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THE DEVELOPMENT OF EXPERTISE IN EDUCATION AND TRAINING MANAGEMENT

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Abstract:
Innovations are invaluable assets and potential competitive factors for international organizations. For companies to remain competitive in the long term, innovation ability is a highly significant factor for success. More than ever in international organizations, the need to recognize innovative properties such as organizational resources and employee potential is growing. This paper focuses on the contrasting challenges of knowledge retention and development at the individual level. Employee potential emerges in parts of education and training management as it is coupled with vital human resources. Essential for employees in coping with innovative contexts is the ability to develop expertise through continued active acquisitions of complementary forms of knowledge in context specific settings. The purpose of this paper is to introduce a didactical concept for the development of expertise. In making reference to the tier classification of novice to expert according to Dreyfus, and an education theoretical theory of complementation, procedural recommendations for the arrangement of operational trainings are able to be presented. Empirically, the reasons for this concept will be presented in a case study.

Keywords: expertise, innovation, education and training management, educational goal.

1. LEGITIMATION OF CONTINUED TRAINING

In 1911, Schumpeter described the process of developing innovation as an implementation of new combinations. This assumes five cases: the production of a new product, introduction of a new method of production, development of a new market, obtainment of a new source of resources and the implementation of reorganization (Schumpeter, 1952, p. 100).

The management of innovation in the classic perspective comprises of technology-management, the research and development department and possibly marketing strategies. This understanding is technology-driven, domestically oriented and shaped by an ideal of predictability. On the contrary, the integrated concept of innovation management covers all organizational actors (Hübner, 2002). Here, a model of capability gains access to continuous improvement with respect to innovation. This is a very broad term of innovation and is reflected in both varied and new types of innovations. In addition to product and process innovation, system and social innovation also exist (Hauschildt & Salomo, 2011). System Innovation refers to the interaction between institution, technology and infrastructure. Social Innovation entails innovation in service, administration and social life. The following assessment is based on this wide-ranging term and the assumption that innovation is an integral part of all organizational actors.

To be innovative, the organization must be able to exploit the innovative potential of employees in all operational fields.

Innovative potential may already be present or should be established. This is a concern of company training programs.

In addition to innovation, sustainability is a further important factor for success. Sustainability is defined as the conservation and expansion of resources and potential reduction in the establishment of resources (Moldaschl, 2005, p. 59). Basic categories of resources are non-renewable, renewable and generative (Moldaschl, 2005, p. 51). Generative resources describe real resources, human ability, social relationships and cultural practices; examples are know-how, creativity, commitment and implicit knowledge. Renewable resources are material resources like know-that, status and explicit knowledge.

These two resources can be preserved and developed in company training programs. Therefore educational management provides and is also necessary for sustainability.

2. EDUCATION AND VOCATIONAL TRAINING

The education theory of complementation is based on the assumption that education is composed of complimentary forms of both knowledge and experience (Jongebloed, 2004, p. 30). Knowledge, in the extent of the theory, can be ascertained through school, professional or problem related contexts. It is repeatable, storable and learnable to where experience is defined as singular, inductive and perceivable. Experience is hence perceivable in field oriented, assignment bound and course related contexts. Knowledge is acquired through teaching environments during which experience is gained through practical settings. Knowledge and Experience cannot take place simultaneously, but only together they make education viable. The transfer as a pedagogical term and concept and as a step in the articulation model in Roth 1983 allows for the transmission of something already learned from the field of experience in the place of knowledge and vice versa. The employee must

integrate instruction material into practice through which it is the only way in which expertise can be acquired. Knowledge is not the only thing that needs to be transformed into experience; experience must also be transferred into knowledge. Moreover, the didactical reduction determines the instruction of knowledge (Hering, 1984, p. 40). Oversimplification of material can lead to inadequate transfer; this presents another thesis of the paper.

The comparison between implicit and explicit knowledge is often illustrated. Knowledge implies explicit knowledge and experience identifies implicit knowledge. The authors of the theory base their debate on the success of dual training programs in Germany and their opinion of questionable performance of on-the-job training. Both effects underline the argumentation of the theory of complementation.

Occupational and operational contextual orientation, economic interest, organization and decisions made by the company characterize vocational education and training (Wittwer, 1982, p. 25). There are many distinctions with regard to the learning location, for example in the difference between internal and external vocational education (Bank, 1997, p. 15), but these differences are not of any particular relevance in this paper. In reference to knowledge gained by employees, there are differences between adoption and promotion training (Münch, 1987, pp. 208–210). Adoptive vocational training, which counteracts the devaluation of work capability, has a curative, conservative character with an aim of conserving professional skills. Vocational promotion training, with a goal of achieving higher qualifications, has a progressive character. In addition to this classification, the vocational education is classified by its intended use, whether by introducing new technology, the fulfillment of skilled worker requirements, improvements in productivity or/and fostering motivation (Weiß, 1990, pp. 72–75). In the following theoretical remarks, we define vocational education and training as a process of extracting knowledge and experience respective of implicit and explicit knowledge. Therefore we take reference to this separation (Bank, 2009) in applying it to the learning field as a place for gaining knowledge, as a place of training in the narrow sense and in the functional field as a field of experience. Incentives are offered in the functional field for the acquisition of implicit knowledge through experience. Learning through explicit knowledge and the acquisition of skills occurs in the learning field. Consequently, the didactical model must observe both sides.

3. EXPERTISE

3.1. Basic Theoretical Concepts and Models

Expertise is regarded as an identification of experts. Apart from the attribution and discussion of social modernization theory, there is the sociology of knowledge and cognitive sciences which determine different approaches for which the term expertise attempts to define expertise. In the area of the sociology of knowledge, Schütz was the first. He described the social distribution of knowledge and analyses the structural types of knowledge baggage. In this typology, the expert, which has concrete and detailed knowledge about a limited area, is the final step (Schütz, 1964, p. 123). The expert has different devising strategies and makes validated messages in contrast to the layman, which has pragmatically motivated knowledge of patterns without relevance of details. This typology illustrates that the definition does not happen without contrasting comparisons.

Cognitive science describes the development of expertise. Presented in Dreyfus and Dreyfus (1988, pp. 37–62), a model suggesting a procession of knowledge as the sum of implicit and

explicit knowledge gaining advancements provides the basic principle defining components of developing expert knowledge. The transformation of explicit knowledge or information about context dependent rules and regulations can be easily transferred to others, but know-how knowledge can only be gained through personal experience; past events that provide a pattern for comparing different schemes and decision processes. In a detailed study, Dreyfus and Dreyfus outline the steps of how novices become experts. The five-steps are novice, advanced beginner, competence, proficiency and lastly expertise. Novices are designated as having learned specific "context-independent" rules and regulations by which objective facts and patterns are recognized. These learned rules permit a dry interpretation of a set of elements without having an awareness of the situation. Advanced beginners build experience in dealing with situations that are not able to be presented by their instructor, and are able to recognize corresponding resemblances to learned contexts which are defined as being "situational", separating them from their context-free counterparts. At this level, behavioral patterns can be a mix of both context-free and situational components. As a learner progresses, with an exponentially growing reference of experience in real-world situations, the ability to catalogue those experiences in order of importance or significance lends the learner decision procedures from which the most relevant factors are taken and compared with viable factors to conclude or compare expectations. This step is where the learner can be referred to as competent in a subject matter, making conclusions from logical comparisons with gained experience and learned patterns, but concurrently acting upon intuition. While at this level, decisions based on logical comparisons rely on the subjective intuitive decision process, a level of personal investment creates a connection, to where a correct decision procures feelings of satisfaction and tends to be more memorable. The ability to act intuitively, be able to use patters without needing to analyze them in individual components is defined by the author as being "holistic similarity recognition", and recursively defined by the terms "intuition" and "know-how" being understood as synonyms, and simultaneously the definitive characteristic of proficient learners. The ability to effortlessly compare and contrast past know-how experiences in an intuitive manner is based on the evaluation of situational elements that are held to be important. But as with proficient learners, the decision process is thereby not a fluid procession of perceptual reaction, but is still interrupted by a moment of indecision. Experts, the highest rank users have the illusion of always making the correct decision, and effortlessly master the problems in their area of specialization. If no abnormal complications ensue, experts can simply apply the relative solution that has always worked, gained through experience. Based on the order of problematic patterns, they are able to refer to characteristic factors hinting towards the most probable outcome. Rationalization no longer takes the energy and effort it once did as they were yet still a novice, and works as "second nature", recognizing significant factors for the application of relevant problem-solving patterns.

The model represents five levels of knowledge mastery, and is representative of corresponding performance capabilities in the application of explicit, situation-independent factors, and implicit know-how in situational contexts for the usage of tested and proven solution methods. The five-steps are a progressive typical learning order, in which experts have mastered and incorporated objective patterns of decision making as well as subjective behavioral patterns.

Drawing upon Dreyfus and Dreyfus and also Schütz, the decisive criteria for expertise is specialist knowledge consisting of explicit knowledge and experience (implicit or tacit knowledge). This specialist knowledge is different from the remedy knowledge of the layman and context-free knowledge of the novice.

3.2. Case Study

The goal of the case study presented in the following section is to reconstruct the acquisition of expertise at a university. Thereby it attempts to explore the analytical usefulness of the didactical model of expertise development on both sides (learning and function field).

In the research of a new didactical concept through independent learning called Autozipient, the development of expertise was an important topic (Bank & Breßler, 2012). Autozipient states that in the development of expertise within an arrangement of didactical elements such as autonomous learning, lectures as a form of action have a very low rate of retention (Breßler, 2012b). This tends toward the structural model of didactics in economics.

The case is about the introduction of expertise development in the learning field for economic students. It was shown that students expounded upon their own experiences from family, social environments and professional settings, but there were no direct instructions and there were no direct possibilities for their application.

Thirty students had to choose their own economic content, where they were instructed to developed specific knowledge respective of expertise over a six month period. They acquired knowledge about the content and attempted to gain expertise. At the end of the program they compared the content with that of the other students.

Ten students chose the theme sale contracts. They all had experience will sale contracts due to already being consumers. Six of these students worked in companies and had already gained specific experience before the program had started. Three of the students continued working three weeks after the end of the program in legal departments of SMEs, in which legal claims were completed with contracts. One of them had specific experience in a personnel department. Two of the other students worked over a five week period during the program in event agencies, where they adopted the creative organization of concerts.

Questionnaires given to students after three months showed that expertise was only developed in similar contexts if they had gained six months of experience. The students that had worked in the legal departments were able to apply knowledge learned in the program in gaining implicit knowledge, experience and intuition. The students that only worked in creative capacities at the event agency were not able to further develop their expertise. In addition, it did not suffice if students had already had unspecific experiences before the acquisition of explicit knowledge, such as the example of purchase contracts shows. Only specific experiences in reference to appropriate content were able to aid in developing expertise. The order of acquisition is therefore not defined. In this case, implicit and explicit knowledge can alternatively be reciprocally developed; explicit knowledge must not forcibly come before implicit.

The case study shows, that it is important to have similar elements between fields of experience and places of learning for the development of expertise. An instructional measure without organizational involvement has no positive effect. This is quite simple, but the largest number of vocational education management fails to recognize it. Certain measures will need to be taken at the remuneration level for encouraging further development.

The case demonstrates that a didactical model of expertise development for vocational education needs to include both sides: explicit knowledge and experience. This will be developed in subsequent submissions.

4. DIDACTICAL MODEL

In the following, didactic is defined as a science of teaching and learning (Dolch, 1965, p. 45) and not as the management of learning processes, the theory of educational intent or science of teaching and instruction. There are a several didactical models at the moment in which we can apply the structural model of didactic of economics (Jongebloed & Twardy, 1983, pp. 163–203). These will be the basic assumptions for the specific model of expertise development in company training programs. The result at the end of the training will be described in the educational goal.

Our didactical model has two sides (see above): a learning field and a functional field.

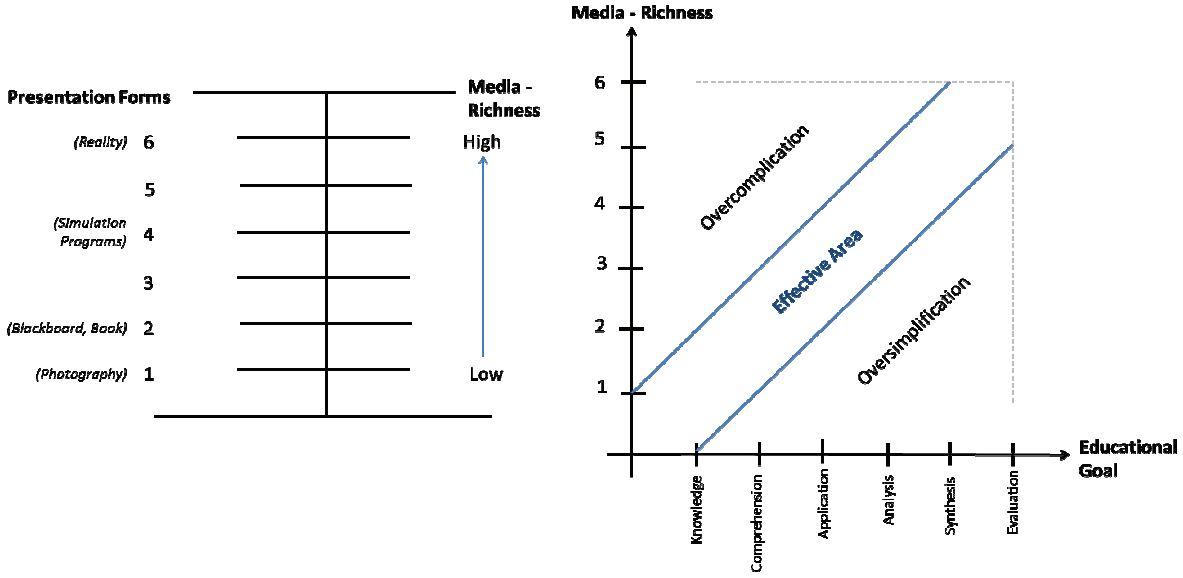
4.1. Learning Field

Key aspects in the model, which provide gained explicit knowledge, are the fields of thematic and methodic (didactical reduction, media, forms of organization and action) as well as the circumstances of the target groups, teaching goals and processes of articulation and sequencing.

The instructional intent respective of intent in the training measure are defined by the company (see above). The methodic decisions are mostly made by the lecturer or teacher. For example, there are questions of didactical reduction or the use of media.

The didactical reduction highlights the dilemma of science-based and comprehensibility principles (Hering, 1984, p. 41). Not every science-based statement can be treated comprehensively because of limitations in time periods, educational backgrounds of the target group, interests and order of comprehension. This offers three consequences for the didactical reduction with respect to the selection, processing and arrangement of contents (Jongebloed, 1983, p. 360). The processing and arrangement of content will be described through Hering's concept. But what is actually reduced? A terminological approach is provided by Popper (1982, p.84) where the term informational content of statements is determined by the class of opinion of falsification. Therefore, reduction is a decrease of the informational content by the abolition of universality/generality and determination. The simplification procedure in Hering describes the abolition of determination in the reduction of differentiation elements.

Picture 1: Revision of Media-Richness



Source: Breßler, 2012a.

In the usage of different media also lie possibilities for didactical reduction or transformation. They visualize and serve as an aid in understanding. The selection of media in companies is described by Daft and Lengel (1984). A revision of the media richness theory for pedagogical/didactic matters permits an adequate selection of media for educational goals (Breßler, 2012a). Media richness is defined as the form of presentation, which is characterized by the coding types and intended stimulus modality. For example, the TV has a form of presentation numbered 3, because there are two stimulus modalities (hearing, seeing) and two encryption options (image-like, symbolic). The analysis of media richness and educational goals (Bloom) creates an effective area of media usage (see picture 1). This will be an aid for the teacher in making decisions.

The development of expertise in the learning field is characterized by the reduction in contents through specific and indirect actions such as the selection of media.

4.2. Functional Field

In this field, the employee has to gather experience. Therefore, a potential didactical model must define the general conditions.

The function field is not described by any didactical models and elements like the structural model of the didactic of economics. By contrast, there are forms of learning, for example on-the-job training and concepts like cognitive apprenticeship (Collins, 1989), which characterize the acquisition of experience within the company.

The concept is developed based on gaining expertise characterizing the necessary requirements. First we need similar elements in the field of learning to generate interchanges between the fields and transfers between explicit and implicit knowledge. Therefore, the thematic of the learning field with respect to instruction has to have similar elements for the intent of the functional field or field of experience. This is the only way in which a transfer can be completed with a shorter distance. The behavioristic approach of Thorndike called upon identical elements and theories of similarity, building upon them to describe this phenomenon. Identical elements in Thorndike already existing in 1901 consist of the identity

of the substance which describes the direct reaching agreement between elements of the learning and application fields and the identity of the procedure, which describe the transfer of learning habits, devising strategies from the learning situation in the applied situation (Thorndike & Woodworth, 1901, p. 256). The concept determines a positive transfer prognosis, if there are identical elements between the predisposed learning situation and the consequent application context.

In reality, the acquisition of experience is characterized by non-reduction and media usage. The reduction hindered the development of expertise because it is described as specialist knowledge consisting of explicit knowledge and experience (implicit or tacit knowledge) (see above). Furthermore, the acquisition only takes place in reality through a medium. The re-evaluation of the media richness theory shows that the reality is the highest richness media (see picture1); employees can only reach the highest educational goals through it.

4.3. Educational Goal

Lastly, a didactical model needs an educational goal. Here it is clear that the development of expertise is the goal. Therefore, the concept is applied as a basis for analyzing expertise in educational goals. The analysis refers to the taxonomy of educational objectives within the cognitive domain in Bloom. He describes six steps of educational goals: knowledge, comprehension, application, analysis, synthesis and evaluation. The transfer can already be initiated at the step of application (Bank, 1997, p. 149), but it is important for our considerations to develop expertise. For this, the application of educational goals is not enough. Experts have capabilities to analyze situations and arrange things within a broad context. Therefore, they can evaluate products, situations, process, and so on. None of these will be characterized by the step of application. “The judgment in terms of internal evidence” and “the judgments in terms of external criteria” (Bloom et al., 1972, pp. 202–204) have already placed the intended justification. The declared educational behavioral target of the training program is consequently the evaluation, the highest goal of the cognitive target classification. This can be an analytical instrument to give the training measure purpose.

5. CONCLUSION

In this didactical model, expertise is determined through the interaction and synergetic coupling of explicit and tacit knowledge based within a specific context. Vocational education and training management can bring experience and explicit knowledge together to generate and develop expertise.

The case study shows that the instruction and teaching of explicit knowledge alone does not create expertise. Therefore, in the work place, conditions and incentives should be implemented to encourage gained experience and the use of explicit knowledge. Thereby, vocational education in the context of personnel development should enhance similar elements between training and work.

Nonetheless, vocational education is necessary as an instrument for the sustainable development of companies and the development of innovative Potential of employees.

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