

Competence Development and Assessment in TVET (COMET)

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Competence Development and Assessment in TVET (COMET)

Theoretical Framework
and Empirical Results

 Springer

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Foreword by Book Series Editor

In the twenty-first century, vocational education is changing increasingly rapidly in response to a move from traditional manufacturing to hi-tech industries, the production of value-added products, and the ever increasing expansion of service and communications industries. Attention is increasingly focusing on meeting the needs of those transitioning from schools to the workforce, or tertiary education, particularly those following a vocational pathway.

The unification of a qualifications system for vocational skills has been a key issue for TVET for sometime. Currently governments in over 100 countries are designing, implementing, or considering national qualification frameworks (NQFs), or are involved with regional qualifications frameworks. Interest in NQFs arises because of the issues of relevance, flexibility, and portability of skills and training, and the effects on employment opportunities. Countries have adopted different approaches to NQFs, but the underlying motives driving the process are usually similar. These include the need to strengthen links between education, training, and the labor market; the need to ease the process of labor mobility across employment sectors, regions, and countries, including lifelong education and training; recognizing prior learning experience and credits; setting standards based on learning outcomes; facilitating quality assurance; and improving the perceived status of TVET.

This book rises to the challenge of developing an international and portable assessment framework, through the use of “Competence Development and Assessment in TVET”, referred to as COMET. This is an effort to test for competence diagnostics in vocational education and training, testing the developed methodology in the area of electrical engineering, with extension to other occupations. Vocational education and training is viewed as a complex field that poses high demands on the development of large-scale assessment frameworks, especially for international comparative testing.

The authors describe how vocational education is characterized by a variety of particular circumstances that makes it very difficult to implement an international comparative competence assessment. The number and diversity of occupations do not allow occupations to be grouped in comprehensive competence fields across occupational domains. Previous efforts to overcome this through the adoption of the

concepts of general technological literacy for engineering and technology, and economic literacy for business and administration, were not successful. It is also acknowledged that qualifications are subject to significant change, particularly due to rapidly changing technology and greening economies. The development of occupational profiles and training requirements is a constant challenge.

This book provides a detailed and systematic approach taken in developing and testing the COMET methodology, and as such the authors' contribution to better understanding the world of TVET is gratefully acknowledged.

March 2012

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Preface

The project COMET – “Competence Development and Assessment in TVET” – is an ambitious effort to test a methodology for competence diagnostics in vocational education and training in the course of a study that focuses on two occupational profiles in the domain of electrical engineering and currently is applied to other professions as well. Especially as regards international comparative testing, vocational education and training is viewed as a heterogeneous and complex field that poses high demands on the methodology of large-scale assessment.

First, internationally established professions can be found predominantly in the crafts and healthcare sectors. In industry and commerce, on the other hand, the tendency towards the internationalization of occupational profiles is much weaker. The “World Skills” can be regarded as an indicator of the internationalization of curriculum development. After all the number of occupations that participate in this competition has grown to approximately 50 in the meantime, including modern industrial occupations like mechatronic.

Another obstacle for the establishment of an international comparative competence assessment in the field of vocational education and training are the different national VET systems with their dual, school-based and alternating forms of vocational learning.

From a scientific point of view, one of the assets of the methodology for competence assessment presented in this volume is the fact that it allows to measure not only professional competence (and its development) but also the development of professional identity and the ensuing occupational commitment. The teachers who were involved in the development of the COMET concept are predominantly interested in the methodology under a pedagogical perspective. This interest is met by the evaluation and measurement tools insofar as the latter are particularly suitable for supporting the teachers in the implementation of the syllabi, which are structured on the basis of “learning areas”. Therefore, the COMET toolbox can also be used as a didactical and methodological support for the planning of school lessons.

The objective of vocational education is the impartation of professional competence in the sense of the ability to act in a professional context. Therefore, *school-based* types of vocational education are followed by a phase of practical training on

the job, and work placements are usually integrated into the curricula of full-time vocational schools. The *vocational* orientation of the various types of VET is an essential prerequisite for comparative competence assessment in this domain. This requires a competence model that can be used as a basis for the measurement of individual competences and competence development as well as for the evaluation of vocational learning processes.

Professional competences are developed in (dual) vocational education and in the process of cooperation between different learning venues. The professional work experience is of crucial importance for the development of competence and vocational identity. The COMET test results represent the learning and development processes at the two learning venues of dual VET (school and company) and can therefore be used as well for the further development of the cooperation between them.

The detailed analysis of the first project phase is expected to yield information and insights for policy makers and VET practitioners concerning the organization and design of vocational education and training processes in an unprecedented depth. The publication of the theoretical framework is expected to stimulate a more intensive debate about the development of learning methods in the vocational education and training system and to give a powerful impetus towards the transnational development and establishment of a high-performance methodology for VET assessment.

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Introduction: Competence Diagnostics in Vocational Education – What For?

“Competence diagnostics in vocational education – what for?” This question is well justified. If we only focus on the German context, since the early 1970s the BLK pilot programme of the federal and *Länder* governments in Germany has triggered a broad range of innovation processes, which contributed to a nationwide modernization of vocational education. The same is true of pilot programmes in the business sector (*Wirtschaftsmodellversuche*) under the aegis of the Federal Institute for Vocational Education and Training (BIBB), which were concerned with the support of innovation in training in enterprises. The development and implementation of methods of competence assessment as a basis for comparative competence diagnostics has never been a topic of these innovation programmes.

The focus has been on

- The modernization of occupational profiles and curricula
- The replacement of subject-based learning by a concept of learning that is based on vocational learning fields
- The testing of new media
- The improvement of the cooperation between learning venues
- The re-establishment of learning in the work process
- The development and testing of didactical concepts on new technologies as a core topic of vocational education and training programmes
- The testing and dissemination of action- and assignment-oriented learning

The list could be extended. It gives an impressive picture of the diversity of aspects that have to be taken into consideration when the improvement of the quality of vocational education is at stake. The argument that the easy access to the two pilot study programmes has compromised the quality of the projects and consequently of the programmes themselves is both right and wrong. It is right in the sense that the pilot projects soon after their establishment abandoned the concept of (quasi) experimental research and redefined themselves as innovation projects in the sense of action research.

The focus thus shifted from the legitimization of decision-making processes for VET policy and VET administration on the basis of experimental research to the

organization of the interplay of scientific, practical, and administrative competence in “processes of change” with objectives that had to be negotiated in advance. In this innovation paradigm, the VET practitioners become the main actors, the “promoters” of innovation projects. Science and research have an accompanying and supportive role, and this is why the criticism mentioned above is also wrong at the same time. Accordingly the access of practitioners to the pilot programmes should depend on the quality of project ideas and the commitment of applicants rather than on the expertise in writing excellent project proposals. This reminder seems appropriate when it comes to initiatives for developing a large-scale competence research in vocational education because the diversity of paradigms, instruments, and methods for innovations in the VET systems should not get out of sight. They are still oriented towards the definition of good educational objectives, the selection of teaching and learning contents, and the advancement of learning methods and educational programmes.

What, then, is the point of a competence diagnostics for vocational education? The COMET project has two answers to this question. The first of these has been formulated by the teachers involved in the project. Their interest is to have access to a theoretically sound and empirically verified competence model and to corresponding testing methods in order to gain a better insight into the strengths and weaknesses of teaching and training. From this perspective the competence model and the methodology of competence assessment should be applicable as an immediate support for the pedagogical work of teachers.

The second answer is the one that applies as well to PISA and similar projects: a large-scale competence diagnostics as the basis for comparative assessment leads to findings whose importance is increasingly recognized by the governance and support systems of vocational education. Needless to say the new transparency engendered by this process also creates some suspicion on the part of VET practitioners as the quantification of results puts especially those under pressure who perform less well according to the test results. In any case the introduction of a model-based competence assessment generates a great variety of new knowledge on the quality of vocational education, which will be to the benefit of a constructive VET dialogue between all stakeholder groups in vocational education and training. Beliefs, prejudices, and illusions are replaced with sound knowledge on the basis of quantitative data. This facilitates cooperation at all levels of the VET system.

The COMET research team is well aware that there is a certain fascination about the quantitative results, which may prompt one to overestimate the range of the “facts” (see especially Sect. 1.5). The quality of good vocational education depends also on factors that cannot be quantified. It is correct, however, that the COMET methodology for the first time allows for an exact, model-based measurement of core dimensions of VET. Thus a new level of knowledge for the design and implementation of vocational education can be achieved. The discussion and estimation of the range of the data therefore serves also the end to evaluate the relevance of the test results and to draw the “right” conclusions. The depth of the analysis was assessed quite positively by all participants already at the end of the first project phase. From the point of view of educational planning the advantage of the research

findings is their contribution to enhancing the attractiveness of vocational education. They also can help to organize the reintegration into the education system more effectively, especially with regard to the transition from school to vocational education (first threshold) and with regard to the transition from vocational education into the employment system, continuing vocational education and higher education.

In 2007 the German Research Foundation (DFG) approved the establishment of a priority programme titled “Competence Models for the Assessment of Individual Learning Outcomes and the Evaluation of Educational Processes” (cf. Klieme and Leutner 2006). This priority programme aims at the development of competence models as a necessary condition for the coordination between learning objectives and test development as well as for the interpretation of test results against the background of pedagogical theory and educational planning. The research task addressed by the priority programme is crucial for competence diagnostics. Prenzel, Gogolin, and Krüger, in their editorial to a special issue of the *Zeitschrift für Erziehungswissenschaft* on competence assessment, once again emphasize the research needs in competence diagnostics: “What is missing is a model of cognitive, but also of motivational and metacognitive components that are needed to master certain tasks and problems” (Prenzel et al. 2007, 6). The COMET project is an effort to put a theory-based competence model under empirical scrutiny. In terms of vocational pedagogy, COMET aims at the implementation of the concept of learning areas, which was agreed upon by the Conference of Education Ministers in Germany as a basis for a work and business process oriented vocational education, which has the objective to enable trainees “to shape the world of work and the society in the spirit of social acceptability and ecological compatibility” (KMK 1996a, b; cf. Rauner 1988). This explicit statement implicitly holds for a major aim of VET in other countries and structural contexts as well.

This aim implies a paradigm shift from a *subject-based* organization of VET programmes to a design based on *developmental logic*, as had already been advocated by Herwig Blankertz (1982). Its attainment was confronted in the practice of vocational schools with a professionalism based on academic disciplines that was deeply rooted in the thought and action of the teaching staff. This turned out to be a barrier for the implementation of the concept of learning areas. A comprehensive empirical study on this topic has been published by Waldemar Bauer (cf. Bauer 2006). Even the teachers who support the concept of learning areas as a pedagogical paradigm often express the view that its implementation is difficult due to the insufficient formulation of practical consequences and the variety of pedagogical interpretations, which are often incompatible. The interpretations of the learning area model that have been published either have the quality of blueprints which are inadequate for the complexity of this reform concept or focus on the elaboration of their scientific foundations. In the latter case, they rarely reach the level of pedagogical practice. Therefore, the COMET competence model also serves as a support for the implementation of the concept of learning areas. The competence (development) model needs to be operationalized in such a way that it can be used as a basis for the quantitative assessment of professional competences and competence development.

The measurement of vocational competences includes the outcomes and effects of vocational education that extend beyond technical or subject-specific skills. These transdisciplinary competences are regarded as a key dimension of vocational competence diagnostics since Urs Grob and Katharina Maag Merki published their study on this topic (cf. Grob and Maag Merki 2001). Setting out from the objectives of vocational education in Switzerland, this project not only achieved a systematization of the categories of transdisciplinary competences, but also an alignment with psychological models of professional identity and motivation. To some extent this concept overlaps with the COMET approach for the study of professional identity and occupational commitment. It was for the reason of a more economical research design that the COMET project chose not to analyse the transdisciplinary competences according to the indicator model by Grob and Maag Merki. This indicator model can be adopted in the context of an extended project design for the assessment of vocational competences and competence development. It would then be necessary to differentiate more precisely between competence and identity development as well as between the different dimensions of occupational commitment.

The separate assessment of vocational competence, on the one hand, and professional identity and occupational commitment, on the other hand, as envisaged by the COMET project is due to pragmatic reasons. The research design guarantees that these two aspects of personal development can be measured individually and related to each other.

Whenever the COMET project is discussed outside the consortium – e.g. at relevant scientific conferences – what suggests itself easily is a comparison to the PISA project and a reflection on the possibility to carry out international comparative studies in the field of vocational education and training on the basis of the COMET approach. Notwithstanding the difficulty to compare highly divergent national VET systems, the COMET concept offers considerable room for the coverage of countries and regions with different VET systems. This is achieved above all by the concept of *professional validity*. This means that the validity of test results has to be demonstrated with reference to the professional work and the competences embodied therein.

In the following chapters we outline and justify the principles of the COMET project and present some of the preliminary phase's results. Some of the items require a somewhat elaborate description that probably not all readers will appreciate. However, as competence diagnostics in vocational education and training is still at a pioneering stage a transparent explanation of the COMET concept is also expected to contribute to the relevant academic debate.

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