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Baethge, Martin; Arends, Lena

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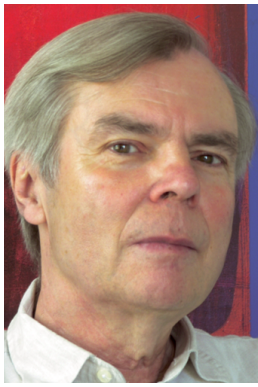
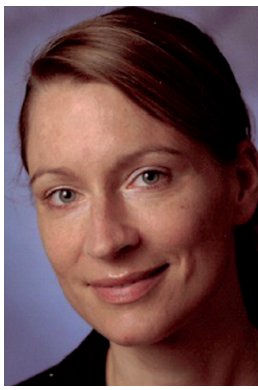
International Large Scale Assessment of Vocational Education and Training (VET-LSA)

Martin Baethge* and

Lena Arends**





Introduction

VET-LSA is a concept for an international comparative study of young adults' competencies developed in vocational education and training. The purpose of VET-LSA is to investigate the ways in which young adults are prepared for the world of work in different vocational tracks in Europe. The aim of the survey is to provide insights into the strengths and weaknesses of VET programmes in different occupational fields as an opportunity for different countries to learn from each other. VET-LSA will assess the level and distribution of young adults' vocational competencies in a coherent and consistent way in selected European countries. Measurement will focus on domain-specific, cross-occupational and basic competencies that are required for successful participation in economy and society in the twenty-first century. VET-LSA will also gather institutional and individual background variables that impact the development of competencies in VET.

Impacts of VET-LSA

The political and economic benefits of an international large-scale assessment of vocational education and training are obvious. In a Europe marked by rapid technological and economic development and increasing knowledge intensity in working processes, educational processes have changed. In order to safeguard and develop competitiveness and social cohesion, Europe's citizens must continuously update their competences to perform successfully in their jobs and lead a life that satisfies them in social and cultural terms. VET systems have gained importance for providing competencies relating to occupational mobility and the independent lifestyle of young people as well as international competitiveness and innovativeness of enterprises.

The European Commission has put forward the ambitious economic and social goal of becoming "the most competitive and dynamic knowledge-based economy in the world" (March 2000). In the field of VET this aim is being pursued through the Copenhagen Process. The European Commission's proposal for a European Qualifications Framework (EQF) offers opportunities to increase mobility and enhance permeability between educational sectors. In the Helsinki Communiqué (2006), education ministers stressed that in the next few years work would focus on introducing the EQF and a credit system with a view to achieving greater mobility for trainees in Europe and, by means of closer co-operation with VET, on further developing VET systems.

From a German perspective, a particular concern refers to the preservation and expansion of VET in the dual system as an attractive option, to retain the "vocational concept" and to combine/interlink VET with higher education and further education (Sellin 2006). A VET-LSA will help to classify competencies developed in different VET systems in Europe and point out the advantages and weaknesses of the dual system.

The main benefit of a VET-LSA is to expand the knowledge for steering VET processes at different policy levels, e.g., national/international administration, public relations and educational institutions.

(1) From a political and pragmatic perspective, VET-LSA will increase valid and reliable steering knowledge:

* Martin Baethge is Professor of Sociology at the University of Göttingen and President of the Sociological Research Institute Göttingen (SOFI) at the Georg-August-University.
** Lena Arends is researcher at the SOFI.

- to determine the relationship between individual/biographic characteristics, training forms and skill building;
- to improve transparency regarding the performance of European VET programmes;
- to link VET outcomes and institutional orders of VET systems;
- to determine the correlation between the competencies certified in final examinations and competencies actually measured;
- to reveal the strengths and weaknesses of different training forms in different countries – not from the perspective of winners and losers in a kind of vocational skill competition (e.g., WorldSkills) but as an opportunity to learn from one another;
- to classify different vocational training qualifications in international classification schemes (ISCED; EQF) in order to support the comparability of certification processes at the European level.

(2) From a scientific perspective, the results of VET-LSA will:

- improve hypotheses and research tools for measuring the performance of vocational competencies in a longitudinal and cross-sectional study;
- support statements regarding the interrelation of competence levels, training forms and context variables;
- provide findings on the interrelation between individual vocational competencies and performance at work.

Concept of VET

Recent international comparative studies, initiated by the OECD (e.g., PISA), shifted the focus of competencies to a policy context. The measurement of competencies has become an instrument for benchmarking the performance of educational systems. These studies are based on the idea that institutional factors, such as student assessment, certificates or duration of educational programmes are not sufficient criteria to compare the performance of different educational systems internationally. This is particularly important, given the heterogeneity of institutional structures in VET systems.

An international comparison of vocational education and training must be based on a common understanding of the goals of VET. There are three central goals, which educational systems must address at the system level:

- the development of an individual's potential for occupational mobility, self-regulation and autonomy;
- the safeguarding of human resources in a society, and
- the warranty of social participation and equal opportunities.

These goals function as reference points for the definition of competencies, which must be developed in vocational education and training.

The first goal – individual vocational adjustment – denotes the ability of individuals to develop relationships with their environment and to create their educational pathways and life in society in a responsible and self-directed way. It includes cross-occupational competencies, such as self-management skills, problem-solving skills, communication skills or meta-cognitive skills. Individuals are considered within the context of individual aims and efforts on the one hand, and beneficial and obstructive environmental conditions on the other hand.

The second goal – safeguarding of human resources – subsumes every aspect of educational systems that facilitates individual abilities to act at work and in the labour market (individual economic user perspective) and to contribute to the workforce (social-demand perspective). It refers to the potential of VET to contribute to the development of occupational systems, conceptualised in the concept of "Mega Trends" (e.g., Achtenhagen, Nijhor and Raffe 1995; Achtenhagen and Grubb 2001; Baethge, Buss and Lanfer 2003). From a quantitative point of view, VET systems ought to supply occupational systems as best as possible, i.e., avoiding narrow professional qualifications or over-qualifications for occupations with low demand or availability. From a qualitative point of view, they should provide adequate preparation for the requirements of the labour market, which include domain-specific, cross-occupational and basic competencies.

The third goal – warranty of social participation and equal opportunities – focuses on the relationship between VET and social structures; i.e., to minimise the interdependencies between social background on educational, life and income opportunities, and to

enhance the social integration and participation of young people in processes that shape the social and political community.

Framework for measurement

VET-LSA will measure young adults' achievements in tests of basic, cross-occupational and domain-specific competencies in vocational education and training, and link the results with institutional and individual background variables. International educational research agrees on the relevance of institutional and individual background factors for the development of individual competencies. In this regard, differences in the students' competence profiles cannot be described solely with reference to individuals' learning preconditions and dispositions; the educational organisation in its social, cultural and economic context must also be taken into account (e.g., Baumert and Schümer 2001).

Competence measurement in the field of VET is more complex than in compulsory education. Whereas international large-scale assessments like TIMSS[1] and PISA are limited to assessing the mathematics and science performance of pupils in the fourth and eighth grades (TIMSS) or the literacy, numeracy, science and problem-solving performance of 15-year-olds (PISA), VET-LSA has to take into account individuals' performance in the labour market. International student assessment programmes like TIMSS and PISA are based upon well-grounded research traditions and internationally validated concepts, like a world curriculum for mathematics. A VET-LSA cannot draw on comparable concepts with regard to the structure and development of vocational expertise in different occupational fields.

International large-scale assessments of adults, such as IALS[2] or PIAAC,[3] differ from VET-LSA in the following respects:

- VET-LSA is focused on young adults enrolled in VET programmes and shortly after entering the labour market; IALS and PIAAC are focused on adults during their entire adult life.
- VET-LSA is focused on the measurement of domain-specific competencies in selected VET tracks and occupational fields; IALS and PIAAC are focused on generic competencies for successful participation in today's economy and society (literacy concept).

Measurement of competencies in VET

The primary aim of VET-LSA is to assess young adults' abilities to successfully apply their knowledge and experience in authentic occupational situations. Thus, vocational and occupational competence refers to individual cognitive structures and experiences as prerequisites for successful performance in the world of work.

Following a broad concept of VET, measurement of competencies includes three areas: basic competencies, cross-occupational competence and domain-specific competencies.

Basic competencies
The purpose of including basic competencies, such as reading, writing, mathematics and problem solving, in the research design is to gain insights into young adults' levels of reading, mathematics and strategies for self-regulated learning. Incorporating basic competencies into the survey design is a prerequisite for investigating the interrelationship between basic and domain-specific competencies.

Cross-occupational competencies
The objective of measuring cross-curricular vocational and occupational competencies is to determine young adults' abilities to successfully deal with the challenges of today's labour markets. Cross-occupational skills refer to aspects, such as understanding organisational structures and labour markets, being able to manage one's career development, deal with colleagues and organise one's daily work.

Domain-specific competencies
The main focus of VET-LSA refers to young adults' abilities to successfully apply their knowledge and experience to authentic occupational situations in four occupational fields (car mechatronics, electricians, business and administration, health care).

The international comparison of domain-specific competencies is new. That means that new tests for common, domain-specific competencies in several vocational areas of interest have to be developed. The proposed item format is a realistic task in a computer-simulated work environment. The main advan-

[1] Third International Mathematics and Science Study
[2] International Adult Literacy Survey
[3] Programme for the International Assessment of Adult Competencies.

tage of this format is the short testing time (approx. 4 hours) compared to real working tasks (several days or weeks) and its validity, i.e. the test reflects professional tasks that are common in the vocational area. It ensures that the test measures the concept that is intended to be measured. Another advantage of the computer-simulated format is that students will enjoy doing the test, and this will enhance the data quality. Since the requirements for reducing measurement error are relatively low, the test length would be suitable for a large-scale assessment with reasonable time restrictions.

The test results will have to lead to an assessment of international differences in competence level in each vocational area. This implies that the same domain-specific construct has to be measured in all countries. If not, comparing the results of different countries would be like comparing apples and oranges, and it would be a meaningless exercise. In order to measure the same construct, the final goals of the educational programs in each specific vocational area have to be specified in a feasibility study. To provide a comparison between countries only the common elements of the programs can be ranked. It would be possible to develop additional national modules to cover the country-specific goals. These additional national modules could be used for national assessment purposes.

The VET-LSA feasibility study, which is currently being developed together with all countries interested in participation (Sweden, Denmark, Norway, Finland, Slovenia, Switzerland, Austria and Germany, including perhaps France, Spain and others), will provide a clear picture of those national programs that are comparable and might be included in an international comparison. This study will also provide more precise estimates of national and international costs (Baethge, Arends and Winther 2008).

The results of the study will provide the basis for countries to decide to what extent they want to participate in a VET-LSA and for the development of authentic tests in each selected field. The results will include:

- identification of test contents;
- description of test environments;
- description of situational requirements;
- presentation of range of performance;
- description of level requirements; and
- development of items, including coding.

Institutional and individual context factors

A comparison of VET can only be explained against the background of social, educational policy-related, economic and demographic conditions. In every country there are different economic, social and political context factors impacting VET and competence development. Therefore, key variables of VET relating to institutional conditions and individual background should be included in VET-LSA.

In agreement with international education experts, a multi-level approach is recommended that analyses systemic factors, the characteristics of educational institutions and instruction and their influences on the development and use of competencies for young adults while taking into consideration the interaction between individual and social factors. The framework is based on the theoretical model of the PISA survey (Scheerens 1990) with its differentiation of input, process, and output variables at different levels of analysis (Baumert et al. 2001; OECD 2003; Baethge et al. 2003).

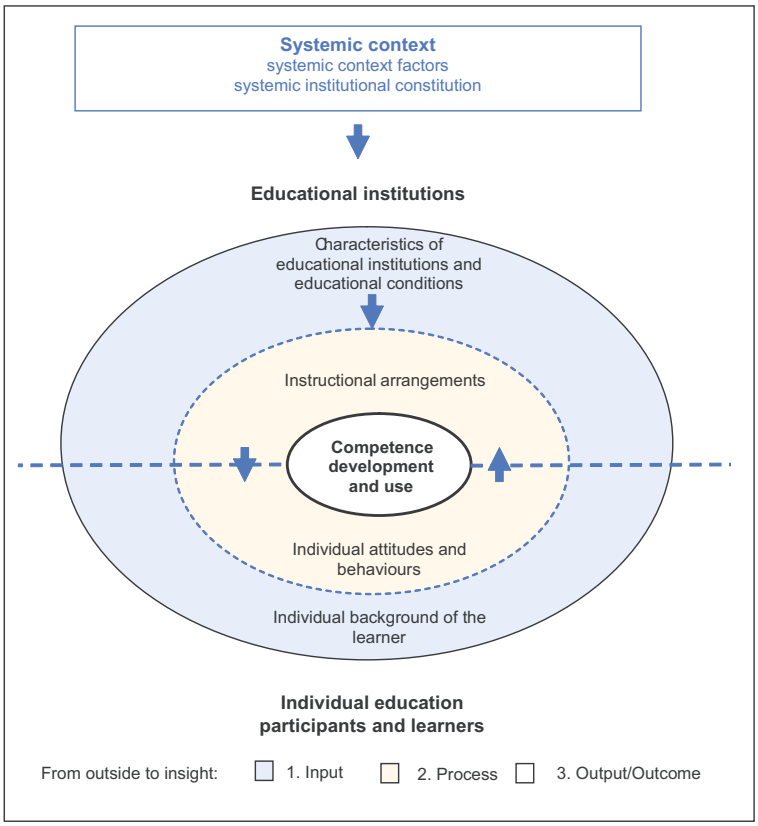
In the concept for VET-LSA, four aspects have been defined (Baethge, Achtenhagen, Arends, Babic, Baethge-Kinsky and Weber 2006; Baethge, Achtenhagen, Nickolaus, Arends and Winther 2007):

- institutional conditions and requirements of the educational systems (context);
- context factors and requirements at the level of educational institutions and individual background variables of learners (input);
- processes of institutionalised education relating to the level of operationalising material, personal and symbolic resources in didactical settings (process); and
- output of educational processes at the level of certificates and their use in the labour market and individual biography (output).

The interplay between institutional and individual conditions and the development and use of vocational competencies can be illustrated as in the Figure.

At a macro-level of the educational and employment systems (systemic context), we distinguish between systemic context factors (e.g., social, cultural, economic and political conditions) and systemic institutional constitutions (coordinating and steering, standards and norms, and financing of VET systems).

Figure



At the (meso and micro) level of educational institutions, indicators relating to the structural and organisational conditions of schools and firms play a crucial role as they mould the learning and teaching processes (Kunter and Stanat 2002). At the input level this refers to the characteristics and organisation of educational institutions, and to the providers of educational services (utilisation of resources, cooperation of educational service providers, quality control). At the process level this involves the instructional setting and the learning environment (learning conditions and instructional setting, such as self-directed learning or teamwork in schools and workplaces, learning climate).

At the level of educational participants and learners, we look into individual living and learning conditions (input), attitudes and behaviours (process) and the quality of individual learning results (outcome). At the input level we distinguish between learners' living and learning conditions (socio-economic status of the family, cultural capital of the family, educational and occupational career), at the process level we consider aspects of educational aspiration and behaviour (information behaviour and learning time, educational aspiration), and at the output/outcome level we include the acquisition and utilisation of competencies (qualification level, transition to an adequate job, occupational mobility).

Selection of VET tracks

There is agreement in the international scientific community that the main focus of VET-LSA has to be the measurement of domain-specific vocational and occupational competencies in a limited number of occupational fields. In contrast to PISA, these competencies are only characteristic for large occupational fields and not for the entire population. Due to this special feature of vocational education the sample design is based on the (quantitatively) most relevant occupations from the major occupational fields in the sample:

- industrial/technical occupations in industry and trade;
- commercial and commercial/administrative occupations in commerce and other services; and
- healthcare occupations in the field of individual-related services.

The current discussion focuses on the following VET tracks and corresponding occupational fields:

- car mechatronics;
- electricians;
- business and administration; and
- health care.

Vertical and horizontal comparability of VET

A comparison of competencies in VET is more complex than in compulsory education. The complexity can be characterised as a two-fold problem of comparison:

- Vertical comparability refers to the educational level and can be determined by institution (e.g., tertiary level (academic track), secondary level or by duration (number of years) and/or age.

- Horizontal comparability refers to differences in curricula and occupational fields and to the problem of defining comparable vocational tracks.

Both aspects have to be analysed in detail to know what can be compared in a VET-LSA. The aim of a VET-LSA feasibility study is to identify common elements in selected educational programs and working tasks in corresponding occupations in each participating country and to develop a common framework that is valid internationally and could be used as a blue print for test development and sample construction based on the concept for VET-LSA. Countries interested in participation will compare their VET programmes and corresponding occupations in the four selected fields in a detailed analysis (Baethge et al. 2008).

Vertical comparability

There are very few publications at the European level that might be useful for comparing the level of different VET programmes. The most useful sources for identifying quantitatively relevant VET programmes are published by EUROSTAT and CEDEFOP (handbook of different educational programmes in different European countries-based on data from 1995–96 and updated in 2000). They offer short descriptions of different VET programmes, including the type of programme (vocational preparation, general education, vocational education and training), ISCED level, typical entrance age, type of labour market qualification (generic, subject specific) and number of students. Abstracts are only available for some countries.

In the feasibility study for VET-LSA, vertical comparability will be analysed in terms of ISCED classification, entry requirements, access to the next educational level, typical educational contents and exam tasks.

Horizontal comparability

The problem of horizontal comparability refers to identifying comparable occupational fields and educational tracks in different countries. At the international level, an occupational classification for discrete fields of training has been developed on behalf of CEDEFOP (Andersson and Olsson 1999) alongside ISCO. However, neither of the two classifications has been accepted as part of the ongoing reporting at the European level.

In the feasibility study for VET-LSA, horizontal comparability will be analysed in terms of classification systems (ISCO, O*NET) and interviews with supervisors and VET trainers at the workplace.

Sample

A real panel study with three measurements, one at the beginning and one at the end of a VET programme and a third measurement four years after entering the labour market, can be considered the gold standard for VET-LSA. It would allow for the measurement of young adults' competence development during VET as well as the outcomes of VET in the world of work. However, implementing a longitudinal study for one country is very complex and time-consuming; it is even more complex if a number of countries are involved (e.g., a stable international expert group must be established for approximately 8–10 years).

A cohort-based, cross-sectional study with two or three age-graded samples can be considered more than a pragmatic, temporary solution. The main sample should comprise young adults shortly before leaving their VET programme. On a national basis, every country has the possibility of adding one or two additional cohorts for every occupational field at the beginning of a VET programme and/or four years after entering the labour market.

From a pragmatic and methodological point of view, a stratified sample is recommended, consisting of a relevant (i.e., important employability segments and institutional arrangements) and comparable extract of young adults, e.g., medium level of proficiency, similar educational contents, in VET and shortly after entering the labour market. Measurement will be conducted in quantitatively relevant occupational fields to assess the major tracks of competence development.

The main focus of VET-LSA should be the measurement of domain-specific competencies in the fields of car mechatronics, electricians, business and administration, and health care.

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