Editorial TVET@Asia Issue 12:

Technical Didactics as a Theoretical Basis for an Effective Practical Implementation of TVET

Anyone who teaches within a specific technical field must deal with specific knowledge of technology: its functions, its use and the vocational activities deriving from the respective area. However, this alone is not sufficient. Additionally, pedagogical-didactic considerations need to be conducted. Therefore, the question arises: who are the learners and what is the purpose of the educational program? Additionally, the following issues need to be addressed:

- What is the need of the target groups with respect to the individual learners´ age and corresponding development phase (see Piaget)?
- How far along is the learner in terms of his/her skills and competence development i.e. is the learner a novice or an expert (Dreyfus/Dreyfus 1980)?
- Does the educational program address engineering programs in Higher Education or TVET programs that rather focus on work-tasks and work-processes?

Didactics of technology or technical vocational disciplines must recognize the differences in approaches with different prerequisites for the learner or in relation to the objectives, and turn it into a meaningful concept.

The development of professional competence is shown within the performance and needs of informal or formal Vocational Education and Training. Informal learning is understood as experiential learning that takes place in an unsystematic and coincidental manner, e.g. at work places and in work processes. Here, the development of professional competence depends on specific working situations. Professionalization of TVET is a challenge in different respects.

Central elements of TVET systems, which need to be in line with the specific technical didactic, are the underlying curricula and the didactical approaches.

But how are curricula supposed to be developed? Curricula are usually based either on simplified scientific knowledge or on coincidentally chosen practical examples. In many countries, the systematic exploration of work in specific fields is seldom conducted. How general and how specific must the curriculum be to meet the demand of the learners and to be an effective instrument? This is one of the main research questions in curriculum development form a standpoint of modern technical didactics. In order to provide a sound answer, it is necessary to analyse, to compare and to classify work tasks and work processes. Additionally, it is important to analyse what competences are relevant to perform the work task efficiently and in a high quality?

The question: what must be learned regarding the processes and the knowledge derived from an job analysis is discussed in the paper of XUAN TIEN VO from Ho Chi Minh City

University of Technology and Education, Vietnam while GOURHAN PIZARDA from Institute of Art, Design & Management, Pakistan discusses how a curriculum must be structured in order to develop the requested competences.

A precondition for the design of a work-related curriculum is a foundational theoretical knowledge of didactical concepts and approaches. VLADIMIR BLINOV, EKATERINA ESENINA & IGOR SERGEEV from Russia Federal Institute for Development of Education discuss in this respect the concept of "Digital Didactics". In their understanding, the system of technology and its more or less closed design prearrange the possibility of learning. One of their conclusions is: "*Many teachers are already asking about the place of the teacher in the digital world. Perhaps, in this perfect and yet fantastic world they are not needed at all? You can safely answer that you cannot educate a person without the help of a person. The functions of the teacher and the tools of his work will change, but the goal is the same – give new generations all the best we have …*"

However, referring to Noam Chomsky and in contrast to other contexts and concepts, "competence" meaning (in scientific TVET discourses) the ability to act self-reliantly in complex work situations as well as act as a member of society and family. Although the technical system is given, there is a need to work with it. In this respect, competence is shown by the performance of the actor. "Competence" means not a pure skill but a disposition to solve complex problems in situations (Rosenstiel & Erpenbeck 2007). The term "competence" can be differentiated from "qualification", which – among others – refers to certified competences.

In Germany, there are different dimensions of competences defined in vocational curricula, which are distinguished into three field-related dimensions: professional, social and self-competences. Each dimension has its own methodical instruments (KMK 2011, pp. 14). Didactics of Technical Vocational Education and Training should combine formal and informal learning to enhance the quality of Technical Vocational Education and Training systematically e.g. by experiential learning. Collaborative problem solving could be one concept to develop corresponding competences. DANG THI DIEU HIEN & DUONG THI KIM OANH from Ho Chi Minh City University of Technology and Education Vietnam develop in their paper a concept of how experiential learning in an institutional and formal context can be achieved through the didactical approach of collaborative problem solving.

In order to initiate and enhance individual competence development, most didactical approaches focus on action-orientation as it is applied in approaches, which are widely known as Problem-Based Learning (PBL) and Project-Based Learning (PjBL). The concepts and their valuable contribution to the variety of technical didactics are discussed in the paper of MARGARITA PAVLOVA & CHRISTY SHIMIN CHEN from UNESCO-UNEVOC Centre, at the Hong Kong University of Education and in the paper presented by LIU HUAN from China/ Technische Universität Dresden, Germany. Both papers deliver outstanding examples for the fact that Technical Didactic is challenged to choose the best possible method to allow the learner to develop professional competences in a suitable learning environment. There are

many questions, which research could clarify through theoretical concepts and by conducting empirical studies: Which methods are therefore most appropriate? MARGARITA PAVLOVA & CHRISTY SHIMIN CHEN address this question by discussing different models of integration of PBL and PjBl in the field of Education for Sustainable Development (ESD) and introducing the Model of "Problem-Oriented and Project-Organized Learning" (POPOL).

Technical didactics, to be understood in a more comprehensive manner, is a central element of vocational teacher education (VTE) and in consequence for the development of TVET systems. It lays the basis for reflection and ongoing innovation or adaptation of educational objectives, contents, methods, design of learning environments, media, strategies of assessment and evaluation in the field of technical education in general and in TVET systems in particular.

Thank you to the contributors. We wish you all great reading pleasure!

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