

“Preparing students for the future” Individual knowledge management as a basic skill and requirement for innovative teaching methods

Christian Berthold Schmidt, Michael Henninger

University of Education Weingarten, Germany

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Abstract:

In today's society the ability to practice individual knowledge management has become a core competence. Schools are still the most important institutions for education and thus it is their duty to prepare students for their future (professional) life. Imparting knowledge management competences is a basic necessity that can be beneficial for the schools as well. Below a concept for preparing students for knowledge management is presented. It is based on the learning by design approach and appears to be well suited to improve students' competence in this subject.

1 Knowledge has become an important resource in today's society

Already in the late 1990s knowledge management was discussed, primarily in the context of commercial enterprises. The ability to make knowledge available, to share it with others, to enhance and modify it as well as to utilise it is considered as an important factor of success in today's *knowledge society* [1]. Economic developments (e.g. globalization, change from service society to information society) and sociocultural changes (e.g. dispersion and increasing impact of the internet) have increased the influence of knowledge on everyone's social standing and social action as well as on his career [2].

The change of business environments in the last centuries [3] leads to an economic system particularly based on the collection, selection and transformation of information as well as on the generation of knowledge. More and more jobs are provided in the knowledge-sector and the majority of today's students will make a living from knowledge work. Thus schools as important instances of education and socialisation have the duty to qualify them for the specifics of this kind of work and to impart the personal resources needed. At present, school curricula barely account for these aspects.

2 Characteristics of knowledge work and personal resources needed to cope with it

If you are scanning the knowledge management literature you will find many authors trying to specify the concept of knowledge work without finding a general definition. But there are

some characteristics mostly mentioned that are quite suitable to describe the concept of knowledge work.

Knowledge work results in immaterial knowledge products or services and requires information and communication technologies for the production process [4]. It is highly dynamic and frequently confronts the employees with new exigencies that are very complex and can barely be planned. In order to cope with these situations a higher level of information, coordination, cooperation and creativity is needed [5]. The employee is continuously confronted with new challenges. He must be able to select relevant contents out of the daily information flood, to interact with colleagues, to communicate his knowledge and, last but not least, to transfer his knowledge into action [6]. This demands a running learning process as well as persistent personal development by constantly gaining further qualifications (keyword: *lifelong learning*).

A knowledge worker therefore needs more than only domain knowledge of his field of work. Of course a software consultant needs basic knowledge of computer and business sciences. But it demands more to become an effective knowledge worker. It requires a lot of problem solving competence to manage all the complex tasks that one will be faced with every day. As mentioned, knowledge work is also closely linked with information and communication technologies. Hence, media competence is also required. An employee must be able to use these technologies for example to collect or share data. He also needs the competence to appraise this information and to decide how to use it. Furthermore, knowledge work can not be done alone. Complex and unstructured tasks demand cooperation and collaboration by numerous team members. Thus, social competence is another important skill for knowledge workers. They must be able to communicate and to integrate themselves in a work group to achieve a common purpose. Last but not least a knowledge worker must accept that his knowledge will never reach a finite state. It must always be enlarged, restructured and changed. Thus, a positive attitude to lifelong learning is necessary for a successful employee in the knowledge economy.

Therefore preparing students for a future knowledge-sector job means to offer them a school education that includes not only basic domain knowledge but also the training of problem solving competence, media competence and social competence as well as the promotion of a positive attitude towards lifelong learning. In other words, a school education should impart knowledge management competence.

3 Assembling the jigsaw pieces – developing a teaching unit to impart knowledge management competence

A teaching unit to provide students for knowledge management must train their problem solving, media and social competence as well as promote a positive attitude concerning lifelong learning. All these educational goals are already more or less explicitly formulated in the school curricula of the federal states of Germany, for example in the school curriculum for secondary schools in Baden-Württemberg. So why should a new teaching unit to impart knowledge management competence be considered?

A closer inspection shows that the several competences are anchored in different subjects. They are scattered in the curriculum like jigsaw pieces. For example the problem solving competence is supposed to be imparted in mathematic and natural science classes whereas the media education is primarily part of german lessons and is also mentioned in the context of english lessons. Social competence, especially the ability to work in teams and the skill to communicate, and the promotion of a positive attitude towards lifelong learning are mentioned rather implicitly as general education targets and are not anchored in a specific subject [7]. We appreciate the consideration of these competences in the school curricula. However, it would be interesting to find out whether their combination in one teaching unit leads to a more efficient and effective training. Most certainly it should assist students in connecting the

competences with knowledge management. Thus we are developing a concept for teaching knowledge management by assembling the jigsaw pieces to one teaching unit. This concept is based on the learning by design approach because this seems to be a promising approach to foster the development of knowledge management skills.

3.1 The principles of learning by design

The learning by design approach was developed based on constructivist learning theories and in reference to problem-based learning and case-based reasoning [8]. It regards the premises of constructivist learning [9] as well as problem orientation and case work. The idea behind this approach is that the design, which means the collective planning, realisation and evaluation, of a (learning) project combined with the reflection of this process in a group is a fundamental component of successful competence acquirement.

Thus, our course concept consists of three levels. The first level contains the actual learning content. The second level is the dimension of reflection on the learning contents as well as on the course progress. Finally the third level includes methods of instruction and support. The course concept is illustrated in figure 1 and will be specified in the following.

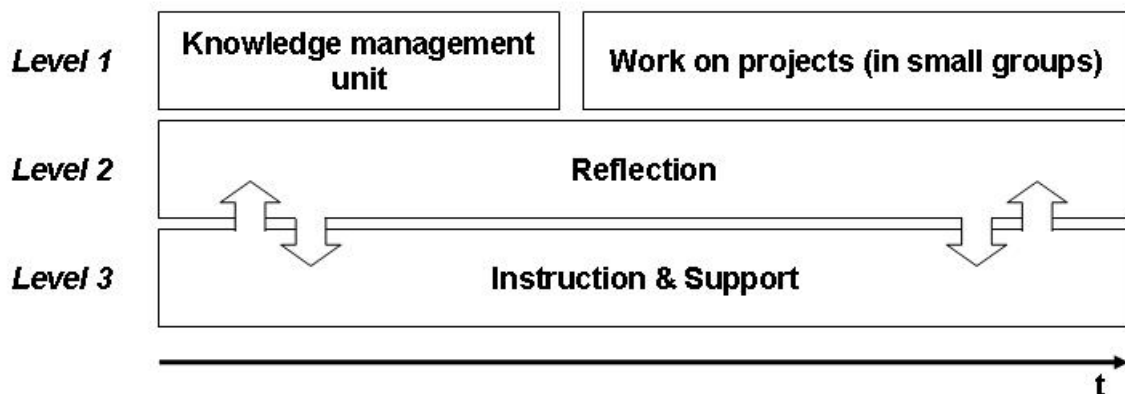


Figure 1: Three-level course concept for knowledge management training

3.2 Level 1: Learning contents

As shown in figure 1, the first level, that contains the learning contents, is splitted in two phases.

The first phase is a knowledge management unit where students learn the basic principles of the subject. This is supposed to compensate differences within the classes and to activate previous knowledge of the students. Especially the activation of students' previous knowledge should have a positive influence on the learning process, not only in this but also in the following project phase [10]. It is advisable to realise the unit by the use of a web-based training integrated in a learning or knowledge management system that can be used for the following project phase as well. Thus, the students get in touch with the technologies used in the teaching unit as soon as possible.

While the first phase is rather teacher-oriented, the following project phase is primarily learner-oriented. The subject is the production of learning software that will allow future students to learn the principles of knowledge management. The students will work in small groups each creating a suitable software program. Hereby they collaborate within their project group and cooperate with the whole class. Thus the development of knowledge management competence is enhanced twofold.

Firstly, structuring and developing the software content requires the students to look into the subject. The intensive examination of concepts, terms, methods and tools of knowledge management should initiate processes of learning and reflection. Secondly, the project definition itself is a complex and unstructured problem situation. To perform this task it is necessary to collectively develop new knowledge (*knowledge generation*), to externalize this knowledge (*knowledge representation*), to distribute this knowledge to other project members or other project groups (*knowledge communication*) and finally to transfer it into concrete actions (*knowledge utilisation*). Thus students experience the use of knowledge management while working on their project. This should initiate deeper elaboration and lead to deeper conceptual understanding.

Synergy effects on learning can be reached by practical activity. On the one hand providing a product, like learning software, helps the learner to connect the theoretical concepts with his everyday life. This should have a positive influence on the learner's motivation and acceptance of knowledge management. The latter is fundamental for the further use of individual knowledge management. On the other hand the production of learning software improves the development of practical media competence, another basic skill in today's society.

3.3 Level 2: Reflection

Reflection is a crucial factor for the learning process [11] and a core element of the learning by design approach. In our concept it has a central position. The knowledge management unit as well as the project phase are accompanied by the reflection of the learning process. The articulation and discussion of the personal learning progress allows students to compare their strategies and their knowledge with others. This should lead to deeper elaboration as well as to the enlargement or restructuring of personal knowledge and finally to a deeper understanding of the subject. Thus the main focus is to foster reflection processes by giving thought-provoking impulses and initiating communication processes as well as providing adequate tools that ease the communication between students. The suggested methods for this will be specified in the next section.

It becomes apparent that the level of reflection is connected with the level of instruction and support. Both categories interact. On the one hand instruction and support of the students aim at the initiation of reflections. On the other hand the articulated results of the reflection process can be used to adjust the instructions and the provided support.

3.4 Level 3: Instruction and support

While the first phase of the teaching unit is primarily teacher-oriented, during the second phase the learners are focussed. This means that the role of the tutor has to change over the teaching unit, too. It changes from the role of a teacher in the classical sense to a coach who accompanies the students during their learning processes and is available if any problems or questions arise; a real change that is often mentioned with regard to constructivist teaching methods [12].

This change of roles does not necessarily take place when the project phase starts. Especially in the beginning of the team working phase the tutor is needed to initiate the communication process and to foster the team building, for example by setting adequate tasks. Over the teaching unit he fades out his scaffolding and leaves the control of the learning process to the students. In the further progress of the course the tutor monitors the students' activities and makes sure that reflection takes place. If necessary he interferes by giving instructions, for example he asks the groups to write down their ideas and discuss them with their classmates. Apart from instructions by the tutor the learning processes can be supported by providing adequate instruments to foster the communication and cooperation as well as the reflection

processes. Technologies like content management systems, groupware or their combination in a learning management system like Moodle have proved themselves suitable for data exchange, communication or the organisation of team work. These technologies are supplemented by a raft of tools which became popular in the last years. Podcasts, social bookmarking, wikis or blogs are only the best known web 2.0 technologies discussed in education science. Foremost, high hopes are pinned on the use of blogs [13]. As a modern form of learning diaries they are supposed to combine their advantages, like fostering reflection [14], with new prospects for communication.

A knowledge management system that integrates those technologies will be a promising learning environment to support students' knowledge management activities by easing the communication as well as the representation and generation of knowledge. Therefore such a system should be integrated in the teaching unit.

4 Opportunities gained by teaching knowledge management at schools

As exposed in the first two sections, today's students await a future that is highly determined by the resource *knowledge*. The competence to handle information and knowledge will be essential for their (professional) everyday life. Thus, it is highly recommended to prepare them for this future by imparting knowledge management competence in school as soon as possible.

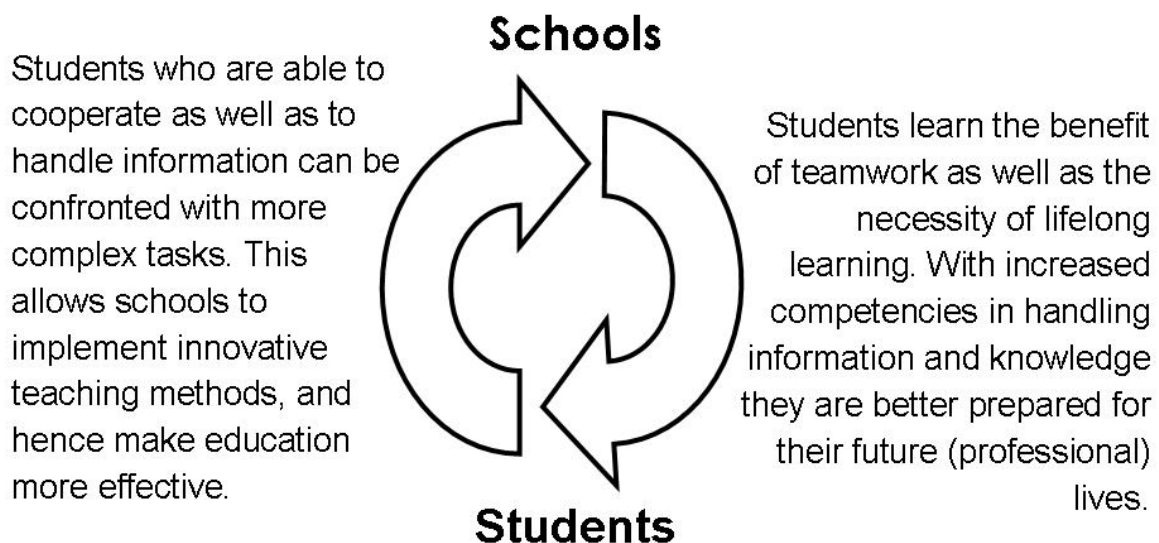


Figure 2: The spiral of education quality

Apart from students' professional qualification it is also reasonable that schools impart basic competencies in knowledge management. Students who can deal with information effectively and efficiently provide the school with the opportunity to increase the quality of education. The deflating results of the last PISA studies stirred a discussion about teaching methods in Germany. Postulations for more innovation are since then growing in popularity. High hopes are especially pinned on learner-centered teaching methods which are based on substantiated findings by the *learning sciences*, e.g. the relevance of active construction of knowledge, situated learning, social interaction, reflection and multiple perspectives [15]. They are supposed to be well suited for competence development. However such teaching methods also demand

a great deal of students' competence to handle with information and knowledge. By imparting knowledge management competences to students, schools will get a basis to implement innovative teaching methods that at the same time improve the training of these skills: A typical win-win situation that can activate the spiral of education quality as illustrated in figure 2.

5 Conclusions

Economic developments and sociocultural changes in the last decades have increased the influence of knowledge on our society. And there is no end in sight for this development. Today the competence to handle information and knowledge is already a basic skill that becomes more and more important for our (professional) everyday life. Thus the postulation to prepare students as soon as possible for the handling of knowledge [16] is more topical than ever. Not only in career terms.

The introduced teaching unit which is based on the learning by design approach seems to be a promising way to impart knowledge management competence and so to prepare students for their future. Although the concept was expatiated on the production of knowledge management learning software it is not limited to this. The teaching unit can also be used in the context of other subjects, for example in language or natural science classes. As long as the task in the project phase is a complex, unstructured problem that demands cooperation from the students and forces them to practice knowledge management.

Teaching knowledge management can be beneficial for schools as well. Competent students provide them with the opportunity to improve their education quality by implementing innovative teaching methods that make great demands on the students' learning abilities.

We are currently working on the realisation of the teaching unit introduced above. Therefore a web-based training is being created. We are also in contact with a software company to develop an adequate knowledge management system to support the cooperation and communication processes of the students. The implementation and evaluation of the course concept in school practice is scheduled for spring 2009.

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Author(s):

Christian Berthold Schmidt, Dipl.-Medienwissenschaftler
University of Education Weingarten, Media Education
Kirchplatz 2
88250 Weingarten
Germany
schmidt@ph-weingarten.de

Michael Henninger, Prof. Dr. rer. soc., Dr. phil. habil., Dipl.-Psychologe
University of Education Weingarten, Media Education
Kirchplatz 2
88250 Weingarten
Germany
henninger@ph-weingarten.de