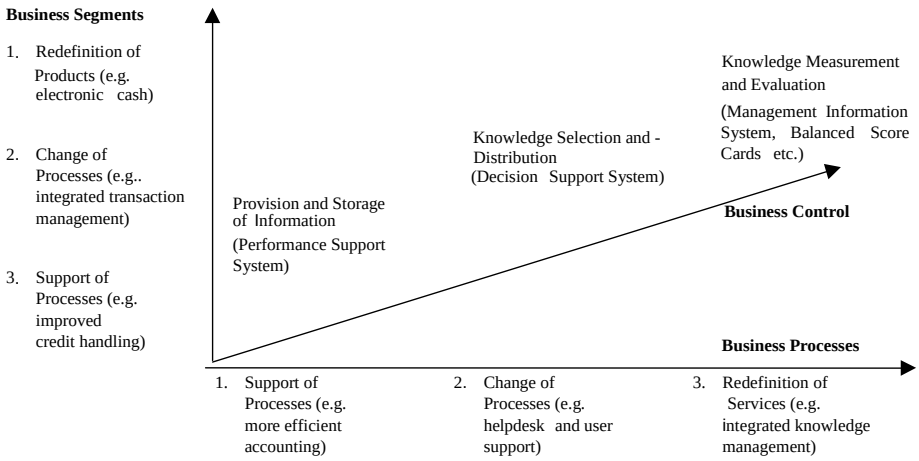

Figure 1: Strategic Areas of Application of Information Technology according to [Bubik/Quenter/Ruppel 2000, p. 105].

Therefore, “knowledge management” is a new definition of internal business and service processes with direct effects on rating and control mechanisms in enterprises and indirect influences on the new definition of business and market segments. In fact, knowledge management is conceived as an internal service which helps to collect, distribute, use, and evaluate explicit knowledge which can be represented in ICT structures [Probst, Raub, and Romhardt 1998, and Kopp 1999]. Business segments with a very high demand of knowledge like banking or consulting industries are leading users of knowledge management; chemical, pharmaceutical and mechanical engineering enterprises are in backlog. One example is shown in figure 2.

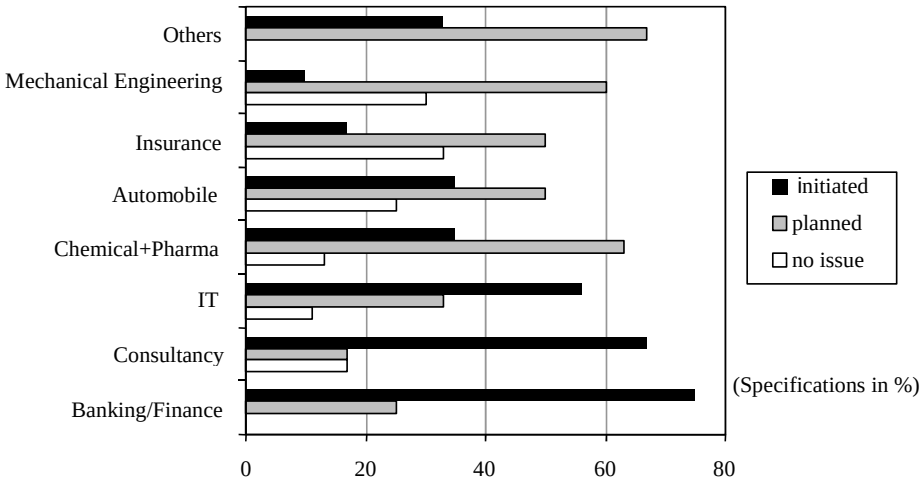

Figure 2: Status of Knowledge Management in Different Business Segments [source: IT Research Report, March 2000].

Of course it is no proof of more efficient or innovative business processes when a company –according to its self-assessment– claims to use more or less knowledge management. The so-called new economy marks the shift from the information to the knowledge economy, and asks for a different approach towards efficient business processes: It is symptomatic for the new economy that the business cycles are temporarily overcome, a development which has bestowed an unequalled growth on the USA during the last years without nameable inflation, and has lead to a more dynamic performance of the stock market and of net products [Löchel 2000].

The market for information- and knowledge-based –mostly digitized– goods is only beginning to grow as yet, and training and education will be very important in this context. According to Merrill Lynch analysts, ICT-based training processes (or better: knowledge acquisition processes) are degrading what is presently meant to be the “new economy” to the “old ICT-based economy”, because as before it is the industrial production of digital goods that is of prime importance, and not the control and support of knowledge-intensive business processes (cf. figure 3).

"old economy"	**"new economy"**
Termination in 4 years (university etc.)	Termination in 40 years (lifelong learning)
Training seen as cost center	Training seen as competitive advantage
Mobility of learners	Mobility of contents
Distance learning in self-study	Distributed, co-operative learning
E-mail, letter and printed products	Multimedia service centers with online media
Generalized offers for everybody	Tailor-made, individual offers
Regional vendors	(mostly international) trade names and well-known individuals
Training just in case	Training just in time
Self-study, personal responsibility	Learning partnerships, organizational learning

Figure 3: Learning in the Knowledge Society [source: Merrill Lynch. The Book of Knowledge, 1999]

2 Web-Based Learning: E-Learning

In order to employ multimedia in an efficient way, it is at least as important to prepare the learning environment adequately as it is to choose the proper media mix and the instruction methods. Figure 4 summarizes the research data and meta analyses on learning efficiency and duration of learning.

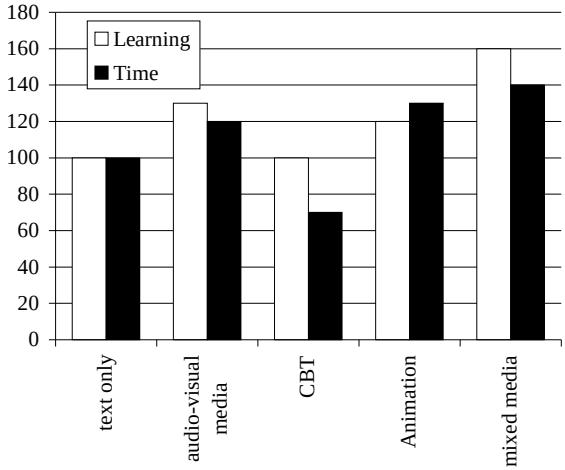

Figure 4: Learning Efficiency and Duration of Learning; Learning Rate and Study Time for Textbooks (text only) are set to 100 [cf. Hasebrook 1995].

The optimal selection of the media mix and the methods of instruction, and –at least as important as that– the adequate preparation of the learning surroundings are basic requirements for efficient learning with multimedia. Figure 4 gives a first view on learning efficiency and duration of learning of the research data and meta analyses [Hasebrook 1995]. On the left, the average study time (time) and learning rate (learning) of a textbook (text only) equals "100" and serves as a benchmark for other types of media. The values in this figure are only approximate values for the usage of the media in question, because above all the learning success depends on the carefully controlled and adequate use of media, and only little on the medium of learning. However, the frequently cited "pyramid of retention rates", which simply summarizes media effects, is unreasonable. This fact can easily be illustrated by an example: Nobody is able to learn foreign-language vocabulary effectively when the radio is playing the latest hits, TV is broadcasting economic news and vocabulary is read at the same time. But that is exactly what a mere addition of media effects is assuming.

3 Learning Organization and Organizational Learning

Learning is the acquisition of a relatively lasting change of behavior (or the potential for it). Learning means exploring and investigating new things, being curious and leaving routines. Organizing, on the other hand, implies laying-down standards and routines, and a restriction of the behavioral spectrum (in order to improve efficiency). On this understanding, every combination of "learning" and "organization" form a so-called oxymoron, i.e. a contradiction in terms [Weick/Westley 1996]. Since the term organizational learning had been introduced by Argyris and Schön, several attempts have been made to reconcile the unfortunate couple. [Argyris/Schön 1978]:

- When comprehending „organization" as a rule describing the desired functionality of a social system, an "instrumental perspective" is adopted which contains prescriptive specifications regarding the characteristics of the organization ("How-to"-approach; [Tsang 1997]).
- When viewing an organization as a social learning society comprising many individuals, an "institutional perspective" is adopted based on descriptive approaches on how collective learning processes actually look [Tsang 1997].

Moreover, there was a discussion whether management knowledge is a combination of know-how and know-why [Kim 1993] or a mixture of explicit and implicit or tacit knowledge [Nonaka 1994]. Kluge and Schilling propose to define "organizational learning" (OL) as co-operative learning in a social system, and "learning organization" (LO) as the formal framework which allows continuous life-long learning [Kluge/Schilling 2000].

Kluge and Schilling come up with the following conclusions [Kluge/Schilling 2000]:

- Organizational learning as a change and adaptation of the organization members' mental models takes place as direct, mostly informal interaction. Information technology is of little importance as far as information take-in

and information evaluation is concerned, but is of high importance as a means of storage and transfer.

- There are organizational processes which improve information processing and transfer, e.g. learning orientation, trial and error-learning, team work, and standardization.
- It is essential to hold a balance of "old" and "new" personnel. Social relationships support the organization but at the same time innovations are prohibited. Social relations tend to stabilize within a few months only, but an organization can only learn by leaving familiar paths.

In a recent study the German company unicmind.com surveyed the top 350 German companies,102 of them responded to the call for information about e-learning and knowledge management. The results show that 90% of the companies employ e-learning, such as computer-based trainings, but only 25% use WBT; e-learning is implemented in order to reduce costs (70% agreement) whereas knowledge management is implemented to exploit the knowledge resources optimally (72%); e-learning and knowledge management projects mostly are initiated by human resource departments (= 62%, IT dept. = 23%) but the systems are mainly used by marketing and sales forces (= 69%, IT dept. = 52%). But, knowledge collection, selection, and distribution mainly depends on informal communication. Active model learning and coaching is only possible where the management span is small (fewer than 10 persons) and the organizational culture supports social learning. Strong personal support at the working-place has a multitude of positive consequences: There is a growth in satisfaction and self-efficiency as well as in the identification with the enterprise. Contrary to some theories regarding OL, informal relationships cannot be forced by means of organizational measures, but mostly develop as informal relations. Job rotation, overlapping project groups and systematic succession plans help to establish informal relationships [Blickle 2000].

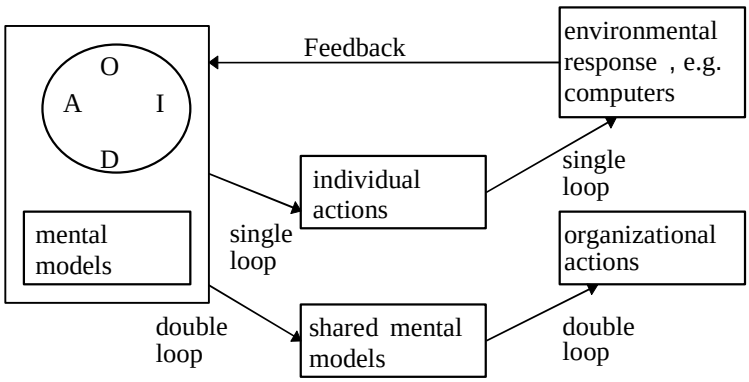

Figure 5: Single Loop and Double Loop Learning Cycles [Kim 1993]

One of the most popular concepts of organizational learning is a learning cycle consisting of observation, assessment, design, and implementation (= OADI). Simple learning (single loop) can be supported technically, organizational learning demands a specific human resource management (double loop). At the beginning of this chapter, learning was defined as a relatively lasting change in behavior, triggered by experiences. It is true that by communication people can exchange information. Experiences, thoughts and feelings, however, cannot be directly transferred from person to person. From a psychological point of view, a definition of learning is only possible and sensible when there is a learning objective or learning task to distinguish the continuous change of mental processes from specific learning processes. Learning in this sense is meant to be every relatively steady change in visible or potential behavior deliberately acquired by an individual through experiences. Contrary to most concepts of OL, learning does not only include verbally describable expert or fact knowledge. Neither is it determined by observation and imitation. Learning is a general, creative analysis of the environment and the body in order to enhance one's own potentials and abilities. The knowledge obtained therewith is not a collection of objective facts: We cannot distinguish between the world we are experiencing and our knowledge about the world because our knowledge is our world [Johnson-Laird 1993].

Assumed that the terms OL and LO are oxymorons, the compound "knowledge management" is as senseless as e.g. the term "virtual reality" for real-existing three-dimensional computer graphs. To direct and to control "knowledge" from aspects of managerial objectives would imply that the experiences of the world of a group of people can be directly manipulated. A simple separation of data, information and knowledge, or terms like "explicit" and "implicit" knowledge is too restrictive and suggests a clarity that does not exist: knowledge cannot be managed and learning cannot be organized. Accordingly, the empirical results in this area are little encouraging. However, the psychological view of learning as a way of systematically changing or enhancing one's knowledge – and with that one's experiences and views of the world – enables us to influence this behavior to the advantage of the organization (and its members).

4 The Market of Knowledge Applications

One of the most successful enterprises of the world is Cisco Systems which is producing most of the Internet's routing systems. In 1999, the CEO of Cisco, John Chambers, stated: "*Investing into technology was the first wave. Investing in services is the second wave. E-learning will be the third wave*". Traditional means of education are no longer adequate to meet the needs of life-long learning. Continuous education for large numbers of people appears to be unrealistic if conventional strategies are pursued. Even where available, the quality of education does not meet the high standards of international business. Furthermore, in many countries public and private funding for educational services are declining while costs rise faster than income levels and tax revenues. Therefore, electronic distance education will become a major source for ongoing education in the international knowledge-based economy [Romer 1993]. In 1998, the German Economical Institute (IDW) published the results

of its study about on-going education in Germany between 1992-1995: About 75% of all employees participated in training courses, this percentage increased about 10% during the course of the study. At the same time, the educational budgets were reduced by nearly 10% (resulting in 34 billion German Mark = US-$ 20.5 billion) – at an average of 1670.00 German Mark (US-$ 1000) per employee [Hasebrook 1998].

In a current study, the Gartner Group estimates that as early as in 2002 60% of the e-commerce enterprises will use skills management, and that 80% of them will experience a considerable increase in productivity as a result. For the purposes of recruiting, employing and training of staff there will be a vast increase in the usage of the internet. According to market analyses of the IDC, the turnover of skills management solutions will increase tenfold from about 565 million USD in 2000 to almost 5.6 million USD in 2006.

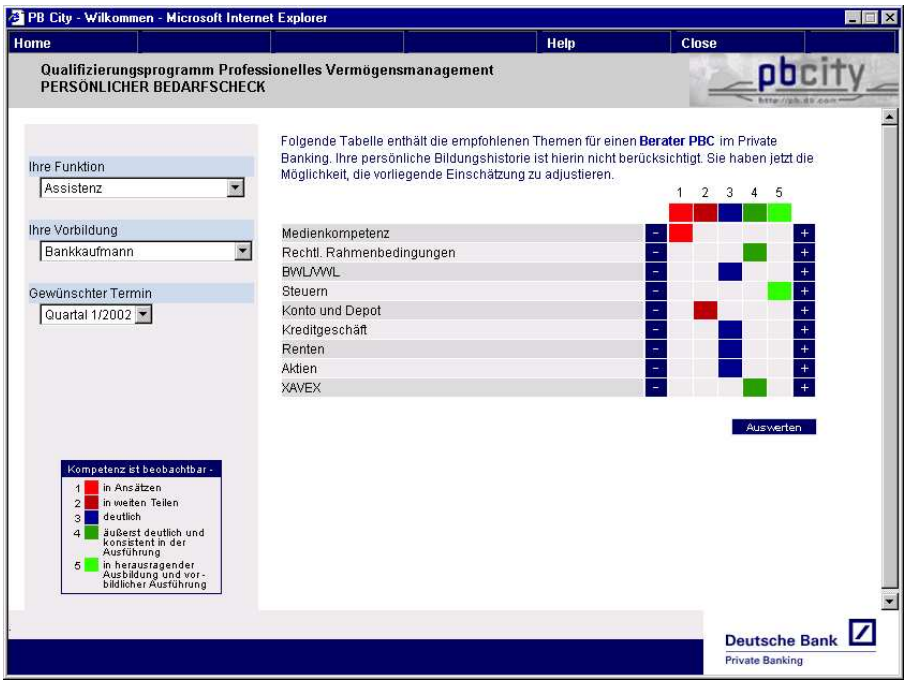

Figure 6: Screen shot from the Skills Management Information System 'SMIS' adapted for Deutsche Bank/Private Banking (Germany) – selection boxes help to identify job roles, prior knowledge, and time schedules (left), a colored table indicates skills covered by recommended training courses (right).

Most technical systems concerning the human capital of a company focus on the administration of personnel and training, such as SAP Human Resource modules, Peoplesoft or SABA - just to mention a view of them. An US-American study lists about 300 systems for training administration and delivery [Hall 2001]. But finding matches of needs and demands certainly means more than matching keywords to indices or user profiles to database requests. The knowledge economy is not so much

about information, it is about people. In a joint initiative of several partners we implement a Skills Management Information System ('SMIS', see figure 6), which enables the user to select learning modules according to her or his indivdual demands, prior knowledge, and time schedule.

To make most of the knowledge and competence resources of ones staff and to motivate them for life-long learning is a key success factor of any organization. In former times, a good administration of personnel was sufficient, but nowadays effective personnel marketing and active personnel development are needed. Ilogos Research report that in 1998 only 29% of the international top 500 enterprises chose e-cruitment for the purpose of recruitment, whereas the percentage rose to 60% in 1999 and to almost 80% in 2000. There is a similar development as regards the usage of online-media for qualification: In 1997, Internet and Intranets together amounted to only about 2.4% of the total turnover of the education market. The IDC (International Data Corporation), however, estimates that there will be an average annual increase of 62% and 140% respectively in 2002. Thus, in 2002 about 39% of the turnover of the education market will be realized on these platforms.

5 Knowledge and Abilities

"*The only capital an organization has that is irreplaceable is the knowledge and skills of its people. How productive this capital is depends on how efficiently people share what they know with those who can put that knowledge to good use*," noted the US-American entrepreneur Andrew Carnegie as far back as 1930. In 1999, the HR-XML Consortium [http://www.hr-xml.org] was founded which – in derivation of the XML 1.0 Standard – is elaborating a meta-data standard for human-resource-related e-commerce.

The group defines itself as follows: The HR-XML Consortium is an independent, non-profit association dedicated to the development and promotion of a standard suite of XML specifications to enable e-commerce and the automation of human resources-related data exchanges. The mission of the HR-XML Consortium is to spare employers and vendors the risk and expense of having to negotiate and agree upon data exchange mechanisms on an ad-hoc basis. By developing and publishing open data exchange standards based on Extensible Markup Language (XML), the Consortium can provide the means for any company to transact with other companies without having to establish, engineer, and implement many separate interchange mechanisms.

Members of this consortium are big ICT companies like IBM, Cisco and Oracle, as well as software companies like SAP and Peoplesoft, and staff agencies like Randstad and Manpower, or financial services like Charles Schwab & Co. At the moment, about 100 companies belong to the consortium. The introduction of this standard and the early adaptation of the solutions in store put both vendors and users of software solutions and services in the areas of e-cruitment and e-learning in an exclusive position among the competitors and enable them to organize global markets.

Internationally acknowledged and XML-based standards for the description of knowledge products are being developed for e-learning. The most important standard

is Learning Object Metadata (LOM). Here is the self-description of the LOM Consortium [http://www.manta.ieee.org/p1484]:

The mission of the consortium is to develop technical Standards, Recommended Practices, and Guides for software components, tools, technologies and design methods that facilitate the development, deployment, maintenance and interoperation of computer implementations of education and training components and systems. Many of the standards developed by LTSC will be advanced as international standards by ISO/IEC JTC1/SC36 - Information Technology for Learning, Education, and Training.

There are several providers for software and consulting in the field of e-learning and especially in the development and management of skills. Beside the modules for the administration of human resources (HR) by SAP and PeopleSoft, there are specialized providers, e.g. Meta4 from Spain or Infinium, and SkillsScape from the USA. Since the majority of enterprises confine themselves in their staff development to the handling of biographical and administrative data, most of the offered software solutions support the administration of human resources only. However, since the rise of the information society and its evolution into a knowledge society there is a need for a strategic reorientation from the administration to a more active development of skills in human resource management (HRM). In this context, skills-oriented management paradigms have lately come into existence which are now considered in corresponding management information systems (MIS). The vast majority of providers of software and service solutions in the field of HRM are still concentrating on administrative solutions, which are of little help in the proactive planning and usage of skills in enterprises.

The skills management system used by efiport (cf. figure 7) is supplied with a thesaurus of some 1000 skill designations covering general skills (with a strong focus on banking and finance), personal skills (e.g. languages) and social skills (e.g. communication abilities). These skills can be put together to create profiles for job and function descriptions, project tasks and job advertisements. The profiles in turn can be combined to form model career paths and then linked to offers of training. Employees thus have the opportunity to assess their own existing skills and their target profile in the context of an internal online job mart. Comparing themselves with existing profiles will help them to assess how further training and project involvement might best contribute to developing their career. To this end the system not only makes all profiles and the links between them available: it also provides a gap analysis (target-actual comparison) relative to all these profiles, together with proposals as to suitable training measures that would move a person's profile toward their desired target. All data are stored as XML data sets and are based on international standards, such as LOM and HR SEP.

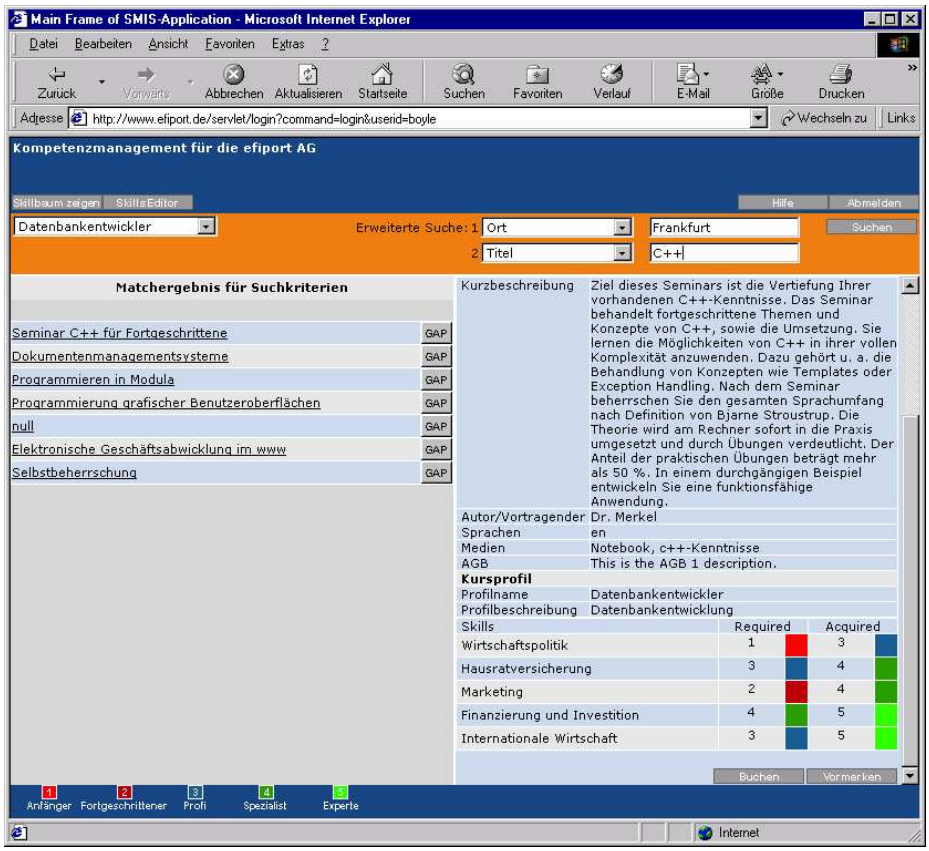

Figure 7: Combined Meta Data Management for Learning Object Metadata (LOM, right hand) and Human Resource Standard Exchange Protocoll (HR SEP, left hand) based on XML binding (skills and learning management system of efiport).

6 Psychological Factors of Success

Bill Gates, founder, former CEO, and present head of research of Microsoft Inc., once claimed that modern technologies of information and communication form the "nervous system" of a modern enterprise. At least in the near future, this will presumably be an apt remark. Certainly, personal communication is not replaced by them, but forms - next to this "nervous system" - the genuine circulation, the basic foundation of life. From 1997 until 1998, the University of Karlsruhe under the direction of Prof. Gemünden surveyed 47 enterprises and 58 persons regarding factors of success and failure which they knew from their daily experience. They distinguished factors within project teams and factors within the organization. The essential results are summarized in figure 8:

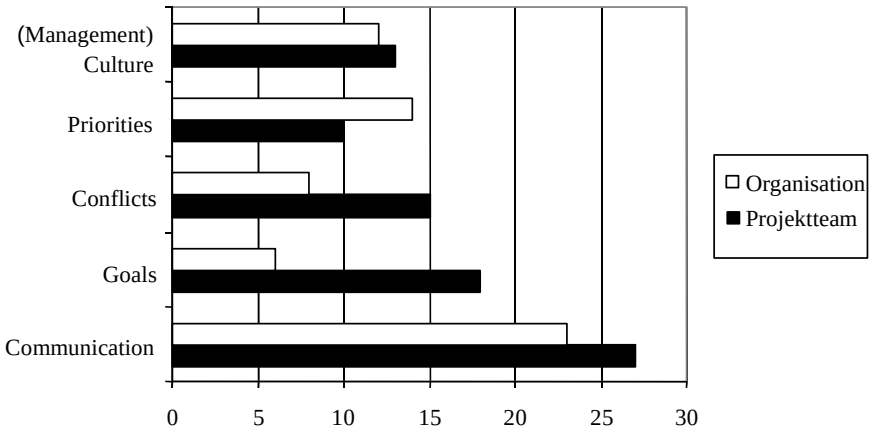

Figure 8: Central Interfering Factors in Projects of Enterprises as Experienced by Project Teams and the Entire Organization. [Gemünden/Bobin 1999]

Gemünden and Babin drew the following conclusion from their study [Gemünden/Babin 1999]:

- Conflicts are inevitable and are no substantial threat for the success of a project.
- Conflicts should be approached and discussed in an open manner, and not be covered up, a solution should not be enforced, and conflicts should under no circumstances be avoided.
- Teams with good group dynamics experience less conflicts and tend to develop a practicable approach to managing conflicts.
- American citizens are accustomed to an open, direct way of managing conflicts.
- In Germany, the existence of conflicts is commonly acknowledged and has considerably less effects on the success and satisfaction of team members.

The theories X and Y, formulated by McGregor as early as 1960, and supplemented by Schein by a "social theory" [Schein 1988] are well known. Summarized briefly, the ideas state the following:

- Theory X: employees are basically not motivated to do their work and must therefore be encouraged to do their work effectively by external rewards and control.
- Theory Y: employees are seeking development and confirmation of their selves at their working-place and therefore will be striving to do their work as successful as possible.
- Social Theory: at their working-place, employees are looking for social contacts and want to be respected and appreciated by their colleagues; therefore they will try to do their work in a way, that will bring them as much confirmation as possible in their environment.

In surveys, approximately 10% of the interviewees tend to support theory Y, 40 % support theory X and the remaining 40% back the social theory. This weak emphasis on the aspects of self-development and responsibility has consequences: Most enterprises have not succeed in winning their employees for their goals. Only 10% have gained agreement with the enterprise's goals by processes of social learning, 5% had chosen the enterprise because of its goals and more then 50% of the employees disagree totally or in part with the enterprise's goals [Berkel/Herzog 1997]. Commitment to performance is not only based on "the hope for success". There is also "the hope for failure", when the goal of a task is disapproved of. There is "the fear of failure", if one does not feel fit for the task, and there is "the fear of success", if the employee fears, that the activities will result in disagreeable consequences or demands. Landy combined these basic ideas in the goal-setting theory [Landy 1985]. It lays stress on four factors of success:

- The determination to reach a joint goal depends especially on whether it agrees with the individual goals. The employee will try to obstruct or prevent a goal that he or she disapproves of personally.
- Employees have to know in advance, which consequences they will have to face, if milestones are reached or not reached. Undefined consequences lead to a more observing attitude. It is highly important, that it is transparent, at what time which consequences will follow and how they are defined.
- Employees work most efficiently, if there are precise milestones and they can adapt their behavior accordingly. Orders like "Do your very best !" are not helpful or even annoying.
- Difficult goals encourage efforts and competition to prove one's expertise. If goals are too simple, they undermine the intrinsic motivation.

The simple technical means of communication most frequently produce the most important effects: For instance, Sproull and Kiesler showed in several studies, that simple e-mail conferences had several advantages over personal discussions [Sproull/Kiesler 1991]. The communication was more balanced and focussed, and more often led to unanimous results. However, co-ordination via e-mail took more time than direct communication. Weisband and Atwater observed that the self-appreciation of participants in electronic communication is more uncertain and more restricted than that in direct communication, because social feedback and sympathy values are lacking [Weisband/Atwater 1999]. The success of electronic communication is highly influenced by the strategic employment of seniors and specialists. Ogata and Yano, e.g., found out that electronic discussions among colleagues tend to be scarcely attended and to "die" quickly. If experts and seniors participate, both activity and drop-off rates are considerably higher [Ogata/Yano, 1998]. Electronic communication is increasingly used to support learning processes. Bolling and Robinson examined co-operative learning by comparing three learning groups: individual learning with print products, group learning with print products, and group learning with multimedia [Bolling/Robinson 1999]. Considered all together, co-operative learning turned out to be the best method; multimedia was best for students with a high amount of previous knowledge.

Information and communication technologies have led to the fact, that local and temporal distances are of less importance. It is more important than ever to practice the principles of management, that are usually restricted to ceremonial proclamations. A management structure, that is based on an open exchange of information also known as "leader member exchange" (LMX), leads to results, that are significantly better than those of a management, which is predominantly focused on organizational and cultural changes. This is holds true for on-site teams relying on face-to-face communication and on-line teams which only communicate by computers [Howell/Hall-Meranda 1999]. If the management participates actively in group processes and defines ambitious (but not unattainable) goals, this enhances both the motivation and the team spirit of the group [Tesluk/Mathieu 1999]. Informal communication, based on personal confidence, is the force that enlarges the knowledge of an organization, as studies regarding LO and OL have shown. In the first instance, technology only solves "technical" problems of data storage and distribution. In an economy working interdependently and relying on direct knowledge transfer these logistical tasks are not to be underestimated. The application of these technologies must not be used as an excuse for not consequently realizing the principles of a democratic management and a transparent culture of communication.

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