Accelerated substantial progress regarding many fields of production and services imposes pressure upon the labor market. Employers are desperately looking for skilled workers in nearly all technological fields. All over the world this pressure reaches the national systems of vocational education and training. Along with the output orientation turn new standards are imposed, forcing firms and schools to make every endeavor to improve and remodel their programs as well as their practices to reach more and more ambitious goals. To be successful they need the results of scientific research from which they demand reliable information on methods to diagnose the state and learning progress of students and on means to foster and promote competencies of heterogeneous groups of learners. The book offers 22 state-of-the-art articles covering the central fields of vocational education and training and reporting on new and adequate ways to deal with these challenges.
From Diagnostics to Learning Success
Professional and VET learning
Volume 02

Series editors
Susanne Weber, Ludwig-Maximilians-Universität, München, Germany
Frank Achtenhagen, Georg-August-Universität, Göttingen, Germany
Fritz Oser, Universität Freiburg, Freiburg, Switzerland

Scope
“Professional and VET learning” is a book series that focuses on professional competencies and identities, but also on conditions and societal frames of job performances. It includes education in economics, medicine, handicraft, ICT, technology, media handling, commerce etc. It includes career development, working life, work-integrated learning and ethical aspects of the professions.

In recent years the learning in the professions and through vocational education has become a central part of educational psychology, educational politics and educational reflections in general. Its theoretical modeling, practical application and measurement standards are central to the field. They are also specific for a new research realm which is until now, especially in the US, minor developed. For Europe the dual system, learning in the professional school and – at the same time - learning in the firm, can be a model for studying how issues of professional belonging, professional life meaning, professional biographies, professional change, but also especially professional competencies and sovereignties respectively securities are generated.

The books in this series will be based on different theoretical paradigms, research methodologies and research backgrounds. Since the series is internationally connected, it will include research from different countries and different cultures. The series shall stimulate a practical discourse and shall produce steering knowledge for political decisions in the field. We invite contributions, which challenge the traditional thinking in the field. Professionals who are accountable, available and certificated shall receive through this series a fundamental support, but also new horizons and broadened perspectives of the domain.
From Diagnostics to Learning Success

Proceedings in Vocational Education and Training

Klaus Beck
Olga Zlatkin-Troitschanskaia
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By editing this book we honor Professor Klaus Breuer who is retiring from his professorship at the Johannes Gutenberg-University of Mainz. Klaus Breuer has taught in the field of business and economics education at the Faculty of Law, Management and Economics for nearly twenty years. He has been a passionate teacher favored by thousands of students as well as a respected and highly esteemed colleague. In 2006 Professor Breuer was elected dean of his faculty for a regular mandate of three years, a time span during which many talented new professors were recruited. Klaus Breuer conducted all the necessary negotiations and helped the faculty acquire a number of remarkable new scientific staff members. In addition, from 2008 to 2012 Klaus Breuer was a member of the executive board of the German Association for Educational Research, an important and prominent position in which he contributed to the association’s formation and also its economic welfare by managing its financial affairs.

This is only one facet of Professor Breuer’s lasting legacy for the good reputation of his faculty. During his nearly two decades of intensive work he stimulated, counseled on and evaluated hundreds of Diploma, Bachelor and Master theses; he also convinced selected postgraduates to embark on doctoral dissertations, encouraged their efforts and led them to the positive completion of their endeavors. As a member of several international scientific associations, Professor Breuer cultivated and still is cultivating intensive and productive contacts across continents.

Given the limits of a foreword, we cannot enumerate and highlight all the awards Professor Breuer has earned during his long career at the Johannes Gutenberg-University of Mainz. Rather, by dedicating this book to him we are attempting to express our gratitude for all he has accomplished for the scientific community, for our university and its Faculty of Law, Management and Economics, for his colleagues and, not least, for his students.

In addition to his multifaceted scientific interests, Professor Breuer’s main research activities have been, and still are, concentrated in particular on the development of complex teaching-learning arrangements in business and economics education and of valid new procedures for examination and assessment strategies in the field of vocational education and training. In several large research projects Professor Breuer created and validated diagnostic methods by simulating real-life work situations and gained useful information on the vocational competence of examinees. This research received a great deal of attention from actors in the field of educational policy development and has had a huge impact on several economic branches where
his suggestions for vocational examinations are practiced with much success and
wide acceptance. Professor Breuer’s research has been published extensively and
quoted in many books and articles in English and German.

The title and thematic structure of this book have been designed to tie in with
Professor Breuer’s multifaceted interests and to mirror at least some of his fundamental
ideas for a better understanding of the process of vocational maturation. Chapter I
comprises papers dealing with basic research concepts in Vocational Education and
Training (VET). Robert D. Tennyson presents his interactive cognitive model and
its components and honors Professor Breuer’s scientific contributions. The next
component of this chapter is by Marold Wosnitza, Balthasar Eugster and Kerstin
Helker. It focuses on universities as venues for self-regulated vocational education
and training. The studies presented here also indicate the potential for linking teaching
and learning research to educational theory. The last component of this chapter is by
Jürgen van Buer and Gritt Fehring. They analyze conceptual differences among major
notions in vocational education such as profession, professionalism, employability
and trainability – with respect to German and European debates. They bring attention
to conflicting perspectives on vocational skills and vocational education.

Chapter II contains five articles dealing with the content, objectives and outcomes
of VET. In the first article, Klaus Beck refutes the thesis of a holistic, universally valid
ethical principle in favor of a “systemic particularism”. In his opinion, developing
moral judgment should be a component of vocational education. Thomas Bienengräber
examines situationism in business education from a didactical perspective and
highlights implications for the construction of learning situations. Susan Seeber and
Rainer Lehmann focus on the preconditions of successful job training and evaluate
the influence of general skills acquired during in-school education on the success
of commercial apprenticeships. The last paper in this chapter is contributed by Fritz
Klauser and Juliana Schlicht. They assess the value of intangible phenomena in
teaching and learning processes such as knowledge, skills, attitudes, motivation and
emotion from both a pedagogical perspective and an economic point of view with
regard to adult education in technology/computer-based and traditional classroom
settings.

Chapter III comprises articles which deal with various methods of instruction in
VET. Stefanie Hillen seeks to answer the question of what research on technology used
in VET can teach us about media didactics. Alfred Riedl and Andreas Schelten address
technical discussions as supportive interventions in the process of constructivist
teaching and learning in VET, while Hugo Kremer examines the potential of social
media in VET and also looks at the associated challenges. Gerhard Minnameier
places focus on the domain of business and economics education and critically
discusses an inferential theory of knowledge acquisition in the context of VET. In the
They present the results of their empirical study assessing the effectiveness of work-
study programs in which learning at school and learning at work are integrated in the
formation of professional skills. In the closing paper of this chapter, Kerstin Norwig,
Cordula Petsch and Reinhold Nickolaus present results concerning the evaluation of the VET program BEST and point out the importance of continuously supporting low-achieving apprentices in industrial and technical fields (construction sector).

Chapter IV includes papers in one of Professor Breuer’s major research areas: diagnostics and assessment in VET. In educational research, “competence” is a passionately debated term. The papers in this chapter pick up the debate. Andreas Frey and Jean-Jacques Ruppert model and analyze the interaction of social, personal, method and subject-related competence as dimensions of comprehensive (professional) competence. In the next paper, Detlef Sembill, Andreas Rausch and Kristina Kögler discuss the meaning of the non-cognitive elements of competence. They argue that not only cognitive facets but also affective and motivational elements are important in self-regulated behavior. They have developed a model to demonstrate the multidimensionality of modeling and measuring competencies. Nina Bender and Daniela Barry survey self-regulated behavior when dealing with financial matters. They present a survey in which financial self-regulation as an important factor of competent action can be measured with the help of the Trait Self-Regulation Questionnaire (TSRQ). In the next paper, Eveline Wuttke and Jürgen Seifried focus on modeling and assessing diagnostic competence, in particular professional error competence, as an important facet of teacher competence. They present preliminary results of an empirical study of business education students. Christoph Metzger continues the discussion on diagnostics and deals with the potential and limitations of standardizing oral examinations in VET. He especially honors Professor Breuer’s contribution to this field of research.

The first three papers in Chapter V, the book’s final chapter, provide assessments of school autonomy in VET. Peter Nenniger concentrates on new Swiss business education and presents the results of an empirical study. Ralf Tenberg and Julia Warwas report on a meta-analysis on the subject of school leadership which can be used as guidance for German research in this field. In the next paper, Olga Zlatkin-Troitschanskaia, Jana Seidel and Martin Stump focus on teachers’ evidence-based actions. The authors discuss variations among teachers in different types of schools, brought together from the results of a new research project, EVIS. The last contribution to the book is by Thomas Deissinger. It is focused on the latest European structural development in VET: the European Qualifications Framework (EQF). In this paper, the question is discussed of whether the German Qualifications Framework can be used as an instrument to contribute to permeability and progression within the VET system.

We do hope that Professor Breuer will enjoy reading the various contributions written especially in his honor and, maybe, entering into a discourse with the authors of one or more of the articles that stimulate his objection or even his enthusiasm.

Mainz, Germany, August 2012
Olga Zlatkin-Troitschanskaia
Klaus Beck
CHAPTER I

BASIC RESEARCH CONCEPTS IN VET
Klaus Breuer and I met in the fall of 1974. I was a new assistant professor at Florida State University and Klaus was a graduate student from Aachen visiting American universities that were doing research investigating the link between computers and human learning. From that initial meeting until the present time, Klaus Breuer and I have collaborated on numerous research projects and have published books, research articles, and book chapters dealing with the fusion of European and American psychology in the field of instructional design. This chapter presents our joint efforts in defining an instructional theory which has and is the basis of our joint activities over the years.

INTERACTIVE COGNITIVE MODEL

Klaus Breuer and I both felt that defining our theory of learning would help us in developing our research in the area of problem solving and decision making. We started with the premise that in defining a learning theory to provide the psychological foundation for instructional theory we did not what to follow the usual practice in the traditional behavioral psychology theory of relying on reductionist models that had little practicality for education. Likewise, cognitive learning research was following, until recently, the conventional sequential approach of science; that is, studying the parts (or components) while ignoring the complexities that emerge as a consequence of the interaction of the component parts of the overall mental system. With the growth of complexity theory in the sciences (e.g., physiological (Li & Xu, 1987); and clinical psychology (Chubb, 1990; Lonie, 1991; Moran, 1991); strategic thinking (Mann, 1992); decision making (Richards, 1990); systems theory (Stevens, 1991); and instructional design (Tennyson, 1997)) that attempt to capture complexity of dynamic phenomena as well as sequential, it seemed appropriate to consider, for instructional theory, learning theories that view nonsequential as an inherent characteristic of the dynamic nature of learning and thinking.

Early attempts to describe cognitive learning followed the classical scientific method of trying to formulate laws that could explain learning via sequential
relationships. For example, the early information-processing models resembled computer system architecture with input/output boxes and arrows. It was quite easy to explain simple learning situations with such models but in situations with multiple dynamic conditions (e.g., time, anxiety, and environmental variables) it became increasingly difficult to predict learning outcomes. By the late 1990s, cognition had come to be viewed as a fluid-dynamic phenomenon that is adaptive to state situations (Steiner, 1997). Instead of a concrete sequential method of information processing, cognition self-adjusts, restructures, and constructs in highly unpredictable ways. The important concept in understanding cognition is that the many components (or subsystems) of the cognitive system flex and adapt in an infinite number of ways. Therefore, it is not possible to develop a sequential model to explain learning but rather we seek to define a structure that allows for learning and thinking to occur in a natural environment, taking into account experiences from the environment as well as the need to construct knowledge from existing knowledge in memory.

Rather than propose yet another cognitive learning model in the tradition of sequential models, we designed a model from a complexity theory perspective developed by Tennyson and Breuer (1997). That theory proposes an interactive cognitive model of learning and thinking (see Figure 1). The cognitive learning model provides an educational explanation for learning; the purpose of the model is to serve as a psychological foundation to instructional theory.

Model Guidelines

In preparing this interactive cognitive model, the guidelines employed by us were threefold. First, the model would have to address both the sequential and dynamic elements of cognition. Second, the model would have to deal with the interaction of content knowledge and cognitive strategies for higher order cognitive processes (e.g., problem solving, decision-making, troubleshooting, and creativity). And, third, the model would have to include affective elements as an integral component of the cognitive system.

The basic subsystems of the interactive cognitive model (Figure 1) include the following components; sensory receptors (sensory memory), executive control, affects, and knowledge base. The model also indicates two primary sources of information to the cognitive system: external and internal. External information enters the cognitive system through the standard sensory mechanisms whereas internal information is the result of the active interaction between the various subsystems and the executive control subsystem. External behavior is exhibited through the output of the sensory memory component.

Notice that the model does not represent a conventional information-processing model but rather a highly dynamic, interactive system that assumes constant integration of the various subsystems. Each of the components is now discussed in a sequential fashion, although this does not represent how the system operates.
DEFINING A LEARNING THEORY LINKED TO INSTRUCTIONAL THEORY

**Sensory Receptors Component**

The sensory receptors component includes the various ways in which external information is entered into the cognitive system. Information is conveyed through the sensory component and is passively registered in sensory buffers in more or less complete analogical form. These sensory registers are sometimes referred to as primary sensory memory. The information in this register decays rapidly and is easily interrupted. Attention- and perception-driven processes in the executive control component determine what subset of this information is selected for further processing because far more information is registered than can be processed and stored.

![Figure 1. Interactive Cognitive Model.](image)

**Executive Control Component**

Control of the cognitive system is usually referenced by some form of an executive processor. The executive control regulates the various components and cognitive abilities of the system in either active (i.e., meta-complexity; e.g., Streufert & Nogami, 1989; Suedfeld, 1992) or automatic (passive) means. Although cognitive theories differ on specific functions and their distribution in the complexity of the system, for the purposes of this section dealing with an educationally based learning theory, it is convenient to consider three primary executive functions: perception,
attention, and resources. It should be noted that in sequential information-processing models, the label short-term or working memory is used to describe many of the functions of this component.

Information coming from either external or internal sources passes through the perception function, which performs the cognitive processes of being aware of and assessing the potential value of, the external and/or internal information. In this function, the perception process services the cognitive system for the purposes of both directing attention and determining effort (i.e., resources). The attention function maintains an active interaction with the other components by the internal processing cognitive abilities.

Resources assist in the coordination of the various components of the entire cognitive system. Of importance in this function is evaluation of the effort associated with a given situation. For example, in most situations, there is an abundance of resources available, so determination is made on allocation of necessary resources. The resources function includes the following four processes:

- **Encoding** processes that, in concert with the perception function, deposit incoming information into the knowledge base;
- **Storage** processes that interact with the knowledge base component to create permanent records and increase the strengths of existing records;
- **Retrieval** processes that interact with internal processing abilities to obtain necessary existing knowledge from the knowledge base (there seem to be at least two different types of retrieval processes: controlled [i.e., meta] processes that are deliberate, conscious efforts interacting with the knowledge base and affects components; and, automatic processes that are highly developed and efficient interfaces with the other components); and
- **Maintenance** processes that keep information in an active mode so that it is not lost before it is stored in the knowledge base.

In summary, the executive control component manages the internal behavior of the system in terms of interfacing the various system components' cognitive abilities based on multiple and complex possibilities. Additionally, the executive component controls the output of behaviors. Behavioral outputs can range from automatic to deliberate conscious activities.

**Knowledge Base Component**

The knowledge base is the repository for previously acquired information – either external or internal. There is agreement in the psychological field that the knowledge base has no capacity limits and that knowledge is considered permanent, although it may become difficult to retrieve in certain situations. The knowledge base consists of domains of knowledge that can be described as complex networks (or schemas)
DEFINING A LEARNING THEORY LINKED TO INSTRUCTIONAL THEORY

of information (e.g., concepts or propositions). Within a domain, knowledge is organized into meaningful modules called schemata. Schemata vary per individual according to amount, organization, and accessibility. Amount refers to the actual volume of knowledge coded in memory, whereas organization implies the structural connections and associations of that knowledge, and accessibility refers to the cognitive skills used in servicing the domains of knowledge.

Within the knowledge base there are various types of knowledge: declarative, procedural, and contextual (Tennyson & Rasch, 1988). Declarative knowledge implies awareness and a meaningfulness of content (e.g., concepts, rules, principles) and refers to the knowing that; for example, understanding the meaning of the four basic functions of mathematics. Procedural knowledge implies a knowing how to employ selected concepts, rules, and principles with newly encountered problems. Contextual knowledge implies an understanding of knowing why, when, and where to employ specific concepts, rules, and principles. This knowing of why, when, and where is governed by selection criteria embedded within the organization of the domain of knowledge. Selection criteria are integrated within the knowledge base because of the interaction with the affects component during the acquisition process. The term contextual implies direct association with cognitive skills that are defined as domain-dependent cognitive strategies. As such, contextual knowledge represents a more complete understanding of human behavior that is necessary for defining an educational learning theory.

Affects Component

Since the 1950s, with the division of the cognitive and affective domains (Bloom, Angellaree, Furst, Hill, & Krathwohl, 1956), learning theories and instructional theories have labored with the construct that even though these two domains are not separate they need to be presented as separate. (Note that this is an example of the reductionist method used in psychology.) Cognitive psychology continued this practice of separate domains for cognition and affective (as well as the psychomotor) well into the 1980s. Only recently have certain cognitive psychologists discovered that the affective domain may actually dominate the cognitive (i.e., many of the constructivist ideas promote this concept; e.g., Brown, Collins & Duguid, 1989, with situated cognition; Harré, 1984; Vygosky, 1978).

Klaus Breuer and I brought the affects component directly into the total cognitive system because of the clear need in instructional design to have a learning theory that implies that the affective domain is integral to the development of learning environments.

As stated above, cognitive theories differ in details but have much in common, and the same is true of the affective domain. Given the complexity of the affective domain and the limited scope of this discussion, we only address some of the more identifiable affective variables. Also, because of their interactive nature and variability, we are listing the various types of affect without reference to hierarchy or value
R. D. TENNYSON

(see Figure 1). The list includes such complex personality variables as motivation, feelings, attitudes, emotions, anxiety, and values. The immediate interaction of this component within the cognitive system is with the executive control component that interfaces with the knowledge base component. For example, motivation influences both attention and maintenance processes. On the other hand, values and feelings would influence the criteria associated with acquisition of contextual knowledge. Anxiety as an affect variable influences much of the internal processing abilities. Along with emotions, anxiety can be a serious interfering variable in the cognitive system.

The implication for instructional theory of the affect component is the need to consider this component as an integral part of the acquisition of knowledge. In educational practice, the continuing effort is to separate the affect from the cognitive. For example, this is seen in the development of separate courses on ethics in professional studies (e.g., law) and in the education field, topics in character education (e.g., courses on respect and violence). In summary, the affect component needs to be considered during the acquisition of knowledge and as part of domains of knowledge.

Cognitive Strategies Component

The cognitive strategies component, in contrast to the knowledge base component that is concerned with specific content of human thought and action, is primarily concerned with the structural process of cognition and its effect upon behavior. This component of the interactive cognitive complexity-learning model has served to explain and, in many cases, predict human cognition and behavior for more than 60 years. Early forms of cognitive complexity theory were based on developmental psychology (e.g., Lewin, 1936; Mead, 1934; Schachtel, 1959; Werner, 1957) and constructivist psychology (Bartlett, 1932). The growth of cognitive complexity approaches to learning theory increased with the advent of relevant measurement techniques (e.g., Asch’s 1946 Impression Formation Task, the Role Concept Repertoire (REP) Test used by Bieri (1955) and Kelly (1955), the Sentence/Paragraph Completion Test of Harvey, Hunt and Schroder (1961) and the applications of multidimensional scaling employed by Breuer (1983) and Driver (1962)).

Initially, complexity theory considered only the availability and utilization of cognitive dimensions in human perception. Work by Bieri and associates (1966), for example, focused on the presence or absence of differentiated dimensions in interpersonal judgment. Harvey et al. (1961) proposed a model for the development of dimensionality and emphasized that higher levels of cognitive functioning must include the integration of differentiated dimensions. In addition to the two general cognitive abilities of differentiation and integration, contemporary science-wide complexity theorists offer a third type of cognitive ability when they refer to the growth of systems toward the edge of chaos, a level where optimal adaptive functioning is attained.
DEFINING A LEARNING THEORY LINKED TO INSTRUCTIONAL THEORY

At the edge of chaos, systems are viewed as undergoing spontaneous self-organization. Indirect or direct learning takes place. Order and chaos are most often kept in balance. Regulation of the system orients it to feedback from the environment but allows enough freedom to assure that the system can be creatively adaptive, that is, open to change. Interconnections among systemic elements are sufficient in number to generate dynamic functioning, but generally not so excessive that chaos would be generated.

Extending the early work from cognitive complexity with current concepts from chaos theory, Tennyson and Breuer proposed that the cognitive strategies component includes three primary cognitive abilities: differentiation, integration, and construction. Differentiation is defined as the twofold ability to understand a given situation and to apply appropriate contextual criteria (i.e., the standards, situational appropriateness, and/or values) by which to retrieve specific knowledge selectively from the knowledge base. Integration is the ability to elaborate or restructure existing knowledge in the service of previously unencountered problem situations. Construction is the ability both to discover and to create new knowledge in novel or unique situations.

CONCLUSION

The scholarly work that Klaus Breuer and I have collaborated on for 40 some years has lead to a fusion of European and American efforts to improve learning through the employment of learning theories and technology. This collaboration has resulted in peer reviewed publications and presentations at international conferences. Additionally, our work resulted in collaborative efforts with colleagues not only in Germany and the US, but also with scientists throughout the world from North America to Asia and most European countries. From that first meeting in Tallahassee, Florida, Klaus Breuer and I have developed through our respective graduate students a truly international network of scholars focusing on the fusion of human cognition and technology.

REFERENCES

R. D. TENNYSON


**AFFILIATION**

Robert D. Tennyson

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When in 1919 Max Weber presented his ideas of “Science as a Vocation” to an audience of students, science – at least in the European context – had a totally different societal meaning and was even a somewhat more difficult starting point for graduates than it is at the beginning of the twenty-first century. Weber, however, taps the pulse of the age, after some preliminary considerations, drawing his audience’s attention to the “inward calling for science [dem inneren Berufe zur Wissenschaft]” (Weber, 1922/1988, p. 588). Getting engaged with science also means getting involved in specialization, which is naturally associated with the inescapability of an ever imperfect scientific work. The researcher’s passion is opposed to the fact that all knowledge is limited in its validity and that it only seems to serve the purpose of being overcome or even rejected at some point in time.

The area of conflict Weber describes as lying between science as outer and inner vocation at first only refers to the academic occupation in its narrow sense. Its main concern is the formation of the academic habitus, which on the one hand follows the ideal of dedication to the research matter but on the other hand is constantly aware of the constriction by the organizational hierarchy (Oevermann, 2005). This is what constitutes science as the type of the unity of research and teaching and those who are following an academic profession have to bear this unity. Max Weber considers this to be the personal challenge for every scientist: teachers should not be prophets or even demagogues but instead they should stick to the facts of this world. This is the code of behavior in a disenchanted world and also the basic pattern of scientific teachers. For Weber the fate of his times is the parallelism of rationalization and intellectualization which both add up to the discharge of the monumental in science. Those who go into research have to content themselves and struggle with the small matters.

Weber’s considerations presented above also outline the foundations of research from a sociological point of view. In order to generate new insights, commitment to the pure matter of the scientific object is necessary. At the same time, this object is embedded in the context of everyday life, which makes research a balancing act between the most accurate description of the object and the responsible usage of insights into the living environment.
By pinpointing this field of conflict, Weber’s writing becomes a sociological link at the dawn of a new era in university history and also in the reformulating of scientific professionalism. In its beginnings in the Middle Ages, the European university was a place of vocational education. Subject matters of the higher faculties were aiming at specific professions with the faculty of arts presenting their propaedeutic. This situation changed in the nineteenth century inasmuch as due to the establishment of teacher education the faculty of (liberal) arts was able to establish its own professional orientation. During the time of these institutional reforms there was another, almost unnoticed change taking place which later turned out to be fundamental for academia. Based on the idealistic epistemology the method applied for gaining knowledge became more and more important compared with the subject matter (Stichweh, 1994). This development was the precondition for Max Weber’s understanding of science as a vocation, because only if the method guarantees the possibility of continuation of knowledge, can the content of knowledge be rejected. Only this allows for the extent of the continual coming and going of insight and the declaration of it as a basic scientific principle.

This bilayer structure, however, is the basis for a further evolution of a scientific vocation, because if the method constitutes science, there can be scientific occupations which allow for scientific professions outside of academia and also apart from classic academically educated professions in everyday life, like theologians, lawyers or physicians. The method itself, which can be typified with a subject matter, gains its own worth and also qualifies. People who are scientifically educated are not limited to one subject as they are able to work scientifically and methodologically. Science qualifies one for a job by absolving the educated person from the usualness of the profession. At the same time, these people are scientists above their jobs as they are also able to apply scientific methods. This context again shows Weber’s basic idea of a bilayer structure, although in a slightly shifted way. It is the (inner) commitment not only to the subject matter but mainly to the method which is typical of science as it has no counterparts in the (outer) professional world.

SCIENCE, VOCATION AND BOLOGNA

This idealization, however, can only take place under certain societal and economic conditions. In times of confusing and unclear market conditions, a broad methodological knowledge does not guarantee job security any more. When there are too many graduates with unspecific competencies entering the labor market, qualification becomes a problem. The European universities have started reacting to this by a re-specification of the scientific method. Scientific work is combined with qualifications needed for the job. This approach is not new as the different disciplines have always been closely associated with specific fields of work. But due to the fact that the method as opposed to the subject matter excelled itself as the nucleus of science, many degrees remained somewhat unspecific. Graduates usually gained their degree in a main subject, which they had studied with some aspects in depth,
but still completed their studies with a rather generalist degree. The Bologna reform now offers the structural possibility for the curricula of the courses to represent the inner differentiation of the disciplines, which is done by the gradation of the different study courses. The apportionment of two or three phases of studies allows for a functional refinement of the courses, which for example also enables students of one subject after graduating with a generalist Bachelor’s degree to choose from several, sometimes highly specialized, Master’s programs.

In terms of the sociology of profession, this development remains multi-layered as the disciplines as well as their forms of organization (universities and associations) only half-heartedly react to societal changes. Whether specialized study courses actually enhance graduates’ qualifications for labor market demands remains unclear. The scientific education is not specified regarding certain fields of work but the scientific community offers a more nuanced distinction of their methods. Many Master’s programs offered do not describe professional fields of work but rather show how to work scientifically on specific questions, which is in line with the market inasmuch as the professions themselves have lost their clear arrangement. Matching academia and profession also means that it is no longer professions that systemize work but rather complex and highly interrelated patterns of work that after all are not too different from the formality of the scientific methods.

By differentiating between outer and inner vocation, Weber indicates that the scientific work implies some aspects that will certainly have consequences for how the reality of university work is represented in higher education teaching. Scientific work means following the rules of methodology on the outside which does not necessarily include a research approach which is guided by curiosity.

Research is more than scientific work – a fact that has been emphasized by the federal conference of lecturers (“Bundesassistentenkonferenz”) in their statement in favour of research-based learning (1970). The antecedence of this method is only half the truth as research is part of the scientific self-conception, although in many scientific occupations people work with scientific methods without actually doing research. Research is distinguished by freedom of choice of method, taking detours and the fruitful experience of making mistakes.

SCIENCE AND LEARNING STRATEGIES

To sum up, it can be said that the loneliness of the mind (Schelsky, 1971) is central to research which consequently guides attention to learning to learn and learning strategies – or, with Max Weber: Science only suffices for the inner vocation when it is appreciated and lived as a learning process, i.e. self-regulation of the person. This is how Weber’s considerations establish the basis for a sociological rationale of the relevance of self-regulated learning. The research process actually is self-regulated learning and thus studying any science can only take place with an appropriate amount of self-regulated learning, which is on the one hand basic to the scientific vocational training and on the other hand the condition sine qua non for working in
a scientific profession – the outer as well as the inner one. Consequently, higher education is vocational education in this sense, because the scientific profession means working self-acting according to the rules of the scientific methodology. It takes a second step and a specific context for this academia to become a field of practice. A physician heals patients, the lawyer represents his clients and the priest counsels the believers, and all do so based on their scientific education. This fact becomes even more apparent with study courses which are not traditionally linked to specific professions. As graduates are trained scientifically, they have a high versatility and are able to – or at least expected to be able to – familiarize themselves quickly with a new environment. The opposite, however, also holds true: that scientific nature actualizes itself only in a professional sphere of action. Researchers in universities as well as the people working in scientific occupations are professionals who shape their scientific nature into a specific form. This supports the statement that higher education is vocational training. With the primacy of the method, science can only be understood as a profession, which is what makes universities a place for vocational training per se. It can be stated that this is the deeper meaning of the Bologna process. The production of knowledge becomes a global business, for the complexity of which the differentiation of the borderlines between the classical scientific disciplines was not sufficient. Furthermore, the list of scientific disciplines cannot display the professional world anymore which is why scientific methods have to build the basic structure of scientific work so that subject matter and knowledge can be added flexibly. Regarding the Bologna reform, this is done by the Dublin descriptors, which describe generic competencies and by that show how science can be understood as a yet unspecific vocation (Joint Quality Initiative, 2004). Through this, the European Qualifications Framework becomes a frame of reference, as the generic competencies describe what constitutes science as a profession (Bologna Working Group on Qualifications Framework, 2005). The subject-specific competencies only serve as a kind of refinement of the primary and broad scientific competencies.

Basic requirement of the gradation of scientific capability in the Dublin descriptors is the adequate implementation of strategies of self-regulation in the learning processes of science. Without self-regulation, the continuing qualification from the Bachelor to Master and PhD degree can be accounted for by neither learning theory nor profession theory. Only those students who learn science as a matter of self-regulation can contribute to research and knowledge gain. This is how research-based learning can use research structures as a model for its pedagogical work and research can use study programs for the same matter, which contributes to self-regulation as a microstructure of scientific knowledge gain.

The forms of self-regulated learning take up these reciprocal references and thus contribute to the claim of the unity of research and teaching (and learning) (Breuer, 1992). Research in the sense of reflexive affirmation of learning progress in cognitive reclaim can only work when metacognitive and motivational aspects are effectively combined in the process (Eugster, 2011). These combinations are highly
contributive in successful learning and teaching arrangements (Beck & Breuer, 2002; Breuer, 2002; Breuer & Tennyson, 1995). In short, science as a vocation and thereby higher education as vocational training are influenced by the same terms of learning and instruction as are models of self-regulated learning (Eugster, 2004).

SELF-REGULATED LEARNING PROCESS

Self-regulation, autonomy, self-organization and self-development are concepts which are discussed in all areas of education but specifically in vocational education and training (cf. in summary Breuer & Brahm, 2004; Breuer & Eugster, 2006; Nenniger, 1999; Straka, 2001; Wosnitza & Eugster, 2001) and show a great variety of concepts and perspectives which can be divided into two broad threads (Candy, 1991):

• self-regulation as a learning goal within the sense of autonomy and
• self-regulation in the learning process.

This paper focuses on the latter, which can again be divided into two areas: on the one hand the learning environments which promote self-regulation, such as cooperative learning, e-learning, experiments, research based learning, case studies or problem based learning (e.g. Reich, 2006), and on the other hand the individual learning process itself and its conditions and pre-conditions. Not only the examples mentioned above but also social constructive approaches (Hickey, 1997) show that self-regulated learning – unlike some notions in the literature – is not necessarily a solo-learning approach with an individual regulation process but it does also appear in cooperative learning settings (Konrad, 2005) with the necessity of cooperative regulation processes (co-regulation) by the members of the group. Against this background, a number of researchers have defined or modeled self-regulated learning from their particular research perspective. Even though these definitions and models vary considerably, two basic areas that seem to be highly significant to self-regulated learning can be identified:

• Conditions of the learning environment and the macro context which influences the self-regulated learning process and
• Cognitive, motivational, emotional and metacognitive processes and preconditions in the self-regulated learning process.

Figure 1 postulates the interrelation between these attributes. The core of the model is the interplay of the individual learner’s use and availability of learning strategies, his motivation and emotions as well as cognitive and metacognitive regulation processes. This is embedded in the particular learning environment. This central element of the model describes the current learning process, which a learner or a group of learners enters with their individual pre-conditions like prior knowledge or experiences (Volet, 2001b). Moreover, the learning process is influenced by further variables which are not directly related to the actual learning process. These aspects
can be of formal nature like rules and regulations, of social nature like family or peers and of material nature like available resources (Wosnitza & Beltman, 2012).

![Diagram of Self-Regulated Learning]

**Figure 1. Self-Regulated Learning.**

### ILLUSTRATIVE STUDIES

To illustrate some of the relations postulated above, results from three different empirical studies conducted by the authors will be presented. The empirical research described reflects a variety of quantitative and qualitative methods. For each example, the specific components of the framework will be identified and defined. Furthermore, the learning environment, the research questions, sample and methods shall be described and followed by the presentation of some key findings.

The first example, study 1, examined how far cognitive, motivational and metacognitive regulation strategies of students preparing for an exam in a teacher education program are influenced by the subjective perception of the classroom situation. Study 2 examined how experiences with group work are related to the learning emotions in a collaborative learning environment in education and study 3 investigated the co-regulation processes of groups of students in a problem-based learning environment in a program on industrial education.

**Study 1: Motivation, Regulation, Learning Strategies and Learning Environment**

Study 1 investigated how student motivation, regulation and learning strategy use were affected by the learning context (Wosnitza, 2000, 2004; Figure 2).

German education students were asked about their perception of social aspects of the learning context and their use of learning and regulation strategies and their motivation while they were preparing for an actual exam. About 85% of the 173 participants were female. The research question was: How are the motivation and use
of regulation and learning strategies of an academic learner related to aspects of the learning environment when preparing for an exam in education?

Students completed a questionnaire consisting, among others, of the following, self-developed scales:

- **Motivation**: Interest, Motivation
- **Learning strategies**: Implementation
- **Regulation strategies**: Metacognitive control, Cognitive control
- **Learning context**: Teacher Behavior, Classroom management, Sense of Autonomy, Classroom Atmosphere.

The results of a Linear Structural Equation Model (Chi-Square with 48 DF = 43.4 (p = 0.66), RMSEA = 0.0, GFI = 0.96, AGFI = 0.93) showed that students’ interest has a significant effect on the use of regulation strategies and the regulation strategies on the learning strategy implementation. All these variables were directly or indirectly influenced by the subjective perception of the learning context (Teacher Behavior, Classroom Management, Sense of Autonomy, and Classroom Atmosphere).

Overall, this study showed that central variables of a self-regulated learning process are interacting with each other and are influenced by aspects of the actual learning environment.

**Study 2: Experiences with Group Work and Learning Emotions in Group Work Settings**

Study 2 investigated how students’ experiences in a self-regulated collaborative learning environment can influence the learning emotions in an on-going group working setting (Kimmel & Wosnitza, submitted for publication; Figure 3).
In this study, 338 teacher education students who completed a mandatory, assessed group task in self-generated groups of three to five members were asked about their appraisals of group work based on their former experience with group work at the beginning of the collaborative learning setting and about their learning emotions during the group learning situation. The research question was: How do students’ appraisals of distinct dimensions of the group assignment resulting from their experience with group work predict their emotions in a group work environment?

Appraisals were measured with the SAGA (Volet, 2001a) which measures students’ appraisal of group work in five dimensions: Cognitive Benefits, Motivating Influence, Assessment, Management and Interpersonal. Emotions were measured with a newly developed instrument (Wosnitza & Kimmel, 2010) with three scales: Positive Activating Emotions, Negative Activating Emotions and Negative Deactivating Emotions. Multiple regression analyses were carried out to examine whether students’ multi-dimensional appraisals of the group assignment serve as significant predictors for students’ emotions.

The results of the multiple regression analyses revealed that students’ multi-dimensional appraisals of the task at hand predicted 60% of the variance in positive activating emotions ($R^2 = 0.60$, $F(5,333) = 97.50$, $p < 0.001$), with Motivating Influence making the strongest contribution ($\beta = 0.60$, $p < 0.001$), followed by Cognitive Benefits ($\beta = 0.17$, $p < 0.001$). Moreover, students’ multi-dimensional appraisals of the group assignment also accounted for more than half of the variance in negative deactivating emotions ($R^2 = 0.58$), which was highly significant ($F(5,333) = 92.04$, $p < 0.001$). Motivating Influence ($\beta = 0.30$, $p < 0.001$) and Assessment ($\beta = 0.25$, $p < 0.001$) demonstrated the strongest significant effects on negative deactivating emotions, while Management ($\beta = 0.17$, $p < 0.01$) and Cognitive Benefits
(β = 0.10, p < 0.05) also made significant contributions. Finally, the multiple regression analysis revealed that students’ multi-dimensional group work appraisals predicted only 8% of the variance in negative activating emotions ($R^2=0.08$, $F(5,333)=6.28$, $p<0.001$), with the Interpersonal dimension being the only significant predictor ($β = 0.32$, $p < 0.001$).

Overall, this study shows how prior experience and appraisals have an influence on the learning process and more specifically how appraisals based on experiences can predict students’ emotions in group work.

**Study 3: Co-regulation of Group Work Learning Processes**

Study 3 is a pilot study investigating how students co-regulate their learning process in a problem based cooperative learning environment (Figure 4). Groups of five and six students studying a problem in the context of a unit in the Bachelor program in Industrial Education were video-recorded. All participants were female. The data were analyzed using a coding system which describes dimensions of regulation processes in cooperative learning settings by Volet, Summers and Thurman (2009), who distinguish between:

- high level co-regulation – various group members are mutually developing new knowledge
- high level individual-regulation – one group member is developing new knowledge
- low level co-regulation – various group members define or clarify aspects and questions regarding the task
- low level individual regulation – one group member defines or clarifies aspects and questions regarding the task.

One of the research questions of this study was to find out whether all successful groups regulate their learning process similarly. It was postulated that successful groups are groups with regulation processes that are dominantly of the type “high level co-regulation”.

The results show that this is not the case. All groups showed different amounts of high level regulation processes. They lay between 21.0% and 33.8% of all coded incidences. High level co-regulation lay between 7.0% and 16.0% and high level individual regulation between 14.1% and 24.8%. All other incidences were coded as low level individual or co-regulation or organization of the task. Overall, the analyzed groups were very different regarding the way they regulated their group learning process but were all on task (in average only 4% off-task behavior). What can be said is that all groups that solved the task successfully were using high level regulation strategies although it is not the dominant regulation strategy. The study furthermore shows that it is necessary to take a more detailed look into group processes in order to understand what is really happening when groups are regulating their learning processes. This requires a broader methodological approach since
survey studies alone, as often used when analyzing regulation strategies (see also study 1), can only scratch the surface of this phenomenon.

Figure 4. Focus of study 3.

DISCUSSION

Universities have increasingly become places of vocational education and training and thereby places in which students gain a professional qualification. This development could in a way be considered an estrangement of Humboldt’s university concept. For Humboldt, higher education only marginally implied the gain of content knowledge but above all the individual development of personality and general education (“allgemeine Menschenbildung”). In a report to king Friedrich Wilhelm III. in 1809 he wrote:

Fängt man aber von dem besondern Berufe an, so macht man ihn einseitig, und er erlangt nie die Geschicklichkeit und Freiheit, die nothwendig ist, um auch in seinem Berufe allein nicht bloß mechanisch, was Andere vor ihm gethan, nachzuahmen, sondern selbst Erweiterungen und Verbesserungen vorzunehmen (Humboldt, 1809/1996, p. 218).

[…but if one starts with the special profession, one makes it one-sided to oneself and it never reaches the skillfulness and autonomy that would be necessary in one’s job not only to imitate mechanically what others have done before but to carry increments and improvements out oneself…].

This idea is known today under the terms key qualification or generic competencies and constitutes a central requirement in all systems of vocational education and training. Even if Humboldt was opposed to the idea of a professional qualification at universities, his idea of an “allgemeine Menschenbildung” [“general education of humans”] is as relevant to vocational education today as it was in his days.
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One other aspect can be found in Humboldt’s concept: Precondition of any education is the presence of autonomy and the freedom from constraints and force or, in our words, the possibility to self-regulate one’s learning processes. For that, universities have to be places of self-regulation and autonomy and our universities are exactly that. Despite the criticism that teaching at universities – with some exceptions – is still dominated by lectures, the predominant part of studying at university clearly is self-regulated by each and every student him- or herself. The studies presented in this paper discuss some different aspects of these self-regulated learning processes and show the interaction of the individual learning process including its motivational, cognitive and metacognitive elements with the learning environment in which the learning process takes place. It furthermore discusses the relevance of individual pre-conditions for this learning process to be successful.

The studies presented here also indicate the potential of linking research in teaching and learning research to educational theory. What Humboldt postulated as autonomic identity formation of the learning individual gains its instructional potential in models of self-regulated learning. This also is exactly the appropriate reading of Max Weber’s analyses of the professionalism of research in the twenty-first century. Universities are places of internal and external vocational education, since they foster students to become autonomous academics and are based on established models of self-regulated learning.

NOTE


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TRAINABILITY, VOCATIONAL SKILLS AND EMPLOYABILITY

Different Stories Relating to Basic Skills and Work Virtues?

INTRODUCTORY REMARKS ON A VERY “GERMAN” DEBATE

The following refers to the discussion about what young people looking for training places should have to offer just at the beginning of their entry into the system of vocational education and training. On the one hand, the discussion of trainability (“Ausbildungsreife”) is a very “German” one. It refers to a long tradition related to unskilled workers (“Jungarbeiter”), goes back to the 1920s and had an intensive culmination in the 1960s to 1980s. This led to actual concepts with differentiated lists of criteria and features about how providers and consumers should use the term “trainability”. On the other hand, advances in European unification have introduced new lines of argumentation, like the debate on employability, into the German context. The question investigated in this article is to what extent actual concepts of trainability are influenced by these lines of discussion, implicitly or explicitly.

In the next section a short introduction to the general context of this discussion is presented, followed by the explication of the key categories like “Beruf” (profession) and “Beruflichkeit” (professionalism) in the German debate (third section). Subsequently, the main lines of the debate on employability are pointed out (fourth section) before critical analyses of actual German concepts for trainability are presented (fifth section). In the sixth section are reflections about vocational skills between formal vocational training policy making and empirically based structures. Finally, the considerations presented in this article close by bringing to mind critical reflections about the crucial relationship between vocational education and training and the requirements of the labor market (seventh section).

SKILLS NEEDED FOR WORK AND EMPLOYMENT INVOLVING VARIOUS INTERESTS AND LINES OF DISCUSSION

The development of skills in vocational training and in employment provides a key focal point for various institutional groups as well as for those seeking such training. These groups include vocational and educational policy makers, employers, employee representatives, non-governmental providers, professional schools and
last but not least young people in education and training. Given the increasing net-
working in employment markets and the attempt to create politically agreed condi-
tions for managing this networking in the European Union, the European debate is
exerting increasing influence on the traditions relating to each nation state (for labor
market developments see e.g. Belke, 2011; Statistische Bundesämter der Länder,
2012). These influences are becoming more prevalent, and this is happening against
the background of increased pressure on skills profiling (for vocational training
see e.g. Descy & Tessaring, 2000; Baethge, Achtenhagen, Arends, Babic, Baethge-
Kinsky & Weber, 2006). Efforts are being made to ensure that the agreed European
qualification framework is subject to national regulatory frameworks. The political
agreements might make it possible to achieve and safeguard equivalent transnational
and national outputs in learning at educational institutions, enable comparisons for
informal learning, and provide arrangements for their formal recognition, facilitat-
ing transnational mobility in training and work.

The significantly different structures in national labor markets and employment
systems, on the one hand, and in vocational training systems on the other, require
close management of the terms chosen for these international statutory frameworks.
This is not only reflected in the transnational European context but it also becomes
evident in the debates taking place in each country and in decisions in the fields of
regional vocational and educational policy as well as economic and employment
market policy (c.f. e.g. the contributions in Brockmann, Clarke & Winch, 2011).
However, the study by Brockmann, Clarke, Winch, Hanf, Méhaut & Westerhuis
(2011) shows that this venture entails some practically insoluble problems.

In Germany, particularly when looking at the output from state schools, we see
intensive expert policy advice and the effects of this advice on developments in
policy decision making; this affects the definition of educational standards as well as
the setting up of organizations for carrying out surveys to monitor learning through-
out parts of the country. In the area of vocational training and the related regulatory
framework, we could almost talk of “resistance to advice” in the relevant processes
of negotiation and political decision-making vis-à-vis expert advice (c.f. e.g. reac-
tions to the feasibility study of Baethge, Achtenhagen et al., 2006).

In view of these complex and controversial conditions and interests, we can focus
on the issue under discussion on at least two levels, i.e. on the vocational and edu-
cational policy level, on the scientific level of defining and measuring competences
and skills, as well on the interaction between these two levels. This also raises the
question of how and in what way the two levels interact. Dewe (2009) describes
these processes as a concept cycle, Brosziewski (2009) as “semantic shifts in the
ways the education system defines itself”.

The following discussion focuses on the policy level, while being aware that this
might curtail the view of the overall subject. The issue of reliable and valid assess-
ment of the competences acquired in education and employment requires theoretical
models and related tools for assessing these competences, and will not be considered
here. These models are tools suitable to the specific competences, the associated
performance and the contexts of education and employment (see also e.g. Winther, 2010; Nickolaus, 2011; Nickolaus, Abele, Gschwendtner, Nitzsche & Greiff, 2012).

PROFESSION (“BERUF”) AND PROFESSIONALISM (“BERUFLEICHKEIT”) – KEY CONTROL CATEGORIES IN GERMAN DEBATES

Work ethics (“Arbeitstugenden”), extra-functional skills, employability, trainability (“Ausbildungsreife”), vocational skills (“berufliche Kompetenzen”) and vocational aptitude (“berufliche Handlungsfähigkeit”) – the list of terms mentioned in the context of this discussion could certainly be expanded. Against the background of the European debate, it is obvious that even for basic terms such as “knowledge”, “competence” and “skills” it is very difficult to find suitable translations (see e.g. Brockmann, Clarke, Winch, Hanf, Méhaut & Westerhuis, 2011, pp. 168ff.). The translation of German terms into English and vice versa remains particularly precarious (see e.g. Méhaut, 2011 for differences with the French).

“Beruf” – Key Concept for the Provision of Training and Employment and for Users and Employees

Reuling (1998) and Hanf (2011) examine the European debates on work-related competences, skills and abilities; for these authors the word “Beruf” denotes a very specific German debate (see e.g. Greinert, 1998; Lipsmeier, 2000; Raeder & Grote, 2005; Lempert, 2006). This leads to profound and, to a certain extent, irreconcilable terminological and conceptual differences, for example, looking at the German and the English terms for “competence” and “skills”.1 In the German tradition, the concept “Beruf” and the vocational training and the regulatory policy structure associated with it have a key management function (see e.g. Arnold & Gonon, 2006, pp. 72ff.). This applies especially to the organization of processes of allocation, particularly the transition from secondary education into the vocational training system, and the integration into the employment system.2 The significance of “Beruf” is associated with the ever-dominant role of the dual system of vocational training (see e.g. Datenreport zum Berufsbildungsbericht, 2011, A3.1; Hoeckel & Schwartz, 2010). Furthermore, it arises from the fact that despite obvious structural changes the profession-based organization of the labor market and employment system plays a key role in Germany (see e.g. Apitzsch, 2010).

According to Kurtz (2005, p. 89), the notion of “Beruf” is “still an important structural component of the life course” (see also e.g. Corsten, 2001; Lauterbach & Weil, 2009). In this sense, “Beruf” for the majority of the population remains a significant factor in terms of providing purpose, a means of engaging and participating in society and offering wide scope for individuals to interact socially. It also functions as a “source of self-esteem and self-image” (Kurtz, 2005, p. 89; see also Lubecki, 2002). In his biographical study Heinz (2002) points out various ways in which the individual relates to his/her “Beruf”, career etc. He also shows that
“Beruf” provides a highly significant pattern of orientation that is largely intact. For Geißler and Geramanis (2001, pp. 41ff.) the term “Beruf” is problematic in that it facilitates the control of allocation processes to secure privileges associated with status. Although Lempert (2006) takes a critical view of “Beruf”, he still recognizes the important function of this concept for providing order, assignment and identity.

**Professionalism ("Beruflichkeit") – A Guiding Principle Interlinking Vocational Training and the Employment System**

When we look at the increasing dynamics in the labor market, particularly with regard to the restructuring of workplace structures and processes affecting many sectors and industries, it is difficult to distinguish the different workplace structures reliably by using the category of “Beruf” (see for example Spöttl, 2005; Petersen, 2008). There is also a growing danger of the aforementioned dynamics disengaging the curricular redesign of vocational training from the rhythms of transformation. And there is the risk, too, of offering “obsolete” content that has diminishing objective and subjective relevance to the self-image and self-esteem of the student looking for vocational training.

In this context, the concept of professionalism (“Beruflichkeit”) has a dual function:

(a) It is aimed at the process of systematic alignment as regards the organization of defined requirements in activities and processes, on the one hand, and the highly regarded competence structures of the employed person on the other (see e.g. Rauner, 2005, pp. 14ff.). According to Rauner’s theories on “open and dynamic” professionalism, young people and young adults encounter this in the area of vocational training processes in their education and further training; employees experience professionalism as part of their activities in the workplace. If employment, however, takes place in so-called “unusual working conditions”, the actual realization of professionalism (“Beruflichkeit”) and the contribution it makes to safeguarding vocational training processes becomes extremely fragile. Given the changing dynamics in the employment system indicated here, professionalism might, according to Rauner, have no precise determinable “exterior”. It functions as a framework of orientation providing a tremendous asset related to a socially accepted maxim (for a critical view see e.g. Geißler & Geramanis, 2001, pp. 51ff.). With regard to the multi-level model of Bronfenbrenner (1981), theories on professionalism apply from the macro-system level across the various system levels to the micro-system level.

(b) According to Rauner (2005, pp. 14f.), professionalism (“Beruflichkeit”) manifests itself not least in the fact that cross-professional activities and the carrying out of such activities in the workplace and cross-professional competences are not only “tolerated” but actively taken on board. The latter provide important interfaces both for the successful completion of training in recognized training-based occupations
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(“anerkannte Ausbildungsberufe”) and the acquisition of vocational skills as well as for the successful development of the courses of careers and employment. One consequence of these considerations is the assumption that, on the level of vocational training, professionalism should find its conceptual differentiation in such phenomena as “trainability” and “vocational skills”.

EMPLOYABILITY – EUROPEAN LINES OF DISCUSSION

The European Qualifications Framework as an Instigator for the European Dissemination of the Concept of Employability

The following has recently become clear from looking at the creation of the European Qualifications Framework (EQR) and the National Qualifications Framework (NQR): As a result of developments instigated by the European Union, there is mounting pressure to ensure that results of educational and training systems can be compared, as well as any skills acquired by individuals through their work activities. In order to achieve this, a politically negotiated and “economically manageable” regulatory framework was set up. It should be used in such a way that the outputs from learning and working might be compared in sufficiently reliable terms (see e.g. articles published by the Bundesministerium für Bildung und Forschung, 2005; Arbeitsgemeinschaft Betriebliche Weiterbildungsforschung, 2006; Gnahs, 2011, in particular pp. 74ff.). For these considerations, economic and labor market considerations formed a striking point of departure. They are based on a key conceptual understanding of what is meant, for example, by “jobs” and “occupations” and to a lesser extent “trades” (see e.g. Clarke, 2011). Considerations regarding “Beruf” and the profession-based organization of the labor market play almost no role.

The criticism of the politically negotiated categories and their significance is obvious, relates to the conceptual design of key categories, and is relatively sharp (see e.g. “Fachlicher Prüfbericht zu den Grundbegriffen und Deskriptoren des Entwurfs für einen Europäischen Qualifizierungsrahmen” dated 22nd May, 2006). It is therefore not surprising that the ITB Working Group (2008) believes that the aim of the EQR to specify areas and cross-professional skills is empirically unsustainable. In their feasibility study, Baethge, Achtenhagen et al. (2006) put forward a proposal that describes the necessary preparatory work for developing such a framework; they highlight the fact that the process chosen with the EQR and the NQRs generates a purely formal point of comparison. However, it turns out that via the political acceptance of the EQR, concepts enter into national debates on skills auditing, on the one hand, and on the regulation of educational and training systems on the other. These are heavily oriented towards labor market policy. There is also a growing danger that the educational and training system will be subordinated to the needs and requirements of the employment system (see Heid, 1977 for a critical view of this issue).
Employability – Maintaining Work Force for the Internal and External Labor Market

The Anglo-American debate on employability, in particular, and the ideas associated with it, are very significant for vocational educational policy (see for example Powell, Bernhard & Graf, 2011, p. 2). With the implementation of the NQR, here of the German Qualifications Framework, one might assumption that the discussion on employability will exert increasing influence on the German debate, too. Against this background it is not surprising that the ideas addressed in the EQR are used as a basis for defining the terms “competence” and “skills” (see e.g. Brockmann, Clarke & Winch, 2011). Moreover, there is an obvious link to the current debate on “key skills” in the context of work and work-related activity (see e.g. Nijhof & Streumer, 1998; Bahl, Camerer et al., 2009). Almost sequentially, primarily education- and training-based concepts on key competences and skills like that of Mertens (1974), which has influenced the German debate for a long time (see e.g. Thoma, 2011, pp. 117ff.), can attract only marginal significance in this European wide discussion (see also van Buer, 2012).

The debate on employability has led to a wide range of definitions and ideas (see e.g. McQuaid & Lindsay, 2005, p. 199). The conceptual clarifications vary considerably depending on whether they focus more on (a) the characteristics of those seeking employment or those in employment or more on (b) the supply of work and workplace structures or more on (c) the interaction between (a) and (b) (see e.g. McQuaid & Lindsay, 2005, pp. 197ff.). De Vos and De Hauw (2010, p. 6) highlight the following: In the concept of employability, the viewpoint of the labor market is usually taken relatively strictly, both with regard to the external labor market and the internal (company) labor market (for the latter see e.g. Geiger, 2012). Learning as a systematic approach to working conditions plays no role, and is probably the investment in learning that the individual has to make. Overall, there is a group of economically based concepts. These are used in relation to employment policy (such as the integration of unskilled workers into the employment system; see e.g. McQuaid & Lindsay, 2005, pp. 197f.) and at the level of the individual company. In their paper, which is published as part of the series of Official Publications of the European Communities, Pacelli, Devicienti et al. (2008, p. 14) describe employability as the ability of workers to remain attractive for the labour market in terms of their skills and qualifications, by reacting and anticipating changes in tasks and the work environment, facilitated by the human resources development opportunities offered to them. [Overall this is about] marketability of individuals’ cumulative skills.

Informal learning at the workplace is certainly ‘implicated’ implicitly, in some concepts explicitly (see e.g. Gnahs, 2011, pp. 36f.; for informal learning at the workplace see the study by Frieling, Bernard, Bigalk & Müller, 2006). In these concepts, however, the responsibility of making the workplace an attractive pool of human
resources (see e.g. Arocena, Núñez & Villanueva, 2007) is still essentially understood as an input the individual is responsible for and has to bring to the workplace. The focus is on skills, abilities, attitudes etc. which are regarded in horizontal terms (economy, industry and trade) and in vertical terms (simple work to complex work structures) as being non-specific to the workplace. Cotton (1993, pp. 3f.) factors in:

(a) basic skills such as reading, writing and basic mathematical skills
(b) problem-solving skills, creative thinking and ability to learn and
(c) affective and motivational characteristics such as willingness to take on responsibility, positive attitude to work etc.

There is also regional mobility and willingness to compromise (concession of economic requirements for employment; see also the German study by Apel & Fertig, 2009).

The question is to what extent there are similar forces at work in the “German” concepts of trainability and vocational skills, providing indicators for a European convergence of vocational training and labor market policy discussions.

TRAINABILITY AND VOCATIONAL SKILLS – TERMINOLOGY BETWEEN THE DESIGNATION OF “TRADITIONAL” WORK VIRTUES AND PSYCHOLOGICALLY BASED CHARACTERISTICS OF PERFORMANCE

By approaching the questions above, we might expect an answer that draws our attention to the peculiarities of the German debate which in particular defines the boundaries of the debate on employability, boundaries that are created to address the concepts of “Beruf” and “Beruflichkeit” and the dual system of vocational training.

The “Young Workers’ Debate” – a “Stable” Basis for the Current Discussion on Trainability?

The debate on what constitutes successful learning in vocational education and successful integration into employment once again became topical in the 1960s. At that time, the keywords were “young workers” or unskilled workers (“Jungarbeiter”). The debate also raised questions regarding the training they needed or might need in the vocational schools (see e.g. Abel, 1960; Höhn, 1974). In the 1980s the debate was again resumed about the Weimar Republic regarding those who were not competent enough to work or the youth that was not “ready for work” (see e.g. Seubert, 1984). In their report on trainability, Dobischat, Kühnlein and Schurgatz (2012, pp. 13ff.) emphasize the change of perspective since at least the 1970s in the relevant debates, a change which has made an impact on the debate on employability: It is about the relativization of the importance of the quality of training programs the companies should establish to offer to trainees versus the increased emphasis on the degree of trainability young people should offer to companies.
Relevant studies on young or unskilled workers, such as those by Kuhlmeyer and Blume (1966), Jaide (1969), Godehart (1972), Griesewelle (1977), Schweikert (1979), Bunk and Schelten (1980), Kloas and Stenger (1980), Kloas (1981) etc., draw attention to the following (for a differentiated study see Höhn, 1974; for a critical evaluation of these studies see Kell, van Buer & Schmidt, 1984): The relevant publications almost all highlight inadequate levels of knowledge; and for large numbers of young people they indicate major shortcomings particularly in regard to “work virtues” required for the job by the training provider and subsequently by the job provider (see the title of the study by Möller, 1966). The main thrust of the debate on young workers that took place between the 1960s and the mid 1980s focussed on shortcomings with regard to necessary work virtues. These were particularly apparent with applicants for training places with no basic or very limited school-leaving qualifications.

In many of the studies relating to unskilled workers, a critical analysis was made to identify what is meant by the term “work virtues” and what interest groups mainly point out as shortcomings (see e.g. Schwark, 1981; Seubert, 1984; also Kell, van Buer & Schmidt, 1984). In the debate on vocational educational policy, however, the impact of this critical thinking was barely noticeable. As a consequence, in the discussion on the conceptualization of “work virtues” in the sense of what young people should be able to offer to providers or enterprises the debate in ongoing (see Dobischat, Kühlein & Schurgatz, 2012, pp. 68ff.). To the contrary, the pointed question what sustainable training quality the companies should offer developed nearly no active pressure. Compared with this, there was only limited impact on organizations to take tangible action (for conditions conducive to development of “work virtues” see e.g. Lempert, 1993; 2011).

The range of words used to describe what young people should be able to offer covers various “work virtues”. This depends on the origin of the training sites or labor market sector. There is considerable semantic variety used depending on the place of work or training context. However, they all include the following: “readiness to work hard”, “punctuality”, “cleanliness”, “discipline”, “respect/ manners”, “conscientiousness”.

As the Swiss study by Stalder and Stricker (2009) illustrates, the above terms still carry a lot of weight. This is because – and this could be expressed as an assumption – they convey important everyday signals of communication. Furthermore, they also have a high level of acceptance (see Gaus, Hoffmann & Uhle, 2007) – almost in the sense of being society-based models for training and work.

*The Concept of Trainability – a “Wish List” Used as a Meta-Framework?*

As indicated above, one can regard the debate on trainability (“Ausbildungsreife”) as a response to the still unresolved problem of the unskilled. The fact is that over the last five decades in the Federal Republic of Germany there has been a significantly and consistently large group of young people who were subsumed under this term.
Society is and has responded to this in a variety of ways. The response includes a demand for more schooling (see e.g. Abel, 1960), increased choice of job-based training courses (see e.g. Bundesagentur für Arbeit, 2009) and the development of so-called non-theory based courses (see Bundesinstitut für Berufsbildung, 2012, Abbildung A4.3-2). Overall, in Germany, this led from the 1970s to the development of full-time training courses at vocational schools. Their numbers kept increasing until 2006 when they catered for approximately 680,000 young people. In 2009 they had approximately 499,000 young people, including approximately 410,000 young people in vocational schools following courses that did not lead to a recognized qualification (see Vocational training report of the BIBB, 2011, Figure A5.1.1).

There is now a debate focussing on “a momentous (sub-)division of young people” (Dobischat, Kühnlein & Schurgatz, 2012, p. 45) between those who are not capable of being trained and those who are capable of being trained, and this debate can be followed in the latest publications (see e.g. Solga, Baas & Kohlrausch, 2012).

In vocational educational policy the “list of criteria for trainability” of the National Pact for Career Training and Skilled Manpower Development in Germany (see Bundesagentur für Arbeit, 2009) offers an attempt to define the concept of trainability using a set of so-called “critical” criteria, to each of which individual indicators are assigned; the words used for describing these characteristics that young people should dispose of as “indispensable” input features should be semantically binding (pp. 17ff.). Young people, parents, schools, careers guidance advisers and companies are mentioned as those to whom this concept is addressed (pp. 9ff.).

Besides the requirement to standardize the use of the term, there is also an important self-imposed requirement relating to the setting up of the list (p. 17). However, this document fails to explain which scientific theories, models and scientific findings the group of experts is referring to.6

The list introduces “fundamental and essential basic features” (Bundesagentur für Arbeit, 2009, p. 18), which in the view of this group of experts must be present if a young person or young adult is deemed to be “trainable”. However one judges the plausibility of the listed criteria, their nomination and specification is done without any further explicit justification. Even the reference to the Delphi Study by Eberhard (2006), which was apparently carried out in the context of the creation of this list, is no substitute for the empirical studies actually needed for the implied efficacy of the skills etc. mentioned in it for successful learning to take place in vocational training.

The list of terms used in the Delphi Study offers a rarely qualified list of semantically undefined terminology which is then sorted into a significance ranking according to the frequency of match. There is then the obvious question as to whether this list offers more than formalized everyday understanding of skills, competences etc., that young people need for successful learning according to unspecified conditions of company-based training, or whether it simply provides information on the semantic similarities in terminology used in the everyday language of the respondent.

The group of experts puts the list of criteria for “trainability” into the context of two further conditions for the allocation of students to training places following
company training. These are the vocational interests of the consumers ("vocational aptitude") and the choice of training places and jobs in the regional contexts ("place-ability"); but this group of experts does not clarify what these two concepts entail (Bundesagentur für Arbeit, 2009, pp. 12f.). Here the latter term is used to take account of the specific regional and local conditions of the market for training places and the individual company “in the sense of maximum suitability” (of the applicant) or because of company-specific characteristics (p. 16). In their study Ebbinghaus and Loter (2010) show how risky these criteria are because their use is often a determining factor in training places not being filled, although there is no empirical evidence to establish a link between this and the successful completion, change or failure of company-based training (see also Nickolaus, 2012, pp. 6ff.; Stamm, 2012, pp. 21f.).

The semantic breadth of the term “trainability” used in this list is evident in five areas, these being: “Basic Schooling”, “Psychological Attributes”, “Physical Attributes”, “Psychological Characteristics of Employment Behavior”, “Personality” and “Career Choice” (Bundesagentur für Arbeit, 2009, p. 17).

A total of 25 characteristics are listed in the five areas. Each one specifies a further ranking list comprising up to seven indicators. For example, the characteristic of “manners” which appears under “Psychological Attributes” lists five indicators (Bundesagentur für Arbeit, 2009, p. 54). The characteristic which has a first place ranking which is explicitly shown as the most important characteristic is:

She/He uses the informal and formal terms of address (“Du” and “Sie”) in the appropriate context.

This brief account leads to a critical review of the list (for a differentiated review see van Buer, 2012): In a designated vocational training policy tool, companies use institutionalized career guidance to control the processes of allocation at the first threshold and by graduates passing through the system. If we regard this as admissible to describe in the language of their everyday understanding of psychological traits the capacity of consumers, the foregoing in the concept of the Bundesagentur für Arbeit (2009), can be given very partial plausibility, perhaps, but definitely no scientific basis (see also Dobischat, Kühnlein & Schurgatz, 2012, pp. 52ff.). Overall, this list provides a document which sets out subjective theories on attributes deemed to be “essential” for the consumers to engage in successful learning and employment activity.

When we follow the intention of this team of experts the characteristics and indicators should have the function of providing at least an approximate understanding of the various interpretations users have of the term “trainability”. However – and this may be expressed as an assumption – the goal stipulated by this concept, i.e. to regulate the use of the word “trainability”, is hardly achievable using this approach. This is because, apart from the rough and partly contradictory semantics, the naming of these traits is decontextualized in two ways: (a) The different requirements of learning and development are not taken into account in the very diverse range of industries, professions and training-based occupations etc. (b) Features in
company-based contexts and the training place itself are not factored in either. The perspective taken is that of the unspecified training place provider. Therefore it is only a little surprising that, despite the updated lexicon, the list is based on a very traditional understanding of what young people have to offer in order to be assessed by company-based training providers or to be judged by the careers service as being “trainable”.

This requirement of what young people have to offer comprises; the basic skills of “Spelling”, (Bundesagentur für Arbeit, 2009, pp. 22f.), “Reading – dealing with texts and media” (pp. 24f.), “Speaking (oral communication skills)”, “Listening (understanding the spoken word)” (pp. 26f.), “Basic numeracy” (pp. 28f.), “Basic knowledge of economics” (pp. 30f.) and “Work ethics”, which largely focuses on the ability to integrate into a work environment. The notion of “value-based action”, however, is not addressed at all. Roth (1971, e.g. pp. 87ff.) shows this to be a crucial aspect of mature and professional conduct. Consequently, not even the question of moral judgement is discussed which – according to Beck et al. (1997) – constitutes an important component of behavioural development (see also Beck, 2010; Minnameier, 2011).

In summary, the list of criteria may be regarded as a wish list that is normative, legitimated in a purely formal manner and empirically unsubstantiated in every conceivable way. Overall, there is little evidence of the theory outlined at the end of section about skills needed for work that considerations regarding “Beruf” and “Beruflichkeit” – based on the idea of vocational education and training being product and process at the same time (see Kell, 1996) – are incorporated into the collection of characteristics that apply to trainability as it is worked out by the Bundesagentur für Arbeit (2009). Instead it is expected that the list of criteria – if used as a significant conceptual management tool – provides a tool for training providers to help them to allocate places and to legitimize their allocation decisions.

VOCATIONAL SKILLS – A CONCEPTUALIZATION BETWEEN FORMAL VOCATIONAL TRAINING POLICY MAKING AND EMPIRICALLY BASED STRUCTURE

For the concept of trainability (“Ausbildungsreifle”), there is no formal regulatory policy (see Berufsbildungsgesetz – BBiG). The Vocational Training Act, for example, makes no provision for this; see also Handwerksordnung (HWO). In contrast, this is not the case with vocational competence/skills (“beruflicher Handlungsfähigkeit”). According to BBiG § 3, “vocational skills” are formally attested for those completing vocational training (see also Reetz & Hewlett, 2008, pp. 23ff.). § 38 BBiG and § 32a HWO state that “vocational competence/skills” are a key component in the final examinations in vocational training (see also Frommberger & Milolaza, 2010). The Conference of the Ministers of Education (see KMK, 2007) bases the development of core curricula for teaching in vocational schools for recognized training-based occupations (“anerkannte Ausbildungsberufe”) on the idea of activity-oriented
teaching and the development of learning areas ("Lernfelder") as a didactic structure. The purpose of this is to support the aim of ensuring that young people obtain vocational competencies/skills as part of their vocational training (for activity-oriented teaching see e.g. Gudjons, 2001; for the learning area concept see e.g. Tenberg, 2006; Buschfeld & Kremer, 2010; Riedl, 2011, pp. 144ff.).

As popular publications from the Federal Conference of the Ministers in Education (KMK) and the Federal Institute for Vocational Education (BIBB) show, the concept of vocational competence/skills is well established. Although both organizations are using it as a general target, it is not surprising that different interpretations are apparent when you compare the two (see, e.g., the diagrams in DEQA-VET, 2012). There is a very unclear picture as regards the idea of vocational competence/skills when we take a close look at vocational educational policy – not least because of the various authorities involved. Empirical studies such as those by Winther (2010) in the commercial area point to the measurement of competence. Studies by Abele, Greiff et al. (2012) and Nickolaus, Abele et al. (2012) highlight the acquisition of dynamic problem-solving skills by automotive mechatronic engineers and electronics engineers. These reveal preferred terms of empirical investigation relating to vocational training policy using testable constructs, extracting them from their purely normative context.

The material presented above shows at least two things: (a) In the discussions relating to vocational training and labor market policy, the conceptual indexing of skills required for the successful application for a (work-based) training place, the corroboration of vocational skills and employability play an important role for management and legitimisation of allocation processes – especially those at the transition point between secondary school and the vocational training system as well at the transition between the vocational training system and the employment system. As shown in the section about the concept of trainability, this indication is carried out to a large extent on the basis of everyday semantics embedded in the concept of trainability. The skills indicated in this concept refer on quite “traditional” notions of the providers of training and work of what characteristics of the consumers support successful learning in vocational training and help to carry out a successful period of continued employment. Empirically-based rationale of the choice of criteria and their ranking is not available and not used. What is striking is the intensive accentuation on what the young consumer is expected to bring to his/her training or employment, but not – or only to a limited extent – on what characteristics conducive to development of apprentices providers are expected to offer in their training places, work places and processes provided by them.
In regard to the discussion on “trainability”, there is evidently a strong link to the debate in the 1960s to 1980s on young workers and the “work virtues” that were discussed in that context. High affinities to labor market policy based on employability concepts are apparent – possibly in contrast to the self-perception of organizational debaters in Germany. The latter emphasize what “attractive human capital” in the guise of those people seeking employment might bring to the internal and external labor market. The main difference between these two lines of argument therefore appears to be that the German notion of trainability is not aimed at work activity in work contexts but at learning activity in training contexts. Reliable evidence relating to basic schooling, attitudes and skills are the focal point of discussions on vocational education and training and labor market policy. These help facilitate the seamless integration of young people into training and work and promote regional mobility and the willingness to make financial concessions particularly when it comes to employability.

Recourse to the considerations of Roth (1971) that are already forty years old throw some light on the slant of the above-mentioned ideas. The “learning of value-based action” (e.g. pp. 389ff.) and its manifestation, for example, in moral-based judgement, is rarely discussed in normative-based lists and theories. Due to its affinity to the debate on skills and the development of training standards, the notion of vocational skills relates more to meta-cognitive management and the acquisition of reflexive skills. However, it does not appear that the debate on trainability and employability addresses these aspects, and so the somewhat reactive integration into training and work structures and processes remains the focus of consideration.

From a vocational, economic and educational perspective, Heid’s critical discussion (1977) on a “relationship of superiority and subordination” between the requirements of the employment system and the choice of learning/training available in the vocational training system is still highly relevant in view of the above considerations. At least for the German debate, in this light it is the question of whether the concepts of “Beruf” (profession) and “Beruflichkeit” (professionalism) again might play an increasing role in the re-balancing of the different requirements of young people looking for training and work and of providers of training and employment.

This line of discussion concludes with a reference to the concept of key qualifications. Although Zabeck (1989) and others (see e.g. Thoma, 2011, pp. 117ff.) carry out a critical assessment, the compilation of key skills qualifications almost seems to be a pre-prepared counter proposal to the above stated scenario, as Mertens (1974, p. 40) has pointed out. Key skills qualifications entail:

- developing skills for lifelong learning and for changing social roles,
- disassociation using theorisation, creativity, relativisation, linking theory and practice, understanding of technology, interest analysis, basic understanding of social sciences, planning skills, communication skills, decoding skills, ability
to learn, ability to manage time and resources, goal setting, ability to work with others, perseverance, focus, accuracy, rational resolution of conflicts, reducing feelings of alienation, desire to achieve.

NOTES

1 For a German language perspective, see, e.g., Hanf (2011). For an English language perspective, see, e.g., Winch (2011).
2 For a general perspective see, e.g., Brockmann, Clarke et al. (2011).
3 For the somewhat explosive quantitative developments in unusual working conditions, see e.g. Bundesagentur für Arbeit (2012, p. 11); Statistische Ämter des Bundes und der Länder (2012, p. 87).
4 http://www.bibb.de/de/25717.htm, downloaded on February 6, 2012.
5 The term “Reife” (maturity) is used in publications, e.g. by the Bundesagentur für Arbeit (The Federal Agency for Employment, see, e.g., Bundesagentur für Arbeit, 2009), but also in publications by the Bundesinstitut für Berufsbildung (The Federal Institute for Vocational Education – BIBB; see e.g. Eberhard, 2006). However, as it is not related to concepts and findings of developmental psychology, it is sensible to use the “neutral” concept of competence/skill instead (“Fähigkeit”; for a debate relating to the theory of youth see e.g. Fend, 2003; Stuhlmann, 2009; Kahlert & Mansel, 2007, and Rauschenbach & Bien, 2012; for transitions, e.g. the first threshold in terms a psycho-social moratorium with specific developmental tasks see e.g. Hurrelmann & Quenzel, 2012).
6 The group of experts consisted of representatives from employers, the Bundesagentur für Arbeit (Federal Employment Agency), a vocational college and the Bundesinstitut für Berufsbildung (the Federal Institute for Vocational Education and Training). Representatives from trade unions and the consumers themselves were not involved.

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