Bundesministerium
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Vocational skills and competencies made visible

The ASCOT research initiative

EDUCATION

Igniting ideas!

ASCOT at a glance

- **Objective:** valid assessment of vocational skills and competencies using technology-based methods
- **Project period:** first funding phase December 2011 to November 2014 – skills and competencies in selected occupations are assessed at national level (subsequent second funding phase planned)
- **Occupations:** motor vehicle mechatronics technician, electronics technician for automation technology, industrial clerk, care for the elderly, medical assistant
- **Target group:** young people in the later stages of vocational training
- **Transfer of results:** examinations, other occupations, continuing training, other European contexts
- **Cooperation between science and practice** as a central mission of project work
- **Initiative supported by a national advisory board** (employers and unions, associations and representatives of the Länder) and a scientific advisory group
- **Funding:** ASCOT is funded by the Federal Ministry of Education and Research (BMBF); for further funding activities see www.bmbf.de and www.ascot-vet.net

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The ASCOT research initiative

Innovative skills and competence assessment to support vocational education and training (VET)

The ASCOT research initiative was launched by the Federal Ministry of Education and Research (BMBF) in 2011. It pursues the objective of measuring vocational competencies which are required for working in high-quality jobs in a changing working world. ASCOT stands for the technology-based assessment of skills and competencies in VET.

This initiative adds to the BMBF's research activities in the field of competence modelling and assessment. The competencies of young people who are trained for various occupations are measured to make them aware of their own abilities. The assessment results show strengths and weaknesses and help optimize the education process. Competence models and measuring instruments are developed and tested in the projects; initial pilot schemes are analysed and prepared for broader application. All projects use modern, computer-based methods which give a reliable picture of the trainees' performance levels.

The measuring instruments

Suitable measuring instruments are needed to make a realistic assessment of the skills and competencies of trainees. The ASCOT initiative develops such instruments on the basis of real working and business processes. As a rule, simulations are used to replicate major working operations and encourage contextual and procedural thinking.

The instruments are so designed as to enable subsequent transfer to examination practice, comparable occupations, continuing training and other European contexts with minimum cost and effort. The results can help increase transparency with regard to the productivity of qualification pathways and programmes, the quality of educational institutions and the success of learners, thus preparing the ground for improvement.

The projects

Under the ASCOT initiative, funding is provided for six networks including a total of 21 projects in different business sectors (for details see below). CoBALIT and DomPL-IK (industrial clerk) are the project networks in the commercial sector, TEMA (care for the elderly) and CoSMed (medical assistant) in the health sector. The networks in the technical sector are KOKO EA (electronics technician for automation technology) and KOKO Kfz (motor vehicle mechatronics technician). All projects encourage close cooperation between research centres and people and institutions working in the field of VET.

Two projects are engaged in the cross-cutting task of providing all ASCOT projects with instruments for the collection of explanatory variables for vocational competencies. They refer to basic skills (mathematical, scientific and reading skills) and to other general aspects of training quality. These measuring instruments will be used in all projects to support the standardized analysis of results.

CoBALIT: Commercial jobs

A test platform for competencies required in the commercial sector

People working in commercial occupations such as industrial or forwarding clerks are required to pursue a process-oriented approach, for example in planning and implementing business strategies and projects. The CoBALIT project network developed a test platform for measuring the full range of skills and competencies in this field. The aim is to find out to what extent trainees are able to understand and plan relevant operations in terms of value creation, sustainability or internal and external communication. The project models an entire business as well as individual processes that are essential for its operation. Testing refers to specific situations and includes job-related skills in the economic and business management field. In a cross-border effort together with a partner from Switzerland, data is collected which enables not only international comparison but also the comparison of different occupations. This is the first step towards a sector-specific competence model.

Partners involved:

- Paderborn University, Prof. Dr. Esther Winther (network coordination)
- SOFI Göttingen, Prof. Dr. Martin Baethge
- Göttingen University, Prof. Dr. Susan Seeber
- LMU Munich, Prof. Dr. Susanne Weber / Prof. Dr. Clemens Draxler

Other partners (financed by the Swiss Federal Office for Professional Education and Technology):

- Prof. Dr. Franz Eberle, Zurich University
- Prof. Dr. Stephan Schumann, Freiburg University

DomPL-IK: Seeing things in context

Industrial clerks need excellent problem-solving competencies

The DomPL-IK project network aims to shed light on problem-solving processes in the field of controlling. Controlling here mainly refers to business operations control. This plays a major role in the work of industrial clerks, who need to be able to see things in context. Problem scenarios are developed with a special focus on practical requirements and authentic problem presentation.
The aim is to make visible not only the results but also the processes involved in order to enable the valid measurement of problem-solving competencies. Consideration is given to the cognitive prerequisites (knowledge) as well as to motivational and emotional aspects. This helps establish the performance of trainees both in tests and in practical work. The test, which comprises several problem scenarios, is intended to enable the assessment of relevant competencies at different levels as well as practical use of the findings.

Partners involved:

- Bamberg University, Prof. Dr. Detlef Sembill / Dr. Andreas Rausch (network coordination)
- Mannheim University, Prof. Dr. Jürgen Seifried
- Bremen University, Prof. Dr. Karsten Wolf
- Frankfurt University, Prof. Dr. Eveline Wuttke
- DIPF, Dr. Thomas Martens

CoSMed: Testing in virtual practice

How to test the competencies of medical assistants

Medical assistant is an important training occupation in the health and care sector. In addition to specialist knowledge, medical assistants need commercial, administrative and social competencies in order to be able to do their job. Building on a preliminary study, the CoSMed project network develops testing instruments to assess the competencies of trainee medical assistants in a computerized approach. Social and communication aspects of the assistants' relationships with supervisors and patients must also be considered, which is a big challenge. Typical operations and job requirements are studied and visualized in a simulation. A „virtual practice" is used for modelling processes and operations. The trainees move through situation-based, authentic test scenarios which match their individual competencies levels. The aim is to gain an overview of the acquired competencies and to identify the individual and institutional factors of competence development. The findings will provide important input for the debate about the quality of vocational training in the medical and care sector.

Partners involved:

- Göttingen University, Prof. Dr. Susan Seeber (network coordination)
- Federal Institute for Vocational Education and Training (BIBB), Dr. Agnes Dietzen
- Darmstadt Technical University, Prof. Dr. Birgit Ziegler
- Jena University, Prof. Dr. Andreas Frey

TEMA: Quality in caring occupations

A basis for assessing vocational competencies in the care sector

The caring occupations are experiencing dynamic change, not least owing to current demographic and social developments. Reliable information about the quality and optimization of vocational training in this field is therefore very much in demand. No methods have so far been available for aptitude and entry tests in the caring occupations. TEMA is thus breaking new ground: It can neither build on existing modelling approaches for mapping caring competencies nor on suitable instruments for skills assessment. An exemplary pilot scheme addresses the field of care for the elderly. Measuring instruments will be made available for the assessment of vocational competencies in the care sector on the basis of a structural model. The aim is to create a prototype featuring testing sequences for the computer-based simulation of typical work situations. Field studies are conducted to test and develop this prototype. The competencies to be tested are selected in such a way as to ensure that they can serve as a basis for test development in other caring occupations.

Partners involved:

- Research Institute for Vocational Education and Training (f-bb), Dr. Ottmar Döring (network coordination)
- Bamberg University, Prof. Dr. Eveline Wittmann
- DIPF, Prof. Dr. Johannes Hartig
- FH Bielefeld University of Applied Sciences, Prof. Dr. Ulrike Weyland, Prof. Dr. med. Annette Nauerth

KOKO EA: Analysis and construction

Innovative testing methods demonstrate the competencies of electronics technicians

The KOKO EA project network addresses the highly complex job profile of electronics technicians for automation technology and highlights the special requirements which technical training has to meet in this field. Trainees must not only demonstrate analytical skills, for example in detecting faults; they must also be able to adapt control systems and production processes and reprogramme relevant elements. The aim is therefore to develop measuring instruments using new technologies to assess the analytical and constructional skills of people training for this occupation. This is done by using simulation models in a way that could set an example in Europe. Efforts to develop testing instruments can build on work previously carried out for the occupations of energy and building electronics technician and mechatronics technician. It is expected that these instruments will not only be used in the assessment of competence levels but also in examinations and in continuing training.

Partners involved:

- Stuttgart University, Prof. Dr. Reinhold Nickolaus (network coordination)
- PH Ludwigsburg University of Education, Prof. Dr. Bernd Geißel
- Elektro Technologie Zentrum (etz) Stuttgart, Dr. Jürgen Jarosch

KOKO Kfz: Driving development

Competence assessment in a highly dynamic occupational field

Like numerous other technical jobs, the occupation of motor vehicle mechatronics technician is characterized by the use of new technologies and a very dynamic development. Consequently, qualification requirements are undergoing substantial change, which means that training programmes must be adapted. The aim of KOKO Kfz is to develop a comprehensive competence model for motor vehicle mechatronics technicians and to optimize computer-based competence assessment instruments for special skills (trouble-shooting, repair / maintenance / standard services). The systems used – some of which have already been tested – serve to map real-life situations and to test and practice competencies, for example in engine management, when deliberately placed defects have to be diagnosed. Preliminary studies have shown that, using these systems, competencies can be tested and assessed in the same way as with real vehicles.

Partner involved:

• Stuttgart University, Prof. Dr. Reinhold Nickolaus (single project)

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and Competencies in VET

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