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Further Education in Knowledge Organization

Basic Didactic Considerations

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Knowledge organization in real world situations is a complex taskrelying on a vast body of knowledge from theories, disciplines, professions, and cultures. This diversity requires a particular instructional design for developing competence in this field. The main features of this design are: real world approach, critical incident analysis, the work on interdependent tasks as a problem-solving method, implementation of solutions, permanent evaluation. It is proposed that documentation of critical incidents, solutions and implementation results serve as a base for establishing knowledge organization as a new interdisciplinary field.
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1. Introduction

The phenomenon of knowledge explosion is a very old one. Leibniz already complained about the fact that he could not read all of the books any more that were important for philosophers. Since the end of the sixties the particular societal meaning of this deluge of knowledge and information has been pointed out by applying very striking terms like "information society" (first in Japan in 1968), "knowledge society", "infoglut age", and "telematic society" (10, p.61). In spite of this appreciation of the difficulties, the solutions for problems have mostly been developed in isolated ways but have not crossed the limitations of a specific context. More efficient media for storage have been developed, as well as more flexible classification methods, new organization structures in businesses and many other things. These developments were hardly ever related to one another.

There have scarcely been considerations that connected the different approaches to knowledge organization in different fields of study, professions and theories, in order to develop solutions or to demonstate ways to solutions by interlacing theory and practice. The claim for such a procedure is part of at least the every-day scientific environment which demands combining and integrating beyond limits. The catch-phrases of these considerations are "thinking in interconnected networks", "system thinking", and "holistic thinking". These demands are resulting at least partly from the perception that to organize big quantities of different amounts of knowledge and information is one - if not the - general ability, ("Schlüsselqualifikation")[1] which enables us to exist in a dynamic and very active society.

It will be outlined now which particular consequences follow for the mediation of knowledge on knowledge organization, considering on the one hand knowledge organization as a comprehensive *general* ability which is on the other hand supposed to become the "key" for problem solving in *specific* contexts for individuals, businesses and other institutions.

Accordingly it is required to roughly outline the field of knowledge organization since my contention of this field affects the didactic design proposed in this paper. The situation in practice, as a starting point for the following considerations, is the further education of individuals in organizations and businesses in knowledge organization. Suggestions out of this practice result from the author's experience in an eightmonths further education programm in Halle, as well as from several workshops concerning knowledge organization.

2. Status Quo

2.1 The Problem of Knowledge Organization in Practice

Knowledge organization can be described as a connection of actions which is not only to sort and arrange knowledge by means of suitable classification methods. Moreover, this connection includes the acquisition, utilization, evaluation, representation, and communication of knowledge. This means that knowledge is not simply there but has, as a first step, to be acquired. It gets sorted and classified in order not to loose the survey on the acquired knowledge and to guarantee swift retrieval. Order and classification, however, are not ends in themselves. They are the basis of utilizing knowledge for problem solving. Eventually, the utilization requires evaluation to verify whether the utilized knowledge or the form of practical application have been successful. On all these levels knowledge is represented by notes, abstracts, indexes, ... or as inner representations, possibly relating to mnemonic aspects. Just as much it is possible and mostly even necessary to communicate about knowledge and the control of organizing actions on all of the levels mentioned.

The different theoretical contexts and fields of study which play a part here can be anticipated even on the grounds of this very short outline. Theories of teaching and learning deal especially intensely with questions of knowledge acquisition. The questions of order and representation are, beyond others, a domain of documentary and

bibliographic sciences, though they intensely engage artificial intelligence as well. The process of utilization is often discussed referring to modern problem solving theory (6) or decision theories. Communication is an important topic in telecommunications, linguistics, and psychology.

In addition to the contexts of theories and fields of study there are professional, institutional and cultural contexts playing an important role. A professional engineer or controller may look upon questions of knowledge organization in a way which is very different from the way which is taught in the corresponding field of study. Institutions may have their own specific philosophy of knowledge organization. Whole cultures as well are characterized by a specific deportment dealing with knowledge. Thus for example Boisot describes typical cultural styles of dealing with knowledge. He characterizes them in terms of the dimensions of codification and diffusion (2, p.229). So he identifies four typical styles which he denotes with the terms "fief", "bureaucracy", "market", and "clan". If e.g. knowledge is regarded as a fief it usually is not codified, interchange takes place in personal communication only, and it serves to build up personal power.

These influences of contexts on conceptualization indicate that knowledge organization, when considered as a relation like it has been depicted above, is connected with significant difficulties. Those are due to the fact that these contexts differ in their "languages", partly aim at different goals, or judge the success of an action by different criteria. On top of that, these difficulties increase because problems of knowledge organization in real organizations and businesses are considerably different from the problems that are faced in so called "educational", "academical" situations. These problems in "practice" (cf. 4):

- have to be first of all identified within a context,
- have to be well defined, i.e. the conditions of the original state and the expected target state have to be characterized,
- have to be well structured,
- on the one hand are highly contextualized (depending on economic pressure or specific organizational structures) and on the other hand - at the same time - are faced with the strong desire to find decontextualized solutions applicable in other contexts.

Working at the problems means to:

- identify the inventories of knowledge which are relevant for problem solving, they are usually not given,
- procure, if necessary, the relevant knowledge,
- make solutions to problems accessible to argumentations of different sides,
- find solutions by group discussions,
- handle feedback on problem solving e.g. by convincing others or by revising the decisions already made.

2.2 Didactic consequences

This short draft of problems leads to several essential didactic consequences when planning to develop competence in knowledge organization:

- Knowledge about knowledge organization is gained from very distinct contexts. It is coded and elaborated differently, and needs to be reduced and integrated. This means limiting the amount of themes and providing possibilities to view the heterogeneous inventories of knowledge in order to provide a common background. In this regard it is appropriate to offer a simple model for the students which indicates with clearly defined terms the connection of the basic actions of knowledge organization mentioned above (14). Such a model provides a frame of orientation and helps the students to use and connect knowledge from different contexts.

- Since the model provides just a frame of orientation there must be an opportunity to give access to background knowledge for specific solutions. On the one hand this background knowledge is specific knowlege about the different particular actions of knowledge organization already mentioned. This includes, besides many others, methods of acquisition like interview techniques or methods of representation like abstracting. On the other hand background knowledge consists of knowledge which is specific for the contexts of the students. This may mean professional knowledge, e.g. that of an engineer, a controller, a system analyst, or institutional knowledge, e.g. the structure of institutions with which the students have to deal. Knowledge which is specific for the student's contexts partly has to be created by the students themselves (e.g. organigrams of the organizational structure of their business).

- If the development of competences in knowledge organization is meant to be based on practice, there are at least three issues of major importance for the basic design of a teaching/learning situation:

1. The teaching/learning situation has to be very open at the beginning. It is important to begin with creating an awareness of the problem, to identify and structure specific problems of the students. Only then the actual work with these problems can start.

2. It is not sufficient to develop solutions only for the learning situation without the perspective of a "real world" application. Routines and strategies must be developed to put the solutions into action. The difficulties which occur then and the necessary revisions of first solutions are important aspects of the learning process and require supervision and/or support during the phase of translation.

3. The learning process as an open procedure relying on problems which are specific for the learners context requires a high amount of activity from the learners who not just get taught something but have to gain it by working.

The claims for orientation models as a basis of the learning processes, for consistent orientation towards

problems and practice, for real application and translation of the results of learning, for evaluation and learner's activity are of major importance within the frame of the new didactic discussion about instructional design[2]. These claims have been made vehemently independent of the specific context of knowledge organization.

A claim of the instructional design which is closely connected to this consists in designing a learning-teaching situation as a specific relation, within which knowledge and skills which are to be developed and the learner's prerequisites are consequently referred to one another. All the elements mentioned depend on one another and influence one another (15, 16).

This idea of integration gets emphasized by the assumption that the learning process always occurs in contexts and is connected with the activities and tasks which one has to cope with in these contexts (1, 9). According to this point of view, the result of the learning process is the competence of an individual, based on the acquired knowledge and a repertoire of skills to solve problems within a context. Context specific competences are, e.g., to make a speech in public, to prepare a meal in one's own kitchen, to install a data programm for accounting etc.

In regard to the activity based theories of Galperin and A.N. Leontev such a competence can be regarded as a "complete activity", marked by motivation (demands and individual interests), fixing of an aim, planning and implementation (20, p.14-15), (5, p.25). In order to install, for example, a data programm for accounting, one cannot simply design a mask according to particular given data. It is necessary to consider the organizational demands and the interests of the individual user. Actions for fixing the aim, planning and implementation are not separated from the actual installation of the data programm, but planning and acting takes place in connection.

3.Basic Model of Competence Development

3.1.Phases

How can the didactic principles that have been developed so far be implemented? Especially the aspects mentioned here, closeness to practice and orientation towards problems, fix the sequence of courses extensively. Some of the following ideal-patterned phases can partly be activated several times:

- *Orientation phase.* A basic model of knowledge organization is presented to depict the sphere of problems which means to show which kinds of problems can arise.
- *Problematization phase.* Practical problems are identified, defined and structured.
- *Accumulation phase.* Informations for problem solving possibilities are gathered, either by acquiring or producing them.
- *Exploration phase.* Alternative solutions are developed.
- *Resolution phase.* Several or one solution are chosen, plans for implementation are made.
- *Implementation phase.* Solutions are implemented.
- *Evaluation phase.* Implementation is checked, if necessary solutions are revised.

This model of phases follows the example of current schemes of problem solving and of the case method, especially the "Life Case Method" (21, p.58). Characteristic elements of this scheme of phases can be found in assignment seminars, workshops, explorations or distance education[3].

3.2. The Design of the Learning Process

The pivotal point of the process, as it has been described here, is the principle of working at tasks by means of practical experiences. Four questions can characterize this principle:

1. Which practical experiences shall be used?
2. How do the tasks that have to be fulfilled look like?
3. Which kinds of solutions are preferably the aim?
4. Which kind of course management is necessary for learning by fulfilling tasks?

3.2.1 Practical Experiences in terms of Critical Incident Situations

From all the practical experiences the learners have got in their professional life, they are to choose those interaction situations which are of central importance for them, for their work in their business, and which are connected to the organization of knowledge. Some considerations to decide for a situation could be as follows:

- Focus on situations in which the individual state of supply with knowledge is important for decisions and future activities.
- Focus on situations in which the state of supply with knowledge of the learner's organization is important for decisions and future activities.
- Description of the type and extent of knowledge which is important for decision making and action.
- Description of the channels, through which knowledge has or has not reached the learners.
- Characterization of individual and business goals concerned in that situation.

Important questions to ask, for fixing the aim, within which the frame of possible changes in knowledge organization is characterized, are:
- With a different supply with knowledge - would your decisions and actions have been different? Different in what way?
- With a different supply with knowledge - had you changed your individual goals or those of your company?
- Which aspects in regard to the supply with knowledge, concerning your's and your company's, should be changed?

These main considerations and questions establish a rough frame for problem finding, defining and structuring. The wherewithal is of course that the learners already have available a first model of knowledge organization, in the sense mentioned above. It makes sense, because of the considerable amount of abstraction which is required from the learners, to exemplify some short cases.

3.2.2 Multi-Perspective Design of Tasks

If you look at the main considerations and questions mentioned in 3.2.1. in regard to the choice of critical incident situations, you will notice that even just obtaining a problem this way is very time consuming. A complete formulation of this aspect of choosing a situation as a task would be considerably different from the tasks for tests and exercises at school. A task as complex as this is not meant to ask for or repeat familiar material but to develop competence. It is only those tasks that I mean by learning tasks.

Assuming that the learners solve different tasks concerning a critical incident situation and are working with several critical incidents during a workshop or a longer course, there are two things that have to be acknowledged in regard to the whole process of the course or programm:

1. Competences that have been developed during former tasks are to be applied in future tasks in order to practice and repeat them.
2. Former learning tasks with little complexitiy prepare future learning tasks with bigger complexity.

These claims are based on Piaget's considerations about learning theory. According to that old stuctures of knowledge do not disappear when new knowledge is built but become part of the new structures. (18, p.42)

With their list of principles for the design of learning tasks which is sketched in the following, Brophy/Allemann offer an essential point for the design of learning tasks. You will recognize many of the principles mentioned in this text, though some are formulated differently. Brophy/Allemann characterize the design of learning tasks as an activity of a designer who has to pay attention to and to connect many different perspectives (, p.16-19):

Primary Principles (necessary criteria that must be applied to each individual activity):
- Goal relevance (Are the planned activities useful means of accomplishing worthwile curricular goals? Are the curricular goals phrased in terms of capabilites and dispositions to be developed by the students?)
- Appropriate level of difficulty (Is the learner able to cope with the task due to his prior knowledge?)
- Feasibility (Is the learner able to cope with the task due to the conditions of the learning environment?)
- Cost effectiveness (Do benefits justify the anticipated costs?)

Secondary principles (desirable but not strictly necessary):
- Multiple goals (Do the tasks accomplish different goals simultaneously?)
- Motivational value (Are the required activitites likely to be enjoyed or found meaningful by the students?)
- Topic currency (Do the required activities form a set built around key ideas and key skills?)
- Whole task completion (Do the tasks focus on complete whole tasks instead of focussing on isolated practice of part-skills?)
- Higher order thinking (Is the task challenging in terms of analyzing, interpreting, and manipulating information?)
- Adaptability (Is the task adapted to accomodate student's individual differences?)

Principles that apply to sets of activitites:
- Variety (Does a set consist of a variety of activity formats?)
- Progressive levels of activity or complexity
- Life applications (Is the task related to real life situations?)
- Full range of goals adressed (Do the activities as a set reflect the full range of goals identified for the unit or strand?)
- Concrete experiences (Is there an opportunity to provide students with concrete experiences necessary for understanding if they lack those experiences?
- Connecting declarative and procedural knowledge (Do the students learn not only that a thing exists but also why it exists, and how it can be produced?
- "Natural" applications (Do the activities occur in a natural context?)

Optional principles (dependent on the designers conception of the world):
- Inductive inquiry
- Disciplinary inquiry
- Student centered activitites
- Subject matter integration
- Extra content insertion
- Tasks as culminating activitites in a unit
- Homework

Implementation Principles (structuring of the tasks by the teacher):
- Consideration of each of the following six principles
- Justify goals and purposes
- Make sure that the students understand what they are supposed to do
- Provide the students with the opportunity to work mostly independently
- The students should get feedback
- The task should be linked to former or future parts of the unit or curriculum
- Choose an optimal format for the materials (written, oral, ...)

3.2.3 The Tension of Concrete and Generalizable Solutions

The Central idea of this disposition is to show how context- specific solutions for practical problems can be developed by working at tasks within a given frame of

orientation and by including background knowledge.

On the one hand the choice of the developed solutions depends on the practicality and applicability of the solution found. For example, something that theoretically could be applied, actually may be impossible because of a particular staff constellation. On the other hand it is important to always relate context-specific solutions to generalizable ones. Routine questions when choosing a solution should be:

"Which solution does not only 'function' within this context but also in others?" or "Which of the solutions can be - with the least changes - applied in other contexts?"

These questions are essential not only for the development of competence but also have an aspect in work economy. To answer these questions requires identifying general elements and relations and transferring them into different contexts (5, p.26). Hence this results in routines for problem solving which mark the actual growth of competence (5, p.22).

There is one important further aspect which is essential for the evaluation of the quality of solutions. It is the specification of criteria which signalize the successful implementation of a solution. Only on the grounds of that, evaluations of the solutions and of the personal success in learning can be made.

3.2.4. Course management

The course management which follows from this concept can be characterized by a number of principles:

- *Personal activity:* The learners are not passively confronted with knowledge like in frontal teaching, but have to acquire it themselves.
- *Course management as design of learning opportunities:* The trainer or instructor provides a frame, giving orientation and tasks, offering background knowledge (literature, data, invitations of experts) or moderating plenum conferences. The trainer or instructor may be called a facilitator, and is no "guru" who knows and determines everything.
- *Cooperation:* It is not only trainers/instructors and learners who have to cooperate. Cooperation with external experts is necessary as well with individuals within organizations and companies, where improvements concerning knowledge organization shall be applied.

4. Prospect and Possibilities for Development in ISKO

The critical incidents, the analyses and the results developed within this type of further educational program should be documentated and collected. Hence a pool of knowledge can be generated - like the case study collection of the "Harvard Business School" or the "Deutsche Zentrale für Fallstudien" - which eventually can lead to far reaching perspectives for the development of knowledge organization as an interdisciplinary field of study:

- The example case studies when used in university studies, can lead to more closeness to real life and greater didactic variety.
- Working out solution samples in university contexts within different fields of studies makes the integration of suggestions for solutions possible.
- Culture-comparing analysis is an opportunity for culture specific adaptation of knowledge organization and systems for knowledge organization.
- The example case studies can be the core of a curriculum, oriented towards practice, for an interdisciplinary field of study "knowledge organization", to be established.
- The central collection of example cases and their solutions increases the consulting competence of ISKO.

In order to achive that, the following activities are necessary:

- Establishing a coordination center where critical incident situations are collected and at call.
- Designing a documentation form and system of those interaction situations.
- An accompanying evaluation of the implementation of solutions found in the workshops.

In my opinion it is desirable, in order to accomplish these perspectives that the activities mentioned above will be coordinated by ISKO and supported by members of ISKO. First steps towards this will follow from a cooperation of ISKO, the Institute of Cross-Cultural Didactics and the University of Bielefeld. A pilot workshop in the sense mentioned above will take place there. The performance and subsequent operations will be scientifically accompanied.

Notes

1 The term "Schlüsselqualifikation" is specific for German educational research. There does not seem to exist a satisfying equivalent for it in English (see 17, p.41).
2 Cf. the overviews by Schott, Flechsig 1991b.
3 Cf. Flechsig 1991, p.13-23, 33-43, 45-49; Kaiser 1973, p.277-278; Kaiser 1983, p.36-44.

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