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Promoting Innovations in Vocational Education and Training - An Exchange of German Experiences

Federal Institute for Vocational Education and Training
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Promoting Innovations in Vocational Education and Training 2009 – An Exchange of German Experiences

Special Edition BWP – Vocational Training in Research and Practice 2009

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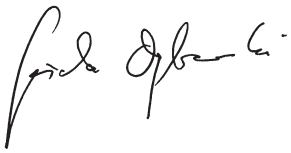
Dear Readers,

The Federal Institute for Vocational Education and Training (BIBB) is a governmental institution under the guidance of the Federal Ministry for Education and Research (BMBF). It was founded 39 years ago aiming in its research, development and consultative activities in the field of vocational education and training (VET) at identifying future challenges, to promoting innovation both, on a national and international level, and developing new, practice-oriented proposals for solving-problems.

Globalisation and the rapid European integration towards a single market for education and employment have given rise to new challenges. National VET systems are caught in between the imperative of international competition and the necessity for cross-border cooperation. At the same time, there are increasing requirements for the planning of VET to embrace a European and international perspective. This prompts a need for action going beyond measures on the national level alone. It is vital to engage in transnational projects, knowledge transfer and international networks as a source of innovative and creative impetus for promoting a broader dialogue in VET. Learning from others, sharing experiences and working together on are essential maxims of VET policy and practice.

Intensifying the exchange of experiences and the transfer of knowledge as a key instrument for promoting an international dialogue is a prominent aim of this journal. The articles are selected not only to provide information on current research, development and international advisory activities at BIBB, but also to give deeper insights into the ongoing development of structures and reforms within the German system of vocational education and training.

This journal wants to encourage people to learn from another and to pass on their experience and knowledge. Accordingly, the articles presented are a compilation of the contributions which have appeared in BIBB's German-language journal "Berufsbildung in Wissenschaft und Praxis (BWP)" in recent months, and are now published in English to bring them to the attention of a wider international readership.



Gisela Dybowski

Learning from one another – global systems consultancy

▶ Many countries are faced with the task of reforming vocational education and training systems predominantly organised along school-based lines to meet the requirements of trade and industry for qualified workers and the needs of the population for training which is relevant to employment. Ideas and role models for this are sought abroad, the spotlight falling on Germany owing to the worldwide recognition its dual system is accorded as a benchmark.

The differentiated spectrum of the research and development work undertaken by BIBB means that the expertise the institute is able to deliver is in demand across a large number of countries. BIBB's statutory duty to seek involvement in international cooperation within vocational training has established a basis for the expansion of its activities and competences in international VET cooperation over the course of recent years. Individual activities are integrated into a medium-term strategy which is coordinated with the Federal Ministry of Education and Research (BMBF).

Public institutions, political decision-makers and relevant VET stakeholders are the main object of the consultancy services offered by BIBB. Further development of the respective national system or system elements constitutes the core of the advice provided.

This means that the advisory services provided take on the character of systems consultancy. The spectrum of activities ranges from short-term consultancy deployments to joint projects with a duration of a few months or several years and extends to encompass the establishment of ongoing network forming structures which facilitate sustained exchange of information and experiences.

Systems consultancy services are in demand from developing countries and emerging third world nations as well as from neighbouring European states. The level of requirements and demand usually far exceeds the capacity BIBB is able to deliver in terms of time and human resources. This means that restrictions, the establishment of main focuses of activity, networking with other organisations and coordination with Federal Government policy are all necessary in order to fulfil the requirements and wishes of our partners.

BIBB's understanding of the term consultancy and of the way in which it should be practically delivered does not, however, constitute a one-way street. The findings and experiences which emerge from international cooperation may be of assistance in further developing vocational training at a domestic level. Targeted feedback processes act as a vehicle for even more effective use of the returns from these projects for German VET.

PROF. DR. REINHOLD WEIß
Deputy President and Head of Research at BIBB

Development of requirements oriented concepts

Experience has taught us that simple and standardised solutions cannot be applied to the educational and vocational education and training problems across various countries. The only way of developing concepts and strategies is to act within the prevailing respective economic, social and cultural conditions as these appertain within the individual states. This means that the initial phase of every new consultancy project must involve engaging in a process of familiarisation with our counterparts in the respective partner country and working in conjunction with stakeholders to conduct this analysis at a local level. Only when this procedure has been completed is it possible for this to serve as the basis for the development of tailored design concepts and of measures which are aligned to relevant circumstances within the countries in question. Systemic VET consultancy thus requires a high degree of openness, flexibility and competence on the part of the institute delivering the advisory services.

Providing assistance for system development and the degree of success consultancy services deliver also depend, however, on the extent to which institutions and stakeholders in partner countries are able to drive forwards the

necessary changes and to establish a foundation for these changes in the form of targeted organisational development measures (capacity building).

Early recognition and curriculum development

Many countries are articulating a growing need for action regarding the greater alignment of the provision of vocational training measures to the requirements of the labour market. The lack of reliable instruments and information for systematic labour market and requirements analyses is being exacerbated in a large number of states by the difficulties smaller companies generally experience in defining their future requirements for skilled workers. There is also a shortage of information on the fields of economic growth towards which vocational training provision needs to be aligned in future, and for this reason, an increased need for consultancy services has been expressed in the field of qualifications research. The early recognition instruments and procedures developed by BIBB have proved to be of assistance as countries seek to use comparable methods for their own analyses and prognoses. Monitoring this process provides information on how early recognition instruments can be adapted to a range of general conditions and how they can be rendered capable of deployment for the specific requirements of individual countries.

Many countries are still lacking a uniform system of vocational standards to provide a point of guidance for training programmes and to serve as a basis for the examination and certification of competences which have been acquired. For this reason, working in conjunction with the relevant stakeholders, particularly those from trade and industry, to develop a national standardisation, examination and certification constitutes a core area of VET reform. This is a field where BIBB has brought its expertise to bear and succeeded in highlighting pathways towards the curricular and qualifications related structuring of vocational training courses.

Ecology and sustainability

An increasing degree of significance is being accorded to the treatment of ecological topics given the fact that the environmental sustainability of products and production processes is beginning to form an important location factor. Notwithstanding this, the integration of vocational training and sustainable development constitutes largely unchartered waters for many developing, emerging and transition countries and is an area where implementation remains at best rudimentary even in the industrialised countries. The main demand from BIBB is for concepts and practical examples to promote employability skills for sustainable business practices on the part of both trainees and skilled workers. An equally urgent level of demand is being experienced for training and teaching materials which are tailored to practice whilst also affording educational staff the opportunity to familiarise themselves with the topic.

Two examples of good practice

The example of Turkey: BIBB has been advising the Turkish Textile Employers' Association in the development of vocational curricula, the structuring of examinations, the planning of equipment and the continuing training of teachers since 2003. The first inter-company training centre for initial and continuing vocational education and training of skilled workers in the Turkish textile industry opened near Istanbul in October 2007. BIBB is monitoring and evaluating the centre's activities, providing support for the design concept of the continuing training courses it offers, for example. Further VET centres are being planned in other cities, and this is another area where BIBB will continue to offer its support and consultancy services.

The example of Vietnam: in the autumn of 2000, the Vietnamese Ministry of Labour sought support for the development of a VET strategy to run until 2010. The first stage of the process involved the drawing up of joint theses on improving the vocational training information basis, the quality of vocational training, system development and general institutional conditions. This led to the establishment of the Vocational Science Research Centre (VSRC) at the end of 2000, and this has acted as a BIBB partner institute ever since. Cooperation is integrated into the existing structures maintained with the German Agency for Technical Development Cooperation (GTZ) and the Vietnamese Ministry of Labour.

Networking of activities

The broad competence profile which BIBB enjoys means that it has good chances of establishing a leading position in a future oriented field such as international consultancy services. The aim for the future needs to be to expand this potential in an even more targeted manner and market it in an even more pronounced form. The Federal Ministry of Education and Research (BMBF) has already put a support structure for the export of German initial and continuing VET provision in place in the form of the service agency iMOVE, which is located at BIBB for organisational purposes. In addition to this, BIBB is working in conjunction with the German Agency for Technical Development Cooperation (GTZ) and INWEnt on an initiative commissioned by the BMBF and the Federal Ministry for Economic Cooperation and Development (BMZ) which aims to increase the effectiveness of German VET cooperation abroad and tap into areas of potential as yet unexploited. The objective is to establish a joint presence under the umbrella of the "Edvance" brand to act as a vehicle for the securing of better opportunities for German VET stakeholders on international markets.

The provision of support services for visiting academics from foreign institutes of higher education and cooperation with German universities on the design concept and structuring of international courses of study represent further opportunities as yet unrealised. In the near future, we plan to step up activities taking place within the context of cooperation agreements. ■

Cross-national equivalence of vocational skills and qualifications

▶ The introduction of a European Qualifications Framework is allied with the intention of rendering qualifications comparable and thus increasing the level of transparency and mobility within the European educational and employment system. In terms of specific implementation of the EQF, however, a number of hurdles remain to be overcome. The present paper takes the initial results from comparative case studies as a basis for identifying the barriers and opportunities emerging from the endeavours to establish cross-country equivalence of qualifications and skills. Whereas establishing understanding of joint terminologies has a part to play, general national conditions and sector and occupationally specific regulations are also of significance.

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Case studies in four countries and on four occupations

The cross-national equivalence of vocational skills and qualifications project deals with issues which may arise from the stipulation of cross-national equivalence for vocational qualifications and uses four occupations as an example in order to demonstrate various possible solutions. This takes place on the basis of comparative case studies in England, Germany, France and the Netherlands.

European initiatives instigated in the wake of the Lisbon Declaration of 2000 form a major point of reference for the project. These initiatives have led to the development of key policy instruments such as the European Qualifications Framework (EQF) and the European Credit Transfer System for Vocational Education and Training (ECVET). In light of the differing traditions of the educational and employment systems of the various respective countries, however, the EQF is raising important issues relating to the type and validity of the comparators and this in turn has implications for the feasibility of implementation of such a framework.

The investigation encompassed the evaluation and comparison of case studies extending over four sectors and occupations. These were selected in such a way so as to represent a range of qualifications and educational pathways:

- *the craft trades occupation of bricklayer:* a training occupation within an established sector traditionally mainly practised by men;
- *software technology:* an occupation not clearly defined, not associated with any vocational education and training tradition, and forming part of one of the "newer" sectors in the field of information and communication technology;
- *nursing:* an occupation predominantly practised by women in which qualifications are governed via EU regulations and which extends into the higher education sector and

- *lorry driver in the logistics sector:* in this case primarily investigated as a job (i.e. means of gainful employment) rather than as a training occupation.

Determination of differences and areas of communality took place with the assistance of a differentiated analytical framework. Instead of merely comparing national systems, the project has attempted as far as possible to use alternative analytical categories which are understood in transnational terms, to compare respective understandings of such key designations as *competence* and *skills* and to determine terminology of crucial significance to the individual systems. This terminology encompasses "Beruf" ("occupation") for the German system, *skills* for the English system, *savoir* for the French system and competence for the Dutch system.
This differentiation enabled the identification of some of the finer distinctions of potential significance to effective implementation of the EQF, both between and within the countries. One typical example of this is the concept of competence, one of the EQF descriptors.

Analysis of the underlying key terminology

Our investigation provides evidence of considerable differences between the four countries. In broad terms, two vocational education and training approaches are discernable in relation to basic structures and functions: the *skills and task-related model* prevalent in England and the *occupationally related model* which is widespread in the Netherlands, France and Germany.

Occupationally related model versus task-related approach

In the occupationally related model, vocational education and training is founded on the principle of fostering individual competence within a broadly based occupational field, a process which involves the development of occupational profiles or skills with the participation of the social partners and according due consideration to economic and branch-specific interests.

In the task related model, on the other hand, vocational education and training is aligned towards the application of certain closely delineated and fragmented skills which are oriented towards the specific requirements of the employer. This approach constitutes an innate part of the System of National Vocational Qualifications (NVQ's).

In addition to this, there are further significant differences between all of the countries not describable via this simple dichotomy. Each country has, for example, its own understanding of education, and there are considerable national divergences in respect of the term competence. To a much greater extent than all the other countries, the Dutch system is defined in terms of attitude *(houding)*, which relates to the social and personal competences of the trainees. Although numerous pieces of research work have been carried out with the purpose of identifying the complexity of this term (cf. Weigel et al. 2007), its interpretation remains equivocal in the final version of the EQF (cf. European Parliament/EU Council 2008).

As far as the four countries constituting the object of our investigation are concerned, the term competence is used in both input or curricularly based skills approaches and in output or performance based approaches. The task related model as deployed in England and the comprehensive employability skills principle pursued in Germany once again present the two diametrically opposed poles.

Employability related versus functionally related definition of competence

Employability skills denote the ability of a person to integrate knowledge, practical skills and social and personal competences in practising complex and unpredictable activities.

The definition of competence used within the scope of the English NVQ refers to the functional execution of stipulated tasks without the reflected use of knowledge.

Whereas these two approaches may represent irreconcilable opposing positions, the competence based French and Dutch Qualifications Frameworks combine input and output orientation and may be characterised by the inherent conflict they display between the personally related comprehensive definition of competence and the functionally related interpretation of the term. The success of the EQF will depend on the interpretation of the key concepts forming its foundations. These currently encompass both employability and functionally related approaches.

"Learning outcomes" constitute a further key concept. The EQF requires skills to be defined in the form of learning outcomes, although this term is subject to various interpretations, sometimes being accorded an association with structured teaching and learning processes and sometimes being separately defined. The explicit structural principle underlying the EQF unequivocally assigns the term to the second category, although it is by no means certain that this interpretation will enjoy complete acceptance in Europe or which problems may arise as a result of differing interpretations.

Identification of convergence and divergence

The principle of the Zone of Mutual Trust is fundamental to the achieving of cross-national equivalence of skills and qualifications. This formed a component part of the cross-national comparative framework as originally proposed and was accorded detailed treatment in a report by Tim Oates

and Mike Coles (2004). A Zone of Mutual Trust affords member states the opportunity of using the open coordination method as a means for agreeing formal and informal solutions and enables them to deploy pan-European instruments for the development of cross-national, cross-sectoral and cross-occupational exchange of labour and training markets.

One of the central objectives of our project is to identify areas of potential convergence and divergence of qualifications and skills within the various countries for the purpose of supplying indicators of barriers and opportunities with regard to the establishment of a Zone of Mutual Trust in the EU. Although national vocational education and training systems may display a greater or lesser degree of similarity to one another, there are still patterns of occupational convergence and divergence which may run contrary to this.

Four categories emerged as significant from our comparative investigations:

- *social framework:* strong versus weak state regulation of vocational education and training; social partnership versus employer orientation,
- *labour market regime:* skills/occupation versus competences; work capacity versus current performance,
- *understanding of competences:* occupationally related versus task-related model; employability understanding versus functionally related understanding,
- *educational system:* proportion of general and vocational training or of vocational training and higher education.

Sectorally and occupationally related convergences and divergences

An analysis of occupations in accordance with these categories shows that the craft trades occupation of bricklayer exhibits the most conspicuous degree of divergence (as does the occupation of lorry driver if the latter is referred to as a means of gainful employment rather than as a training occupation). In these areas, training in Germany, France and the Netherlands is characterised by the occupationally related model and by the principles of social partnership and holistic employability skills. Training is broadly based and encompasses elements of both vocational and general education. By way of contrast, vocational education and training in England is characterised by a weak regulatory framework and is oriented towards the interests of employers. It is also task oriented and tends to follow the principles of training for a specific job rather than those of education.

DIVERGENCES IN THE CRAFT TRADES OCCUPATION OF BRICKLAYER

As far as the craft trades occupation of bricklayer is concerned, there is a fundamental difference between the three continental European systems and the English system in the form of the broader scope of the occupational fields, the scope of activities and the much higher level of responsibility displayed by the former. This also has a fundamental impact on the mobility of qualified bricklayers. In France, Germany and the Netherlands, skilled workers are, upon completion of training, in a position to carry out complex tasks (such as concreting work, simple joinery, plastering, screed laying etc.) within a variety of contexts, including organisation, coordination and the business settlement of work processes. In contrast to this, tasks carried out in England are largely restricted to bricklaying and the mixing of mortar.

Source: National Federation of the German Construction Industry

Although qualifications in England, France and the Netherlands are also based on a competence oriented approach and skills are aligned to the tasks required in the workplace, competences in the last two countries named form the foundation of the training programme, the aim of which to develop the competences of the trainees via comprehensively structured teaching. In a similar way to the German system, the programme contains broadly based specialist training (including theory and practice within the further occupational environment) and units which focus on general education. By way of contrast, the National Vocational Qualifications in bricklaying in England are characterised by their narrowness of scope and their separation from educational processes, the consequence of this being that the amount of theoretical knowledge imparted is minimal.

HIGH DEGREE OF CONVERGENCE IN THE FIELDS OF NURSING AND SOFTWARE TECHNOLOGY

The convergences identified in the fields of nursing and software technology may constitute a potential basis for the development of Zones of Mutual Trust, these in turn being an important prerequisite for the functionality of the EQF and ECVET. The involvement of the trade unions in training development means that nursing in England bears most resemblance to the social partnership model. Completion of comprehensive and regular training in all countries also fulfils the requirements for cross-national comparability. This is an area in which convergence may be observed due to the pressure exerted by EU regulations and by dint of the fact that a general shift of training into the higher education sector has taken place. The latter also applies to the software technology sector, although the occupation of software technician is based more on the individual acquisition of competences rather than on differentiated initial training. This is particularly true in respect of England whilst also being discernable in the other countries. Convergence in respect of software technology is particularly driven by accelerated technological progress, companies which operate at a multinational level and the identical nature of the expectations in different countries in respect of levels and degrees of scope.

CONVERGENCE IN THE JOB OF LORRY DRIVER

As far as the job of lorry driver is concerned (only very few workers in Germany, France and England have completed initial vocational education and training), EU regulations have also brought about a certain degree of convergence, although England has interpreted the implementation of the Certificate of Professional Competence more narrowly than the other countries.

Various pathways lead to the goal

Our research work has identified that there are various convergence pathways for the exchange of qualifications and skills, the EQF merely being one of several instruments.

EU regulations which considerably restrict separate developments although including flexible provisions such as those relating to driving licences which do not prevent divergence in certain circumstances are, for example, of importance both in the nursing sector and for lorry drivers. In the software technology sector, such regulations create identical requirements by using widespread branch related qualifications and cross-national mobility of labour to establish a certain degree of convergence despite the differing qualifications pathways which apply from country to country.

The EQF operates extremely differently depending on the occupation and sector.

Our research work has revealed both conceptual and real convergences and divergences which indicate that the EQF will function extremely differently in practice depending on the occupation and sector. We are of the view that fundamental sectoral and qualifications related investigations will be required to ensure that Zones of Mutual Trust are not reduced to the status of a paper tiger merely serving the development of a joint terminology. The emphasis needs to be on structuring them in a robust manner so as to enable real practice in the various countries to be reflected and to allow areas of communality to be fostered. Notwithstanding this, the conceptual problems must not be marginalised. These will inevitably continue to arise constantly as exchange at a practical level takes place and will pose questions relating to the prestige and the transnational transferability of various qualifications and skills. ■

Literature

Brockmann, M.; Clarke, L.; Winch, C.: Can performance-related learning outcomes have standards? In: Journal of European Industrial Training 32 (2008 a) No. 2/3, pp. 99-113

Brockmann, M.; Clarke, L.; Winch, C.: Knowledge, skills, competence: European divergences in vocational education and training (VET) – the English, German and Dutch cases. In: Oxford Review of Education 34 (2008 b) No. 5 (forthcoming)

Coles, M.; Oates, T.: European reference levels for education and training: an important parameter for promoting credit transfer and mutual trust. Luxembourg 2005

European Parliament/EU Council: Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning (Official Journal of the European Union 2008/C 111/01)

Weigel, T.; Mulder, M.; Collins, K.: The concept of competence in the development of vocational education and training in selected EU member states. In: Journal of Vocational Education and Training, 59 (2007) No. 1, pp. 53-66

Core occupations as a building block for European vocational education and training

▶ **At present, the proposals for a European Qualification Framework (EQF) and for a Credit Point System in Vocational Education and Training (ECVET) are revitalising the discussion surrounding European core occupations, although it remains unclear whether occupations should play a role in this system and which "vocational education and training concept" could form the basis of a consensus in Europe. Core occupations may constitute the foundation for the respective context of a sector related "ECVET configuration" and could provide a major contribution to a vocational education and training concept dialogue between social partners and policymakers. The present paper investigates whether the establishment of European core occupations represents an opportunity to enrich the European vocational education and training debate by adding a modern concept of vocationalism.**

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Initiatives for core occupations

The initial basis for the development of European core occupations and the debate surrounding them was established within the scope of such internal European funding projects as FORCE and LEONARDO DA VINCI. Research findings which provided evidence that there was scarcely any difference between partner countries in terms of the structure of work processes and which indicated that distillable core structures for occupations enjoyed acceptance as transnational solutions on the part of the sectoral representatives constituted the starting point of the process. This meant that, in contrast to the dispute centring on various vocational training design concepts or systems, core occupations were able to provide a stable basis for further clarification processes.

Two core occupational profiles will be presented to serve as examples of these discussions and of the ensuing steps undertaken in terms of implementation:

- motor vehicle mechatronics fitter (cf. www.itb.uni-bremen.de/projekte/kfzmechatronica/deutsch/sitemap-d.htm) and
- eco-recycler (cf. box)

The LEONARDO Project
European RecyOccupation Profile

The project developed the **core occupational profile of "ECO recycler"** for closed loop recycling and waste management complete with learning and work tasks and country-specific manuals. The project also submitted a proposal for the alignment of credit points (ECVET) to the main focuses of the "ECO recycler" occupational profile.

The pilot project won a **"UN Decade Project"** award from the German UNESCO Commission. (cf. www.recyoccupation.eu.tc/).

The main focus of the occupation of motor vehicle mechatronics fitter is on a clearly structured high-tech product with the car as an entity forming the main centre of interest. The work processes prevailing in the automotive service sector constitute the basic structure of the profile.
The occupation of eco-recycler exhibits a different picture in terms of the product involved. The closed loop recycling and waste management sector does not feature clear product and

corporate structures, although there are work processes which scarcely differ from company to company. These constitute the linking elements for cross-sectoral debate which is assisting in the establishment of the core occupational profile for the occupation of eco-recycler and is supporting its implementation within the individual countries.

Characteristics of a modern concept of vocationalism

Notwithstanding all the criticism levelled at the concept of the occupation and vocationalism, we may assume that vocationalism will continue to be the organising principle of work in Germany.

Vocationalism will also leave its mark to a greater or lesser extent as it plays a role in other European countries. The view that skilled work in the classical sense is declining in significance and bringing an attendant focus on the transitory nature of vocationalism in its wake, an opinion justified by some industrial sociologists in terms of a "deoccupationalisation" of industrial work processes, fails to convince. The same may be said of the assumption that occupations and vocationalism may be perceived in purely specialist terms, a view postulated within traditional vocational and economic pedagogy. The sole responsibility of a vocational education and training theory is not merely to account for its educational concept. It is more important for such a theory to have its foundations in a concept of vocationalism which emphasises the process orientation of work (cf. MEYER 2000, p. 29).

Self-direction, the ability to cope with complexity and acquire knowledge and handling such areas as methodological and organisational knowledge are just some of the parameters characterising modern vocationalism.

From traditional skilled work to work and business process orientation

Companies are changing their organisational structure and their forms of process organisation in order to be able to compete globally on quality and cost. Tayloristic organisational forms with their function and performance related structures of specialised and skilled work controlled by various hierarchical levels are proving be too rigid and are losing their dominance in areas where product quality and work efficiency are combined. In small and medium sized companies in particular, the only secondary level which often exists aside from the management level is the production level. The main emphasis of the function of a foreman, a position which is frequently located between the management and the shop-floor levels, tends to be on the coordination of tasks. This role is today more closely integrated into the employee level than was the case in the past. The results of such developments are a flattening of hierarchies and the coalescence of the areas of organisation, technology and human resources development (training), sectors areas hitherto separate in terms of their function. This process of change encompasses a flexible and networked bundling of tasks relating to the entire business process of a company and brings a need for appropriate qualification profiles in its wake.

The consequence of this is a requirement for a qualification profile and competence development design concept which needs to ally itself to the understanding of business and work processes outlined below.

- Business processes describe the functions, performances, participating organisational units, necessary resources and planning and control of work processes related to the processing of a certain order. This means that there is an increasing requirement for qualified workers to scrutinise, reflect on and assist in shaping operating or internal organisational structures as a whole. This renders the ability of skilled workers to participate in shaping the triad of "development of company organisation – development of technology – competence development" a central target of core vocationalism.
- Work process knowledge is the core of business process knowledge. In simplified terms, this can be described as the intersection of context-related and situationally dependent vocational know-how and generalisable systematic and scientific knowledge. Work process knowledge may be viewed as a concretisation of business process knowledge with clear references to company work organisation, tools, plants, materials in the company, the company life world and mechanical, energy, chemical, information technology and other processes.

It is clear that such an understanding means that new forms of work such as teamwork, autonomy, willingness to assume responsibility, the ability for self-direction, a sense of responsibility, coordination and communication and a high degree of competence are indispensable.

Consequences for modern vocational education and training

Changes to the necessary skills become evident during the work process, and this is the only area where such skills can be absorbed in a timely manner and integrated into training. The development of work process oriented occupational standards is accorded a predominant role within this process.

This is particularly true against the background of the current endeavours being undertaken within the scope of the ECVET and the EQF to complete the paradigm shift towards outcome orientation and thus towards acquired competences and skills. The LEONARDO Project Vocational Qua-

lification Transfer System (cf. box) illustrates how the work process approach may be structured in practical terms.

The LEONARDO Project
Vocational Qualification Transfer System (VQTS)

Within the Leonardo Da Vinci VQTS (Vocational Qualification Transfer System, 2003 to 2006), an ECVET approach was developed which facilitated a structural description of work related competences, enabled the acquisition of such competences to take place and incorporated credit points. The VQTS model increases the transparency of occupational competences and in particular provides a solution for the description of the acquisition of work related competences which may also serve to support a better understanding between the worlds of training and work.
www.vocationalqaulification.net/vq/VQTS_model/de/f_main.htm

The introduction of work process based standards represents a suitable way of describing the necessary skills for core occupations in order to avoid fragmentation into modules comprising separate, self-contained teaching and learning units. Such a fragmentation into self-contained partial qualifications has been in operation in the Anglo-Saxon countries in particular for a considerable period of time. Notwithstanding this, a format involving standards based on "competency-based training" (cf. WINTERTON et al. 2006, p. 30) has proved unsuitable as a way of mapping the increasing complexity and the rapid technological development in the workplace.

In contrast to this, the drawing up and setting out of process oriented occupational standards can act as a vehicle for the description of the skills profile which is essential to the successful exercise of an occupation at the workplace. So-called "work process analyses" are required to define these standards. The most important objective during the conduct of work process analyses is the identification of core work processes. A sequence of core work processes can then serve as a basis for the description of a skills profile at the level of skilled worker.

Core occupations: fundamental design concept principles

The concept of core occupations avoids the specialist systematic and technologically centred profiling of occupational profiles in favour of two essential structuring characteristics (cf. SPÖTTL 1997, pp. 13):

1. The contents of the core occupations are related to work processes at all levels of differentiation. When dealing with occupationally relevant content, this is achieved by drawing a distinction between:
   - the object of (skilled)work (content based on the utility value aspect and the technological function on the value of services rendered);
   - the methods, tools and the organisation of work;
   - the corporate, societal and subjective requirements for work and technology (requirements arising from standards, legislative measures and the requirements and targets of the employees and customers).

This means that the focus is no longer on the cataloguing of scientific and technical facts and circumstances and the static integration of such catalogues into the contents of occupations and occupational profiles. The emphasis is placed far more on the identification and denotation of the multifarious dimensions of core work processes, on the stipulation of the essential objects, methods, organisational forms, tools, corporate, societal and subjective requirements involved and on the implications the latter will bring in their wake. This enables overarching qualifications requirements to be secured and guarantees societal reconnection.

2. The work process related contents within the occupational profiles are aligned in such a way so as to ensure that the work processes are able to act as a vehicle for the successive accessing of the overall correlations relevant to an occupation during training.

The concept of core occupations is in line with the fundamental considerations of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) on basic occupations, although the concept also stresses that the linking of the occupations to work processes enables particularly domain-specific accesses to be promoted, an aspect which renders it possible to promote expertise within a course of vocational education and training. Sector-specific accesses allowing the identification of core work processes for the shaping of core occupations via sector-linking, work process oriented focuses are essential for this purpose (cf. also KMK 1998; www.kmk.org/beruf/ueberleg.htm).

Consequences of the core occupation approach

The process orientation of core occupations renders them suitable for European occupational profiles due to the fact that work processes in comparable European sectors and branches do not evince striking differences. The work process oriented approach has been conceived as a vocational educational and labour market policy response to the challenge posed by an increasingly globally organised European economy. Such an approach is sustainable because core occupations are designed in a broadly based manner in order to support structural change, absorb service dimensions and face up to the challenge of quality orientation as well as by dint of the fact that they are designed in a way to enable them to shape developments.

The structuring of work process oriented occupational profiles ensures that an increasing deepening of practical and theoretical knowledge is achieved during the course of training and that comprehensive competence development takes place on the basis of domains. Core occupations can exert a key impact on reducing the number of occupations, and the fact that their main focus is on work processes which bundle a number of tasks together may enable them to constitute the foundations for the formation of occupational groups or families. More detailed differentiation of occupations has hitherto taken place on the basic of other structuring tools such as activities, areas of work performance, materials, technologies, components of larger plants and the like. The restructuring of occupations in accordance with core occupations and on the basis of selected work processes:

- enables a significant reduction in the number of occupations to take place. The figure of approximately 100 occupations stated by Heidegger appears to be realistic (cf. Heidegger 1998, p. 2);
- requires a high degree of occupational and interdisciplinary competences;
- may contribute to establishing closer links between vocational and general education, especially if continuing training is systematically integrated into vocational education and training;
- advises regulating only two thirds of the training time rather than the whole of the period of training in order to accord due consideration to the dynamics of changing work processes;
- facilitates work organisation innovations within the companies, such the introduction of teamwork, and enhances employee flexibility;
- notwithstanding the close correlation with practice normally requires comprehensive basic training within the work process which is closely entwined with more detailed specialist training in order to develop expert competences;
- opens up opportunities for debating this open concept with neighbouring countries and for investigating whether the EQF and ECVET are transferable work process structures.

European occupational profiles: opportunities and challenges

The alignment of core occupational profiles to work processes ensures that vocational education and training relates to practice. This work process orientation ensures that implementation into different educational systems can take place. The extent of the aim to implement the concept into training which is predominantly school-based, however, means that traditional specialist didactics must be overcome and a convincing work process oriented educational theory drawn up.
The company work related nature the occupational profile displays means that its work process oriented structuring is fundamentally able to provide leeway for implementation into a range of educational systems such as for the integration of regionally specific requirements into an occupational profile. It also enables the occupational profile to be accorded a high degree of dynamism. If changes take place to the work tasks in companies via such mechanisms as the utilisation of new products or procedures, the depth of precise detail the occupational profile already contains can be used to update it easily and at very little outlay. The fact that an occupational profile conceived in this way does not have its basis in content access via purely technical requirements means that it also represents an advancement in terms of gender mainstreaming. A core occupational profile needs to be designed in the form of an integrated vocational education and training plan in order to cater to the requirements generated by the varying characteristic features defining the two learning venues of school and company in Europe. This was realised on a point-by-point basis in the afore-mentioned LEONARDO Project *European RecyOccupation Profile* (cf. box).
The sector project reveals important components for the establishment of European core occupational profiles aligned on a national basis. European actions within the quasi-straightforward terrain of an individual sector and the involvement of the relevant stakeholders will not only serve to tap into existing knowledge of (future) qualification requirements. The cooperation of the stakeholders within the sector will also exert a reciprocal effect in ensuring acceptance of the project results. This means that the social partners need to be the prime movers of initiatives for core occupations, and these partners will need to involve themselves in the European vocational education and training scene.
Core occupational profiles can make a major contribution to solving the complex of problems relating to transparency, comprehensibility and recognition in Europe by operating at the interface between the vocational education and training system and the employment system. At the same time, a concept of a common core curriculum featuring a range of national characteristics also respects the diversity of European educational systems. ■

Literature

Blings, J.; Spöttl, G.; Windelband, L.: Qualifizierung für die Kreislaufabfallwirtschaft. Bremen 2002

Heidegger, G.: Basisberufe: Öffnung des Berufsbildungssystems für die Zukunft. In: berufsbildung Volume 52 (1998) 54, p. 2

KMK: Überlegungen der KMK zur Weiterentwicklung der Berufsbildung. 23 October 1998

Meyer, R.: Qualifizierung für moderne Beruflichkeit. Münster 2000

Spöttl, G.: Der „Kfz-Mechatroniker" – ein innovatives europäisches Berufsbild. In: lernen & lehren Volume 12 (1997) 46, pp. 13–18

Winterton, J.; Delamare, F.; Deist, L.; Stringfellow, E.: Typology of knowledge, skills and competences: clarification of the concept and prototype. CEDEFOP. Reference series, 65, Luxembourg 2006

International indicators on youth education attainment levels – what is Germany's true position?

▶ **Although indicators mapping the level of youth education attainment in international comparative terms are often used in discussions centring on the efficiency and effectiveness of the German educational system, the position occupied by Germany is not clear. The Eurostat data, for example, shows that the proportion of young people who have at least completed upper secondary education is at a comparatively low level. This contrasts with the upper secondary education completion rates provided by the OECD, where the figures for 2006 (OECD, 2008) show Germany in top position. The aim of the following is to examine the computation approaches adopted by both indicators and the attendant interpretation problems more closely.**

Who calculates what?

Although both the OECD and Eurostat[1] publish data which is used to measure youth education attainment levels, the fact that neither the denominator nor the numerator are identical in the two computation methods means that the indicators are not directly comparable. The calculations are also based on different data sources.

- Eurostat measures the "Youth education attainment level" structural indicator via the proportion of persons aged between 20 and 24 who have completed an upper secondary education qualification.[2] The numerator and denominator comprise persons of the same age group. The data source is the EU Labour Force Survey (LFS), an internationally comparable personal survey.
- The OECD determines "Upper secondary graduation rates"[3] by presenting these in terms of a percentage of all persons who have obtained an upper secondary education qualification (for the first time) relative to the population at the "typical age of graduation"[4]. Whereas the OECD states that the "typical age of graduation" in Germany is 19, the figures for those completing upper secondary education for the first time include persons of every age. Administrative data and estimations conducted by the individual countries serve as source material.

The publications of the Federal Institute for Vocational Education and Training (BIBB) issued at both domestic and international level have drawn attention to the problem of the lack of comparability afforded by the two indicators, the most recent example of this being in a study commissioned by the European Commission (Behringer, 2005; Behringer/Pfeifer, 2005; Behringer/Hanf, 2005).

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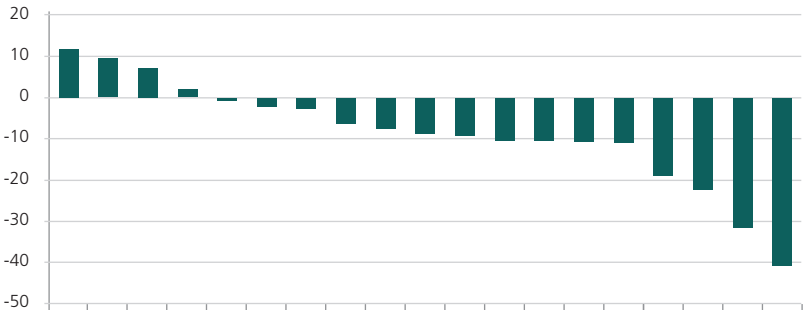
1 Data on the key indicators may be viewed online at http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=tsiir110
2 Explanations relating to this indicator may be viewed online (at http://epp.eurostat.ec.europa.eu/tgm/web/table/description.jsp).
3 The following uses the term "OECD rates" to refer to the "Upper secondary graduation rates".
4 More detailed information on this topic is available by consulting Annex 3 to the OECD publication "Education at a glance" (2008).

A clear difference between the two indicators emerges in the case of the majority of countries (see Figure 1), the OECD rate being above or below the Eurostat rate depending on the country. The difference between the two rates is not constant over time. For the year 2006, for example, the OECD completion rate for Germany was 31.4 percentage points above the "Youth education attainment level".

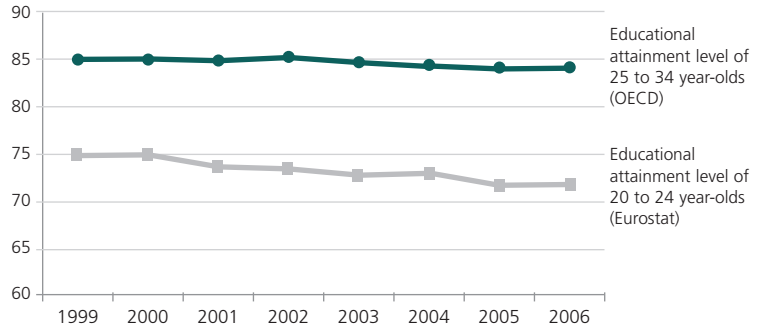
Figure 1 **Differences (percentage points) between the Eurostat "Youth education attainment level" and the OECD completion rates, 2006**



	PL	SK	EE	CZ	IE	HU	LU	TR	SI	DK	UK	FI	ES	IT	CH	GR	NO	DE	IS
Diff	11.7	9.5	7	1.8	-0.3	-2.1	-2.7	.6.3	-7.6	-8.6	-9.2	-10	-10	-11	-11	-19	-22	-31	-41

Sources: The data for "Youth education attainment level" originate from the Eurostat New Cronos Database (structural indicator II.9). Data for the OECD upper secondary education completion rates is taken from OECD – Education at a glance, 2008.

Figure 2 **The Euroststt Indicator and the educational attainment level of 25 to 34 year-olds** (in %)



Sources: The data for "Youth education attainment level" originate from the Eurostat New Cronos Database (structural indicator II.9). Data for the OECD upper secondary education completion rates is taken from OECD – Education at a glance, 2000–2008.

What needs to be taken into account when interpreting the two indicators?

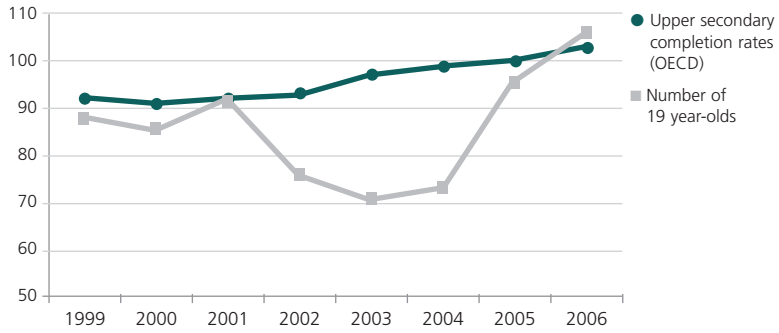
Consideration needs to be accorded to the following when interpreting the Youth education attainment level published by Eurostat. Although a fall in the indicator means that a lower proportion of persons within this particular age group (20 to 24 year-olds) has achieved an upper secondary education qualification, it may be the case that this is accompanied by a rise in upper secondary education graduates within the age groups above (such as the age group of 25 to 34 year-olds). This means, therefore, that a decrease in the "Youth education attainment level" does not necessarily indicate that a lower proportion of the population is attaining an upper secondary education qualification in overall terms. There is the possibility that the relevant qualifications are being obtained at a biographically later point, meaning that they are no longer covered by the age group relevant to the indicator. As far as Germany is concerned, a fall of around 3 percentage points in the Eurostat indicator may be discerned for the period between 1999 and 2006 (see Figure 2). The proportion of the population aged between 25 and 34 identified by the OECD as having obtained an upper secondary education qualification also underwent a slight fall in the year 2005. The supposition here would be that this decrease is occasioned by the delayed effects of the data recorded for 20 to 24 year-olds by Eurostat in 2001. Due, however, to the fact that the OECD does not provide information to decimal places for the educational level of 25 to 34 year-olds, it is not possible to judge whether this decrease has continued to its full extent or not.

The first thing to be said about the OECD indicator is that the completion rate does not permit any statement to be made on the level of educational attainment within the population in general terms. Since it constitutes a periodic value merely measuring a change in cumulative value rather than a cumulative value in itself, it is only able to provide indications as to the future development of educational attainment. The more closely the population group forming the object of observation is delineated in terms of age, the more likely it is that the completion rate can also be used as a yardstick for the level of educational attainment. Completion rate and education attainment level will, for example, be identical if observation is restricted to a single year group. This also appears to be the reason why completion rates frequently serve as a vehicle for addressing youth education attainment levels.

Notwithstanding this, the method of calculation deployed by the OECD exhibits a number of problems. The greater the number of upper secondary education graduates deviating from the "typical age of graduation" in terms of their age, the less adequate is this indicator for mapping the actual completion rate for a year group or cohort. The degree of fluctuation in the number of persons contained within individual year groups also plays a part.

We present an example for the purpose of clarifying this. The "typical age of graduation" in two countries, country

Figure 3 **OECD Indicator and population at the typical age of graduation**



Sources: data relating to OECD completion rates at upper secondary level is taken from OECD – Education at a glance, 2000–2008. Data on the population of 19 year-olds is from the population extrapolation conducted by the German Federal Statistical Office, 1999–2006.

A and country B, is stipulated as 19 years. A considerable proportion of graduates in country A is, however, 20 years old rather than 19, whereas in country B almost all pupils obtain an upper secondary qualification at the age of 19. The assumption is that numbers are lower in the year group of 19 year-olds greater than in the year group of 20 year-olds in both countries. The result is an extremely precise completion rate for the year group of 19 year-olds in country B. In country A, however, a misleadingly high completion rate emerges by dint of the fact that the total completing upper secondary education from an age group higher in number (the group of 20 year-olds in the numerator) relates to a year group where numbers are relatively low (the group of 19 year-olds in the denominator).

This example illustrates the imprecision of the rate for a certain point in time. Over the course of time, consideration also needs to be accorded to demographic fluctuations in a country. In the event of considerable fluctuations within the individual age cohorts, there is a risk that developments are incorrectly interpreted. If in the example given above the subsequent year group in country A were to be once again greater in number, this would in turn result in a misleadingly low completion rate due to the fact that the qualifications obtained by the relatively small group of those now aged 20 relates to a larger subsequent group of 19 year-olds.

Figure 3 indicates an increase in completion rates for Germany over the period 1999-2006 (cf. OECD Education at a glance 2008, p. 65).[5] There is a strong suggestion that the implausible values exceeding 100 percent which have resulted in the last two years have their origins in demographic fluctuations, although the development of the 19 year-old age group constituting the typical age of graduation is not demonstrating any clearly opposite trend. The decrease in the age group of 19 year-olds may be a contributory factor to the rising completion rates between 2001 and 2004. Such an explanation may, however, be discounted for the years 2005 and 2006. The increase in the rates of graduates and the attendant fall in the level of educational attainment of those aged between 20 and 24 (cf. Figure 2) is far more likely to indicate that an increasing number of graduates are not obtaining the qualification until they are older. This increase is barely reflected in the level of educational attainment of the 25 to 34 age group in Figure 2 due to the fact that it is not of great significance in terms of the overall size of the cohort. This means that it is unable to compensate for the fall in the level of educational attainment occasioned by subsequent year groups.

Apart from these factors, another possible cause of an excessive graduation rate is when individuals obtain more than one qualification at the same time or consecutively. Although the aim of the indicator is to include only first qualifications at upper secondary level and accord only single consideration to multiple qualifications, it is not possible to guarantee elimination of multiple upper secondary qualifications in equal measure in all cases and in all countries. Each member state "estimates" the number of multiple qualifications and subtracts this from the total number of qualifications which have been counted and recorded in the administrative procedures. The decisive factor for the quality of these estimations is how good the information on the relevant facts and circumstances is within the countries. This problem is the reason why no OECD graduation figures are published for the United Kingdom and other countries.

Determination of the "typical age of graduation" as stipulated by the OECD must also be viewed as a problem. The typical age at which a child commences education (assumed to be 6 for Germany) is taken as the basis, and the theoretical duration of schooling before the attainment of an upper secondary qualification added (the figure for Germany thus far being 13 years until a pupil sits the upper secondary school leaving certificate or concludes a course of vocational education and training). This gives us a "typical age of graduation" for Germany of 19 years. No account is taken of pupils who start school later or of repetitions of one or more school years, and neither is any consideration accorded to the waiting loops leading up to the commencement of vocational training, which are an object of

5 *Values in excess of 100% may arise if the total number of graduates from all age groups in one year is higher than the population at the typical age of graduation. Implausible values also arise for other countries. The OECD, for example, indicates that the completion rate for women in Norway in 2006 is 103% (cf. OECD – Education at a glance 2008, p. 465).*

considerable current debate and which can cause a delay in the time required to obtain a vocational qualification.

Two examples will illustrate the extent to which the typical age of graduation deviates from the actual prevailing circumstances in Germany. Only a very small proportion of those commencing training (fewer than 15%) begin vocational training at the age of 16, enabling them to complete three-year training occupations and obtain a vocational and upper secondary qualification by the age of 19 (BIBB, 2005). As far as those who have completed the upper secondary school leaving certificate are concerned, fewer than 40 percent are aged 19 at the point when the qualification is obtained (German Institute for Business Research, IW, 2006). The attendant problems have been described in the example above.

Conclusion

Although caution needs to be exercised in respect of potentially erroneous conclusions in interpreting both indicators for the measurement of youth education attainment levels, the Eurostat indicator on the proportion of 20 to 24 year-olds with an upper secondary qualification in conjunction with the level of educational attainment of the subsequent age group provides the more transparent values. By way of contrast, the OECD completion rates constitute a fundamentally questionable yardstick for the measurement of educational attainment, and not merely by dint of the fact that they represent a periodic value. The method of calculation deployed is difficult to understand and delivers results which are implausible in some areas and scarcely capable of interpretation over the course of time. In Germany, for example, the "increase" in the completion rates up until 2006 may disguise the fact that a shift in the age of graduation has actually taken place. ■

Literature

Behringer, F.: Effectiveness and efficiency of VET. – In: Leney, T. et al. (Eds.): Achieving the Lisbon goal: the contribution of VET. Final report to the European Commission. Brussels, European Commission. (2005)

Behringer, F.; Pfeifer, H.: Indicators and Data for VET. – In: Leney, T. et al. (Eds.): Achieving the Lisbon goal: the contribution of VET. Final report to the European Commission. Brussels, European Commission. (2005)

Behringer, F.; Hanf, G.: Der Beitrag der beruflichen Bildung zur europäischen Agenda 2010. Erkenntnisse aus der "Maastricht-Studie". In: BWP 34 (2005) 1, pp. 26–29

BIBB-Datenblatt: 996000 Ausbildungsberufe – insgesamt, Bundesinstitut für Berufsbildung 2005

BMBF: Berufsbildungsbericht 2006

Institut für Deutsche Wirtschaft: Informationsdienst des Instituts der deutschen Wirtschaft Köln, Volume 32, 26. 2006

OECD: Education at a glance 2000–2008. Paris

Statistisches Bundesamt: Bevölkerungsfortschreibung, Special series 1 Series 1.3. 1999–2006

Labour market prognoses – trends, opportunities and limits

▶ The labour markets trends of tomorrow began yesterday. Past developments are being acted upon in order to make projections for the future. The dominant trend in terms of the supply of skilled workers is demographic development, whereas on the demand side the primary focus is on economic development. The aim of current labour market prognoses is to indicate which trends are currently most likely to loom large without necessarily being inevitable. Such prognoses constitute a concentrated point of focus for policy options. Where, however, do their opportunities and limits lie?

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Decrease in the number of persons of employable age

Germany is today undergoing a phase of ongoing decline in its population. According to the 11th Coordinated Population Forecast (2006), Germany reached its highest level of population by 2003. The prognosis for 2050 is for a population of only just under 74 million inhabitants (assuming a constant birth rate, development of life expectancy on the current basis and net immigration of 200,000 persons per year). This decline will be accompanied by a stronger degree of demographic ageing. Population forecasts are operating on the assumption that by 2030 around 28 percent of the population will be aged over 65. The corresponding figure for 2005 was approximately 19 percent of the population. In contrast to this, the proportion of those aged under 20 will have fallen from 20 percent in 2005 to 16.9 percent by the year 2030 (see Figure 1).

In the medium term, it will no longer be possible to cover the requirement to replace the workforce by the new supply of workers coming onto the labour market. In purely arithmetical terms, the year 2006 will produce a new supply of people of only around 672,000 (who are already born and will enter employment on completion of training in 2026) to replace those born in the baby-boomer years (first half of the 1960's reaching a peak of 1.3 million births in the year 1965) who will enter retirement between 2020 and 2030 (depending on pensionable age). Skilled staff trained from within the new provision of such workers will play a proportionately lower role in driving forwards innovations and the ongoing structural change from an industrial to a knowledge society. Those in employment or the unemployed will increasingly be required to make the necessary adaptation.

The further expansion of the European Common market and the ongoing worldwide economic interlinking (globalisation) of industry, trade and services are also resulting in new and changed skills requirements for employees. World financial markets are subjecting every location to comparison in terms of the profitability of an investment.

This is leading to international competition in respect of infrastructure, social systems, production structures and labour as well as with regard to goods and services. As far as the domestic labour market is concerned, relocation of production to low-wage economies (such as in the case of the clothing, textiles and toy sectors) is generating negative effects. In general terms, the branches affected are those which involve relatively work-intensive production segments featuring simple manufacturing technology (see KNOCHE 2007, p. 19). On the other hand, foreign investments often also enable markets to be opened up and may exert a stabilising effect on domestic employment. "Foresighted companies recognise that human resources are increasingly becoming the critical factor in the success of corporate activity and are realigning their personnel policy and human resources management to be able to use highly skilled and motivated staff as a vehicle for continuing to hold their own in a more fiercely competitive global environment despite alternative workforces and a diminution in the flow of up-and-coming skilled workers" (KNOCHE 2007, p. 1).

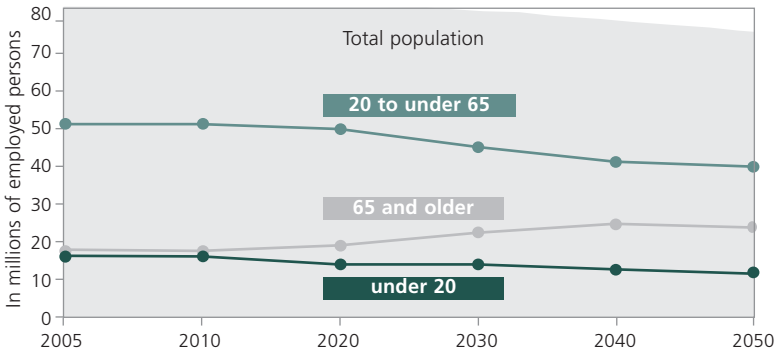
The flexibilisation of work is particularly evident in the wide-ranging forms of employment which now exist, including part-time work, fixed-term employment, agency staff, marginal employment and the pretence of self-employment and extending to encompass the decoupling of work in terms of time and space. Job descriptions are becoming more differentiated, requirements for company-specific knowledge are increasing and dependence on a stronger degree of team work is growing. All of this is happening in conjunction with greater demands for employees to act on their own initiative.

Tertiarisation of branches of trade and industry and of skills requirements and provision

Employment within the primary sector (agriculture, mining) has fallen drastically since 1995, accompanied by a strong attendant decrease in the secondary sector (manufacturing industry, energy, construction). At the same time, the tertiary sector (finance, company services, private and public services) has seen a significant growth in employment in some areas. Although this trend is most discernable in West Germany, it applies to the whole of the country in overall terms (cf. BONIN et al. 2007, p. 63).

This development is accompanied by a trend towards higher qualification (cf. DOSTAL/REINBERG/SCHNUR 2002; BOTT 2003; SCHADE 2007 inter alia), something which the example of the former federal states of West Germany clearly shows. A strong growth in university and University of Applied Sciences graduates of 33.8 percent and 39.6

Figure 1 **Population development in Germany 2005-2050**



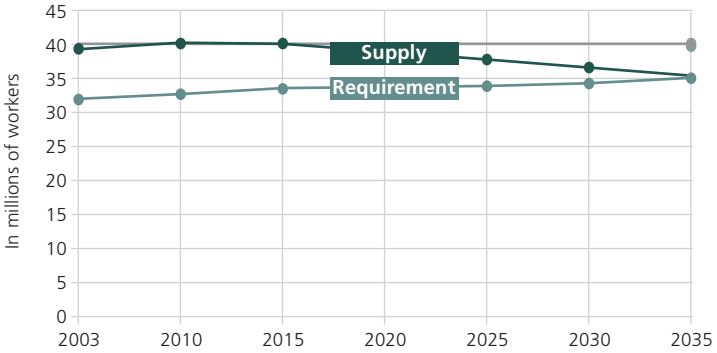
11th Coordinated Population Forecast 2006, "medium variation" of population development: constant birth rate, development of life expectancy on the current basis and net immigration of 200,000 persons per year
Source: DESTATIS (2006), own calculations

percent respectively was recorded between 1991 and 1993, whereas the supply of persons with a master craftsman or technician qualification or with qualifications from trade and technical schools remained at approximately the same level as 1991. During the same period, the number of those who had concluded vocational education and training fell by 9.3 percent and the number who had not completed VET decreased by 28.7 percent (cf. BONIN et al. 2007, p. 70). The trend towards tertiarisation of branches of trade and industry and the attendant additional employee requirements are leading to a greater need for more highly qualified staff. There is significantly lower growth in manufacturing industry, trade in and maintenance of motor vehicles, the hotel and restaurant industry and transport/telecommunications, all of which sectors employ only low proportions of people with a higher education qualification (cf. BONIN et al. 2007, p. 70).

In contrast to this on the supply side, the proportion of people in the population with a higher education qualification has only risen slightly and from a comparatively low base (the 2005 figure for Germany being 19.9 percent compared to an EU 19 average of 34.9 percent; cf. OECD 2007, p. 71).[1] No dominant trend towards tertiarisation in terms of the labour supply is currently discernable in Germany. At the same time, the proportion of persons employed who do not have any formal qualifications has remained virtually constant. The number of employed persons who have completed vocational education and training (including

1 *It should, however, be noted within this context that the high degree of significance accorded to its dual system of vocational education means that Germany displays a high level of education in overall international comparative terms. A proportion of around 83 percent of those aged between 25 and 64 have completed at least an upper secondary school qualification (OECD 2007, p. 41).*

Figure 2 **Labour market balance of the BLK (IZA 2007) for Germany from 2003 to 2035**



Source: IZA (Bonin et al. 2007) (BLK prognosis 2006), own calculations

those who have completed training at a trade and technical school or a master craftsman qualification) underwent a below-average rise. This varying development is reflected in the shift taking place within the overall labour supply. Higher education qualifications are rising in relative terms, whereas the proportions of other levels of qualification are falling. If we take only those in employment, or skilled worker requirements which have been realised, into account, the proportion of those with a higher education qualification in West Germany has risen since the 1980's, by about a half in the case of universities and by around a third for Universities of Applied Sciences.

Information and knowledge work

Information and knowledge work is increasing in the wake of the trend towards technologisation of production and economic processes and the transition to a service and knowledge society and is also bringing about change both in job profiles and skills requirements. Contents of job descriptions are turning away from materials related work to focus on data, information and knowledge oriented work. Alongside the physical added value which converts raw materials into products and services, intellectual added value emerging from knowledge as a raw material is also generated. The productive contact with this raw material is one of the core elements of the knowledge society. Work is becoming increasingly more demanding and more knowledge-based both for the group of highly qualified employees and the self-employed engaged in research, development, construction, marketing and consultancy and at skilled worker level. There is a shift in job requirements profiles from motormanual activities to cognitively abstract work. The requirements for this are broadly based specialist knowledge, correlative thinking, the assumption of process responsibility, autonomy, willingness to work flexibly in groups and readiness to undergo continuing training.

The labour supply and requirements prognoses[2]

Assuming a modest rise in economic output (+ 1.74 % per year), labour requirements will increase during the course of the next 30 years or so. By the year 2020, Germany will see its core labour force requirement climb by 1.7 million to a total of 33.6 million people. Between 2020 and 2035, these labour requirements will undergo a further increase of around one million to 34.6 million. For demographic reasons already indicated, the labour supply will decrease during the same period. In overall arithmetical terms, a balance between supply and demand will be achieved in the years around 2035 (see Figure 2).

A sharply declining labour supply nationwide is expected to occur as early as 2015 onwards. The new labour supply will be increasingly unable to cover the need to replace workers, let alone satisfy new demand. This development is relatively stable and valid. The further important prognosis conducted by the Institute for Employment Research (IAB) in 2007, for example, arrives at virtually the same developments, despite adopting a completely different projection procedure and operating with a different delineation of the groups of persons forming the object of the projection.

The striking feature of the course of the IAB prognosis is the obviously market related progression of requirements. For the first time, a requirements analysis simulates the reaction to a shortage of skilled workers expressed in terms of rising wages and an attendant fall in demand. This regability is make possible via the structure of the INFORGE model (cf. Schnur/Zika 2007), which forms the basis of the IAB prognosis. It has, however, only been possible to project the demand side in this way. A relevant time-coordinated simulation of supply and demand corresponding to an endogenous model has not hitherto taken place.

Change in demand within the branches of trade and industry according to occupations and qualifications

The trend towards tertiarisation mentioned above is also perpetuating itself within the projections. Agriculture and fishery, mining, manufacturing industry, construction and

2 *The following representations are based on analyses of the German Federal Government – Federal States Commission for Educational Planning and Research Promotion (BLK), conducted in 2007 by the Institute for the Study of Labour (IZA, cf. BONIN et al. 2007).*

the public administration sector will all experience declines in demand, whereas the requirement for staff in trade, the hotel and restaurant industry, transport, financial and corporate services and public and private services will increase. The structural change associated with this development will be accompanied by increasing qualifications requirements. Innovative service activities for highly qualified staff will emerge from within the information technology and communication sector in particular and will also be in evidence in the science branch, such as in the field of bio and nano technology.

The development of the various branches of trade and industry will exert an effect on the demand for occupations. Within this context, however, consideration needs to be accorded to the fact that some occupations are extremely heavily concentrated within a particular sector of the economy and display only a very low level of flexibility, whereas other occupations are in evidence in several trade and industry branches meaning that they react in only a very limited manner to changes within a specific sector. These projections have been prepared on the assumption that the distribution of occupations across the areas of the economy will remain relatively constant. In other words, the ratio between commercial administrative staff and bricklayers in the construction industry will, for example, stay the same. If demand for labour within the construction industry falls, both occupational groups will be equally affected and exhibit decreases in line with their respective proportions. Whereas commercial administrative staff, however, are able to display greater flexibility towards their sector and thus able also to gain a foothold in other areas of trade and industry, opportunities for bricklayers are restricted to a very few areas of the economy and retraining offers the only successful way of returning them to employment.

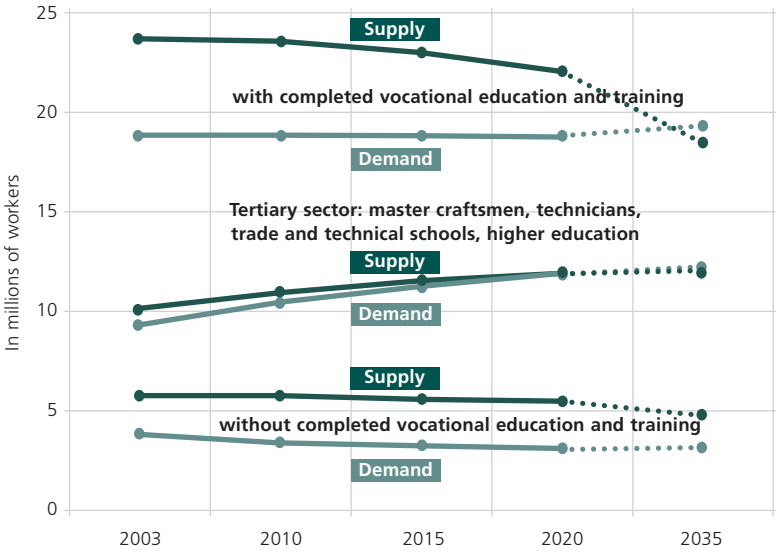
The occupational fields for which growth is predicted are social and educational occupations, organisation, administration, other scientific occupations, technical and scientific occupations, service, bank and accountancy clerks, information technology and data processing. In contrast to this, auxiliary and other work, office occupations, commercial employees, agricultural occupations and manufacturing occupations are areas where the tendency would be to expect a fall in employment.
The development of the branches of trade and industry and demand for labour according to occupations and qualifications enables economic demand for qualifications to be determined. This is illustrated in the requirement for various levels of qualification and, at a detailed level, is also revealed in changes in demand for occupational qualifications characteristics. Figure 3 is based on the BLK prognoses and shows demand and supply projections to 2035 according to three levels of qualification.

The demand for workers who have *not completed a course of vocational education and training* will continue to fall gradually. The fact that supply is only declining slowly means that the existing oversupply will only reduce slightly. This group of persons will not find that the labour market affords them any better employment opportunities in future. Ways need to be found to enable such people to be brought into closer contact with initial and continuing training programmes. They will otherwise be losers on the labour market and will have very little chance of escaping the alternation of periods of unemployment and barely adequate minimum wages. They will continue to place an immense burden on the social security system, even given the fact that it is, at the same time, impossible to fulfil the demand for qualified workers.

Although the supply of persons who have completed *a course of vocational education and training* will fall until 2020, it will continue to remain above the level of demand until 2030. The number of employed persons who have completed a course of vocational education and training will decrease significantly both in absolute and relative terms after 2020 occasioned by the dominant effect of the fall in population. From this point onwards, we will be faced with a rapidly increasing shortage of skilled workers at this level of qualification. From 2035, supply will also no longer be able to cover demand in purely arithmetical terms.

Both supply and demands will continue to rise in the *tertiary* sector, an area where there is already not much of a gap between them. In the case of higher education graduates, expected demand will be approximately equally based on replacement requirements and the new demand caused by structural economic change. From the end of the second decade (from 2020), replacement demand will grow extremely significantly as a result of the retirement of those born in years of high birth rates (baby boomer generation). The shortage of skilled staff in the academic and highly qualified sectors already discernable today, in evidence in such areas as the science sector and a number of technological occupations, will then extend to include virtually all occupational groups and branches. The prognosis already operates on the optimistic assumption that all those looking to undertake higher education study, for example, will be able to do so and that this will happen to the same extent as was the case in the past. This means that the capacity of institutes of higher education to accept students will need to be increased by about 30 percent simply to accommodate the double cohorts in the years between 2012 and 2014 occasioned by the shortening of the period of schooling. The situation will become particularly explosive in the case of non-academically qualified skilled workers such as master craftsmen, technicians and graduates from trade and technical schools. Supply and

Figure 3 **Worker supply and demand according to levels of qualification 2003 to 2035**



Source: (Bonin et al. 2007) (BLK prognosis 2006) own calculations

demand are even now virtually identical in the case of these workers, something which is considered to be an indicator of a massive shortage of skilled workers in some branches.

Opportunities and limitations of labour market projections

Prognoses are a concentrated point of focus for the most probable developments at any given time rather than constituting actual objectives or expressing inevitability. If a prognosis which has a strong academic research basis and which has been conscientiously prepared turns out not to be true, this does not mean that the prognosis is bad. It may still have been able to offer areas of guidance and/or provoke changes in behaviour. And, if it has succeeded in achieving the latter, then it has, of course, also altered its own basic projection principles as well as fulfilling its purpose. For these reasons, it is generally scarcely possible to validate the results of prognoses.

The key element of all prognoses, or to be more exact projections, is that they continue developments of the past into the future via the present. They focus on what will presumably happen if the future develops in a way in which the longer term past has developed down to the present day and include all the well-founded information we believe to possess on the future. Prognoses are nothing further than a description of what would occur if there were no changes to previous trends. The process takes place on the basis of a whole series of assumptions on such factors as economic growth, population development and the proportion of those in employment. If one of these parameters changes, the inevitable consequence is that the result is different.

One particular risk attached to labour market prognoses is considered to be the possible creation of "self-fulfilling prophecies" in such forms as the emergence of so-called "pig cycles". Examples of such labour markets in Germany were the profession of engineer and the teaching profession.

One reason for such developments is delayed action on the part of labour providers, who concentrate on the opportunities of the past and the present when planning their provision. Why not, however, look to the immediate future? Because such information is not available in Germany. Differentiated information on labour market developments is generally one year old (the current statistics being "Occupations as reflected by statistics 2007; www.pallas.iab.de). The lack of transparency on the markets is, therefore, causing this development. Notwithstanding this, it is possible to counter this effect by more timely and regular provision of up-to-date information both in respect of current developments but particularly with regard to future development. Regular updating in particular is the most effective means of combating the pig cycle which may have been presumed to have occurred in the past even in the absence of prognoses. ■

Literature

BLK: Zukunft von Bildung und Arbeit – Perspektiven von Arbeitskräftebedarf und -angebot bis 2015. Bonn 2002

Bonin, H. et al.: Zukunft von Bildung und Arbeit – Perspektiven von Arbeitskräftebedarf und -angebot bis 2020. IZA Research Report No. 9. Bonn 2007

Bott, P.: E-Commerce/E-Business – ein Tätigkeitsfeld im Aufwind. In: Bullinger, H. J.; Gidion, G.; Schnalzer, K.; (Eds.): Transport in die Zukunft – Berufliche Entwicklungen in Logistik und E-Commerce; Bielefeld 2003, pp. 34

destatis: 11. Bevölkerungsvorausberechnung – Annahmen und Ergebnisse. Wiesbaden 2006

Dostal, W.; Reinberg, A.; Schnur, P.: Tätigkeits- und Qualifikationsprojektionen – der IAB/Prognos-Ansatz. In: Kleinhenz, G. (Ed.): IAB-Kompendium Arbeitsmarkt und Berufsforschung. Beiträge zur Arbeitsmarkt- und Berufsforschung, Volume AB 250/2002, pp. 547–556

Knoche, M.: Die deutschen Unternehmen im Globalisierungsprozess – Erfolgsfaktor Personal. ifo-schnelldienst, Weekly reports, Volume 60 (2007) 6, pp. 17–28

OECD: Education at a glance. 2007: – www.oecd.org/dataoecd/4/55/39313286.pdf

Schade, H.-J.: Früherkennung von Qualifikationsentwicklungen in der beruflichen Weiterbildung – Untersuchungsansätze im Bundesinstitut für Berufsbildung. In: Abicht, L. et al.: Auf der Suche nach neuen Qualifikationen – Methoden der Früherkennung von Qualifikationsentwicklungen, Bielefeld 2007, p. 101

Schnur, P.; Zika, G.: Arbeitskräftebedarf bis 2025: Die Grenzen der Expansion (IAB Brief Report 26/2007), Nürnberg 2007

Tiemann, M. et al.: Berufsfeld-Definitionen des BIBB auf Basis der KldB 1992. Bonn 2008

Dual vocational education and training in the service society

▶ The dual system of vocational education and training in Germany is frequently accused of failing to have achieved the leap into the knowledge and service society and of remaining too rigidly aligned to the production sector.

The present paper uses the results of empirical analyses conducted by the Federal Institute for Vocational Education and Training (BIBB) as a basis for investigating whether the structures of the dual systems are, in fact, still operating in accordance with their historical origins. The results provide evidence that the increasing significance of the service sector initially brought about an attendant weakening of in-company training, although dual training has now made significant strides in developing in line with the service society. Work still remains to be done in respect of the more knowledge oriented service occupations. Of particular importance here is not to narrow down the debate to the competitive aspect of higher education.

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Since the 1980's the service sector has been taking on a dominant role in terms of the proportion of employment in Germany. The development towards a service society[1] is associated with the move towards a knowledge society[2] in which knowledge becomes a strategic resource for the generation of economic performance. The change in employee structure inevitably brings in its wake the issue of the effects exerted on skills requirements in the workplace and the demands placed on the educational and vocational education and training system.

The dual system of vocational education and training, which has its historical origins in industry and in commercial and technical occupations in particular, is often accused of continuing to align itself to these traditional structures.[3] The argument is that the emergence of a service and knowledge society has tended to bring about an increase in the importance of systematic theoretical knowledge and a decrease in the significance accorded to know-how or implicit knowledge,[4] the assertion being that the fact that vocational education and training within the dual system "is continuing to lose ground against higher general education and academically based education"[5] by dint of its integration into the work process.

The Federal Institute for Vocational Education and Training (BIBB) has conducted a series of empirical analyses to investigate the extent to which the structures of the dual system still actually correlate with their historical origins or to

1 *The French economist Jean Fourastié used this term in 1949 to describe societies in which a predominant proportion of employees work in the tertiary sector. Fourastié, J: Die große Hoffnung des zwanzigsten Jahrhunderts, Cologne 1954*

2 *Cf. Bell, D.: Die nachindustrielle Gesellschaft, Frankfurt/Main 1985. For more recent debate cf. e.g. Heidenreich, M.: Die Debatte um die Wissensgesellschaft. In: Büschen, S.; Schulz-Hoffner, I.: (Eds.): Wissenschaft in der Wissensgesellschaft, Opladen 2003*

3 *Baethge, M.; Solga, H.; Wieck, M.: Berufsbildung im Umbruch. Signale eines überfälligen Aufbruchs. Gutachten zur beruflichen Bildung in Deutschland im Auftrag der Friedrich-Ebert-Stiftung, Berlin 2007*

4 *ibid p. 73*

5 *ibid p. 74*

discover how far a process of adaptation to the increased significance of the service sector has become established.[6]

When considering the service sector, a general distinction needs to be drawn between a perspective based on branches of trade and industry and a perspective based on occupations or occupational groups. Training for service sector occupations certainly occurs in manufacturing industry and viceversa. These two differentiations need to be clearly delineated when making statements on vocational training. BIBB has investigated both economically related and occupationally related structures and developments.

No adverse effects as a result of structural change since the 1990's

Troltsch has conducted a branches of trade and industry related observation to investigate the correlations between the structures and developments within the employment system and the provision of in-company training places for the service sector.[7] This analysis is based on the statistics on employees and companies issued by the Federal Employment Agency and differentiates between phases of development from 1980 to 1998 and from 1999 to 2004. The analysis of the first of these periods initially shows a significant decline in the number of people employed in manufacturing industry at the end of the 1990's compared to 1980, whereas a clear increase was recorded in the tertiary sector. During the period forming the object of investigation, the primary and secondary sectors suffered a reduction in jobs of 1.9 million compared to an increase of 3 million for those working in the service sector. Manufacturing industry saw a sharp decline in the number of trainees, the fall here being significantly greater than the decrease in the number of employees. Despite the positive development in employment within the service sector, there was also an adverse movement in the number of trainees, albeit to a significantly more moderate extent than was the case in manufacturing. As a result, in-company training has been significantly weakened with an attendant fall in the training quota. A similar development applies in respect of the number of companies providing training and general participation in training by companies. In overall terms, 440,000 training opportunities for young people were lost during the period forming the object of investigation. We may, therefore, observe that the tertiarisation of the economy during this phase of development was accompanied by a significant restriction in company training activities. The climax of this development was reached during the late 1980's, the process largely having come to a halt by the start of the 1990's.[8] Although in-company training continued to decline during the period from 1999 to 2004, the falls were significantly lower than those which took place in employment. A considerable proportion of the further restrictions which occurred in in-company training was due to the construction industry and occasioned by general economic development. By way of contrast, the tertiary sector saw an increase in the number of trainees which even exceeded the growth in the number of employees which had already taken place. Relative participation in training by companies has not declined further, and has indeed even exhibited a slight increase in recent years. The overall conclusion is that no further adverse effects have been exerted on in-company training as a result of structural change since the 1990's.

Significant growth in dual VET in service occupations

Employment statistical data shows us that the main focus of the dual system today is clearly on the service sector rather than on manufacturing industry as was previously the case. Around two thirds of all trainees complete their training in the service sector.[9] By way of comparison, the supply of training places available in the private service sector and public or non-profit sector in 1980 was only 38 percent and 11 percent respectively.

An analysis conducted by Uhly sheds light on the significance of the service sector for an occupationally related consideration of the dual system.[10] The changes in dual training occupations during the period from 1995 to 2005 formed the object of investigation. The results show that there has been a significant shift towards service occupations. Around 57 percent of all training contracts, for example, are now concluded in service occupations. A further reason for this development is the fact that a series of new service sector occupations have been developed and have enjoyed acceptance over the course of recent years. Nevertheless, production oriented occupations remain signifi-

6 *For more detailed information on the individual results cf. the papers published in Walden, G. (Ed.): Qualifikationsentwicklung im Dienstleistungsbereich – Herausforderungen für das duale System der Berufsbildung, BIBB (Ed.), Bielefeld 2007*

7 *Troltsch, K.: Der Stellenwert des tertiären Wirtschaftssektors für das duale Berufsbildungssystem. In: Walden, G. (Ed.): pp. 51-97*

8 *Cf. also Troltsch, K.: Der Stellenwert des tertiären Wirtschaftssektors für das duale Berufsbildungssystem. In: Walden, G. (Ed.): pp. 51-97*

9 *The 2004 training figures for West Germany (not including Berlin) showed that 54.6% of trainees underwent training in the private tertiary sector and that 9.6% entered training in the public or non-profit sector. Cf. Troltsch, K.: Der Stellenwert … p. 64*

10 *Uhly, A.: Der berufsstrukturelle Wandel im dualen System der Berufsausbildung – Empirische Befunde auf Basis der Berufsbildungsstatistik des Statistischen Bundesamtes [Occupation structural change in the dual system of vocational education and training – empirical findings on the basis of the vocational education and training statistics of the Federal Statistical Office]. In: Walden, G. (Ed.): pp. 209-257*

cantly overrepresented within the dual system of vocational education and training compared to the proportion of employees working in these occupations.

If a distinction is drawn between primary and (the more knowledge oriented) secondary occupations, the main focus of the dual system is clearly on primary service sector occupations (47% of all trainees). Secondary service occupations are significantly underrepresented (9% of all trainees, production oriented occupations 44%).[11]

Do white collar replace blue collar workers?

The ratio between those trained in-company and those who have undergone higher education may initially be viewed from a competition or substitution aspect. A complementary correlation may, however, also be identified, as demonstrated by Troltsch[12] and Hall[13]. Troltsch arrives at the result that a higher proportion of more highly qualified workers within a company may exert positive effects on the readiness of the companies to provide training. A direct comparison between companies in the tertiary sector which provide training and which do not provide training shows a higher proportion of more highly qualified employees in the companies which do provide training. A growth in the number of employees who have completed higher education is also frequently associated with corresponding increases in skilled workers who have been trained in-company. Hall's analysis ascertains that the field of employment represented by secondary services is an area in which persons with intermediate vocational qualifications have been able to gain an employment boost rather than merely remaining a domain for those who have completed academic education. Around one in three of those who have completed intermediate vocational qualifications is working in the field of the expanding secondary service occupations. Between 1996 and 2004, this sector experienced an increase in employees both in number of persons with a University of Applied Sciences degree or other higher education degree and the number of persons with intermediate vocational qualifications, the growth figures being 13.1 percent and 9.9 percent respectively.

Development towards a service society

We may state that dual training has clearly developed in the direction of the service society over the course of the past decades, although this development has taken place in a delayed manner and after the system had already lost ground in terms of quantitative significance. It has not proved possible to compensate for the loss of traditional jobs in manufacturing, a process which began in the 1980's, by additional jobs in the service sector. The decline in relative participation in training by companies came, however, to an end by the mid 1990's at the latest.
Evidence of further weakening of the dual system has been absent since the mid 1990's. The main reason for the ongoing and continual decline in in-company training provision, at least until the year 2005, is the generally negative development in employment. By way of contrast, an increase in the number of trainees in the service sector was even achieved. For a considerable period of time now the majority of trainees has been undergoing training in the service sector rather than in manufacturing industry.

There has also been a significant decline in the traditionally strong commercial and technical characteristics of the dual system at the occupational level. There has been a strong increase in the number of newly concluded contracts in the service occupations since the mid 1990's. The figure of such contracts as a proportion of all newly concluded contracts has also significantly risen, reaching just under 57 percent by 2005. The creation of a series of new service sector occupations has undoubtedly exerted an impact on this development.[14] Although the dual system has become part of the service and knowledge society to this extent, the main focus of dual training is on the primary service occupations. Despite the growth in dual training, this is an area where much remains to be done in respect of the more knowledge oriented service occupations.

Views must not be narrowed as to only consider the aspect of competition in respect of the development in employment of persons with an intermediate level of qualification and those who have completed higher education. Areas in which a growing number of higher education graduates are involved bring fields of activity for workers with an intermediate level of qualification in their wake. The number of unskilled workers remains high and constitutes potential for growth or stability within the intermediate level of qualification, even if this would bring about an attendant rise in the number of higher education graduates.

11 *Cf. Uhly p. 221. Alternatively, since the figure has now also been included: Unterscheidung zwischen primären und sekundären Dienstleistungsberufen in Anlehnung an Kupka/Biersack (IAB), see Uhly pp. 224*

12 *Troltsch, K.: Auswirkungen betrieblicher Qualifikationsstrukturen und am Qualifikationsbedarf orientierter Rekrutierungsstrategien auf das Bildungsangebot im Dienstleistungssektor. In Walden, G.: pp. 99-123*

13 *Hall, A.: Tätigkeiten, berufliche Anforderungen und Qualifikationsniveaus in Dienstleistungsberufen [Activities, occupational requirements and skills levels in service occupations]. In: Walden, G.: pp. 153-208*

14 *Cf. Schöngen, K.; Westhoff, G.: Ausbildung in jungen Dienstleistungsbranchen – empirische Ergebnisse und ihre Weiterentwicklung im Modelversuchsprogramm „Flexibilitätsspielräume". In: Walden, G.: pp. 125-142*

Table: **Qualification levels according to occupational fields 1996 to 2004**

Production occupations	**1996**	**2000**	**2004**	**Absolute terms**	**In %**
No vocational education and training	1,895,700	1,655,500	1,336,300	-559,400	-29.5
Completed apprenticeship, trade and technical school	7,144,000	6,688,600	6,011,800	-1,133,000	-15.9
University (of Applied Sciences) qualification	150,100	144,600	150,700	600	0.4
Primary service occupations	**1996**	**2000**	**2004**	**Absolute terms**	**In %**
No vocational education and training	2,497,000	2,453,200	2,345,200	-152,700	-6.1
Completed apprenticeship, trade and technical school	9,222,600	9,401,700	9,179,200	-43,400	-0.5
University (of Applied Sciences) qualification	722,700	686,300	853,700	131,000	18.1
Secondary service occupations	**1996**	**2000**	**2004**	**Absolute terms**	**In %**
No vocational education and training	607,700	593,900	593,000	-14,700	-2.4
Completed apprenticeship, trade and technical school	5,409,000	8,895,100	5,946,200	537,200	9.9
University (of Applied Sciences) qualification	4,092,200	4,208,100	4,629,900	537,700	13.1
All occupations	**1996**	**2000**	**2004**	**Absolute terms**	**In %**
No vocational education and training	5,001,300	4,702,600	4,274,500	-726,800	-14.5
Completed apprenticeship, trade and technical school	21,776,400	21,985,400	31,137,200	-639,200	-2.9
University (of Applied Sciences) qualification	4,965,000	5,039,000	5,634,300	66,900	13.5

Taken from: Hall, A.: Tätigkeiten, berufliche Anforderungen und Qualifikationsniveaus in Dienstleistungsberufen. In Walden, G.: p. 190

Source: Microcensus Scientific Usefiles 1996, 2000, 2004; calculations from BIBB
Employed persons not including trainees in private households at their main place of residence

The impact of the fundamental changes in the higher education area occasioned by the broad introduction of Bachelor courses of study is likely to be of significance for the further development of the dual system in the service sector. Development structure here will certainly be subject to vocational education and training policy rather than being inevitable.

Concluding remarks

In overall terms, a series of fundamental research issues and practical structural tasks emerge from the results of the analyses conducted by BIBB:

- Models involving the linking and cooperation of dual training with the higher education sector should be further developed and established on a broader foundation. Within this context, permeability from the dual system to the higher education sector also needs to be further improved. The assumption is that considerable impetus in this area will be generated by the debate surrounding the introduction of a European and National Qualifications Framework.
- The question of the perception of service activity within an intermediate qualifications segment delineated from the area of those who have completed higher education requires fundamental clarification.[15] The weighting of experience driven and school oriented learning processes is also something which needs to be explored within this context. This is linked to the issue of what requirements for vocationalism will exist in the service sector in future.
- As far as the tailoring of service sector occupations is concerned, questions relating to the spectrum of qualification levels to be covered by training occupations need to be addressed. A further issue needing to be tackled within this regard is the future role service sector occupations will be able to adopt in terms of segments of activity tending to feature reduced skills.
- A further problematic aspect is the fact that service occupations are frequently differentiated from production oriented occupations by being accorded equivalence with commercial occupations. This is an area where there is a need for clearer definition of the terms “service activity” and “service occupation” and for further appropriate structuring criteria.[16]
- In terms of content, questions as to the tailoring of occupations within the service sector will continue to emerge to a heightened extent. Another aspect requiring clarification in this regard is whether it is possible to identify core elements and core curricula for individual areas of activity and whether it is possible to combine mono occupations to form occupations with differentiated profiles. A debate on the modernisation of the vocational education and training system analogous to such debate as the present discussion on the construction of training modules needs to be instigated for this purpose.

The future of the dual system within the service sector will, in the same way as the development of the system as a whole, ultimately also depend on the extent to which it succeeds in covering the demand of young people for in-company training. Although a consideration of the demand side has not been undertaken here, the considerable quantitative deficits in in-company training places over the course of recent years have been common knowledge. For this reason, one of the major tasks of vocational education and training policy over the course of the coming years will be to achieve fundamental improvements in this area. ■

15 *Cf. here Dietzen, A: Ausgewählte Schwerpunkte der soziologischen Arbeits- und Qualifikationsforschung im Dienstleistungsbereich. In: Walden, G.: pp. 19-50*

16 *Cf. Brötz, R.; Paulini-Schlottau, H.; Trappmann-Webers, B.: Stand und Perspektiven kaufmännisch-betriebswirtschaftlicher Dienstleistungsberufe. In: Walden, G.: pp. 259–289*

The course of training and the transition to employment

A comparison of participants in in-company and school-based vocational training

▶ The recent bottlenecks which have occurred on the apprenticeship market have forced many young people to make compromises, sometimes having to forgo the occupation they have set their hearts and even having to fall back on school-based vocational training in some cases. What were the implications of this for the course of their training? Did they complete their training or did they drop out? And what are the chances of making the transition to employment for those who have completed school-based vocational training rather than an in-company apprenticeship? The aim of the present paper is to use the BIBB transitional study as basis for identifying the answers to these questions.

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The negative development in employment brought a strong decrease in the provision of training places within the dual system in its wake, a fall which continued to the middle of the present decade. Compared with 1992, when 721,800 training places were available, the figure for 2005 was only 562,800. The number of general school leavers moved in the opposite direction, rising from 759,700 to 939,300 in the same period. Considerable bottlenecks were the result of all this as young people continued to display the same high degree of interest in dual training.

The problems faced by unsuccessful training place applicants at the so-called "first threshold" (transition from school to vocational training) are a topic which has frequently been addressed over the course of recent years (cf. Beicht/Friedrich/Ulrich 2007), whereas relatively little attention has been accorded to young people who managed to secure a route into vocational training. The presumption would be that the hurdles at the "first transition" also leave their mark on successful training place applicants. It is likely that many have made compromises, whether this be in the form of having to fall back on their "second choice" occupation within the dual system or of needing to pursue an alternative route into the school-based vocational training system. Such compromises affect training motivation, however, and the fear would be of a greater tendency to drop out.

For this reason, we are seeking to address the issue of how many of those who have commenced training over the course of recent years have actually completed the full normal term of their vocational education and training and of how such trainees succeeded in making the transition from vocational training to employment ("second threshold"). The basis of the present paper is the "BIBB transitional study 2006", a representative survey which involved collecting retrospective information on the education and occupational experiences of young people born between 1982 and 1988 (for information on the methodological approach adopted cf. Beicht/Friedrich/Ulrich). The analyses include approximately 3,000 participants who had begun their first fully qualifying course of vocational edu-

Table 1 **Persons commencing initial vocational education and training in the form of in-company training or a school-based occupation according to personal characteristics**

Characteristics of young people commencing training [1]	In-company training	Training in a school-based occupation
	Column percentages (weighted)	
School leaving qualification *** (on leaving general education)		
• Maximum of lower secondary school leaving certificate	45.9	28.2
• Intermediate secondary school leaving certificate	47.5	59.4
• Upper secondary school leaving certificate, University of Applied Sciences entrance qualification	6.6	12.4
Average certificate mark on leaving school (German system from 1 to 6)		
• Up to 1.9	7.1	8.3
• 2.0 to 2.9	50.3	52.1
• 3.0 to 3.9	37.9	35.9
• 4.0 and worse	4.6	3.6
Gender ***		
• Male	61.7	24.2
• Female	38.3	75.8
Migrant background		
• No migrant background	80.3	79.0
• From a migrant background	19.7	21.0
Type of occupation ***		
• Commercial/technical occupation [2]	56.2	7.0
• Service occupation	43.8	93.0
Training and preferred		
• occupation *** "is my preferred occupation"	47.6	53.8
• "at least resembles my preferred occupation"	26.3	29.9
• "is not my preferred occupation"	18.4	11.8
• "do not have a preferred occupation"	7.7	4.5

1) Significance test (χ^2-, t-tests) of the bivariate correlations with the selected form of training on the basis of unweighted data: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$
2) Including occupations in the primary sector

Source: BIBB transitional study 2006. Basis: persons born between 1982 and 1988 whose initial vocational education and training took place in in-company or school-based form (unweighted case figures: in-company training: n = 2.484; training in a school-based occupation: n = 670)

cation and training either as trainees in a company (which includes commercial firms, local authorities or professional practices) or else as a pupil in a vocational school-based training occupation.[1]

New in-company trainees compromise more frequently their occupational choice

We also know from vocational education and training statistics that young people who enter in-company training are predominantly male and include a relatively high number of lower secondary school leavers (cf. Table 1). The main focus of school-based occupations is in the service sector, and these mainly attract females or persons who have attained at least an intermediate secondary school leaving certificate. Our random sampling did not reveal any significant differences in certificate marks. The proportion of young people from a migrant background was also approximately equal in both training systems.
Notwithstanding this, in-company trainees needed to make compromises more frequently in terms of choice of occupation. Only about 48 percent were able to fulfil their wishes entirely in this respect, whereas 18 percent explicitly emphasised that they were not undergoing training in their preferred occupation. A further 26 percent were at least able to discern similarities with their preferred occupation. Those commencing school-based training were significantly more likely to be able to realise their preferred occupation, although the proportion of 54 percent was much lower than we had expected on the basis of the fact that access to the school-based occupational training system is largely unaffected by the market.

More drop-outs within school-based occupations

Although young people in school-based occupations were able to fulfil their occupational preference on a more frequent basis, they were more likely to drop out of vocational education and training before completion[2] (cf. Figure 1). The probability of drop-out in the case of an in-company apprenticeship was, by way of contrast, only particularly high during the first three months with relatively moderate development thereafter. One year after commencing training, a total of seven percent had dropped out of in-company vocational training before completion. The corresponding figures after two and three years were ten and eleven percent respectively. In the school-based occupations system, on the other hand, accumulated drop-out rates had already reached a level of ten percent after one year and were 15 percent and 19 percent after two and three years respectively. As far as apprenticeships were concerned, it was clear that the highest danger of drop-out was during the probationary period. Subsequent to this, no further phase of training was characterised by a particularly high degree of risk. The situation in the case of the school-based occupations was quite different. Considerable increases in the drop-out rate occurred at the end of each school year.

What were the reasons for dropping out of training? The most frequent reasons stated in the case of in-company

1 The survey did not include trainee civil servants or extra-company or school-based new trainees in occupations regulated by the Vocational Training Act (BBiG) or the Crafts and Trades Regulation Code (HwO).

2 Not including those who failed the final examination. The period of observation of 36 months corresponds to the stipulated duration of training in most occupations. Persons undergoing a shorter duration of training were treated as cut-off cases.

apprenticeships (56%) were problems with training and teaching staff, colleagues, fellow pupils or other trainees.[3] These difficulties played a significantly lower part in school-based occupations. Those dropping out of school-based vocational training were more frequently likely to indicate that the training was too difficult (26% as opposed to 12% in the case of those dropping out of in-company training). At the same time, the former were more likely (31% as opposed to 20%) to state prospects of another (better) training opportunity as the reason for dropping out of vocational training early. Young people acting in this way often waited for the end of the school year before dropping out so as to be able to commence a new training course without having to wait for a lengthy period.

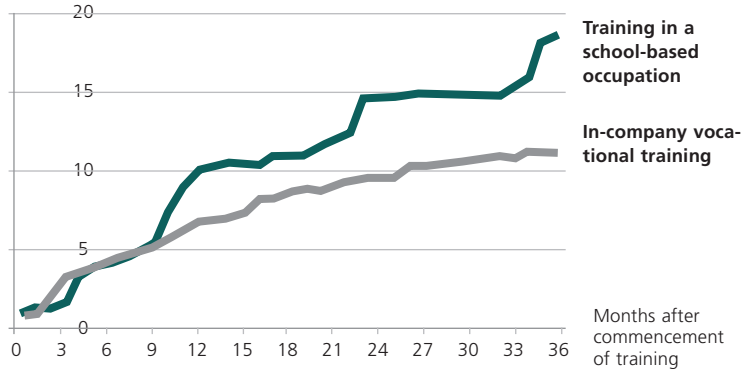
A significant factor in both forms of training was the fact that the occupation was not suitable. This aspect was stated somewhat more frequently by those dropping out of in-company training (51%) than it was by school-based drop-outs (44%). The difference between the groups was not, however, significant in statistical terms.

The results of a Cox Regression indicated that explicit failure to obtain a training place in a trainee's preferred occupation led to a particularly high degree of probability that drop-out would occur (cf. Table 2). No increased level of risk was discernable in the event that the chosen occupation at least displayed similarities with the preferred occupation, the same applying in instances where young people had not had any clear occupational preferences. Another factor which diminished the risk of drop-out was a better level of performance in general schooling, whether exhibited in the form of higher school leaving qualifications or better certificate marks. Young people from a migrant background were fundamentally at greater risk of dropping out. Gender, on the other hand, did not play a significant role. The Cox Regression also confirmed findings on the influence exerted by the form of training. In the case of school-based vocational training, the probability of drop-out rises disproportionately over the course of time[4] and significantly exceeds the risk of drop-out from an in-company apprenticeship in overall terms.

In-company trainees move more rapidly to employment

What was the nature of the development undergone by those participants in the survey able to conclude their vocational education and training successfully? As Figure 2 shows, there were considerable deviations during the course of the first year depending on the form of training. 47 percent of those who had undergone in-company training were in permanent employment and working more than 20 hours per week after three months. Together with

Figure 1 **Development of the accumulated probability of drop-out during the course of in-company and school-based vocational training estimated according to Kaplan/Meier** Accumulated probability of drop-out in percent (weighted)



Source: BIBB transitional study 2006. Basis: persons born between 1982 and 1988 whose initial vocational education and training took place in in-company or school-based form (unweighted case figures: in-company training: n = 2.484; training in a school-based occupation: n = 670)

those who were employed in other ways, this made a total of 72 percent in employment. By way of contrast, only 15 percent of those who had completed training in a school-based occupation had entered the same type of permanent employment and the total proportion of the latter group in employment was a mere 40 percent.

Twelve months after the end of training, the proportion of those who had undergone in-company training and found permanent employment had risen to 50 percent, although there had been a decrease in the number of fixed-term employment contracts. The reasons for this are likely to include the fact that fixed-term contracts of employment offered to trainees in the company where they had completed their training had now come to an end. For this reason, there had been a slight fall in the overall proportion of all those in employment to 69 percent. In the case of those who had completed school-based training, the proportion of those in permanent employment had risen to just under 20 percent, meaning the total of those employed was now 56 percent in overall terms. Around 30 percent of those who had completed school-based trai-

3 *Interviewees were permitted to state more than one reason.*

4 *In the case of a Cox Regression, assumption of proportionality should be fulfilled for the covariates included. The model is imperfect if, as is the case here, – expressed in simplified terms – probabilities of drop-out in the case of in-company and school-based training do not develop in the same proportion to each other over the course of time. In this case, an interaction variable needs to be integrated into the regression model along with the time (for more information on the procedures of the Cox Regression cf.* Diekmann/Mitter *1984 inter alia).*

ning found themselves back in the educational system after one year. 17 percent had entered new, fully qualifying training including higher education study and 13 percent were attending a specialised upper secondary school or a specialised grammar school or else were participating in a full-time continuing training measure. Eight percent were either unemployed or engaged in other activities. Of those who had completed in-company training, ten percent were back in the educational system and only five percent were pursuing a second course of training. The proportion of those without employment or engaged in other activities was twelve percent.

Debate

Particular emphasis needs to be accorded to two results. Firstly, the total proportion of in-company trainees dropping out early, which was eleven percent, was lower than we had expected given the transitional problems at the "first threshold" and the associated compromises in terms of selection of occupation. Secondly, it is noticeable that young people in school-based occupations dropped out of their vocational education and training significantly more frequently although they were more likely to be able to realise their preferred occupation as well as having a higher level of prior learning at school.

Table 2 **Cause variables for the development of the drop-out rate – results of a Cox Regression**

Cause variables investigated [1]	e^{β}
School leaving qualification	
Reference: maximum of lower secondary school leaving certificate	*1*
• Intermediate secondary school leaving certificate	.653**
• Upper secondary school leaving certificate, University of Applied Sciences entrance qualification	.636**
Average certificate mark (on leaving school)	1.415***
Gender	
Reference: male	*1*
• Female	1.296
Migrant background	
Reference: no migrant background	*1*
• From a migrant background	1.430*
Type of occupation	
Reference: commercial/technical occupation	*1*
• Service occupation	.979
Training and preferred occupation	
Reference: "is my preferred occupation"	*1*
• "at least resembles my preferred occupation"	.898
• "is not my preferred occupation"	3.622***
• "do not have a preferred occupation"	1.179
Form of training	
Reference: in-company training	*1*
• School-based training	2.883***
Time change in the effect of the form of training on the drop-out rate	
Reference: in-company training	*1*
• School-based training	1.685**
Overall model: χ^2 = 159,656 df = 11 p = .000	

1) The effect coefficients e listed in the right-hand column indicate the influence of the various variables and group alignments on the drop-out rate. Values greater than 1 indicate a higher probability of drop-out (compared to the respective reference group) whereas values smaller than one indicate a lesser such probability. The effect coefficient of the average certificate mark numeralises the effect of a school performance worse by one mark.
Significance levels: * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001.

Source: BIBB transitional study 2006. Basis: persons born between 1982 and 1988 whose initial vocational education and training took place in in-company or school-based form (unweighted case figure: n = 3.071).

STABLE TRAINING COURSES IF COMPANIES TAKE "THE PICK OF THE CROP"

Paradoxically, we cannot exclude the possibility that the surprisingly low drop-out proportion in the case of in-company training is (also) a consequence of the transitional problems which occur at the "first threshold". In light of the very high numbers of applicants, companies were largely able to operate by selecting the "the pick of the crop". This approach caused higher ability trainees to enter apprenticeships, and feelings of being out of their depth played a relatively minor role as a reason for dropping out of training, as seen here. The risk reducing effect produced by this higher level of qualification (cf. Bessey/Backes-Gellner 2007 p. 17) was possibly stronger in overall terms than the negative motivational impacts occasioned by failing to secure entry to preferred occupations.

The fact that the officially measured rates of apprenticeship contracts terminated early in times of high numbers of applicants did not fall in any way is conspicuous (even falling from 24.1% to 19.8% between 2002 and 2006). The reason for this phenomenon is to some extent considered to lie in the lack of opportunity for potential training drop-outs to change training given the bottlenecks on the training market (cf. Brosi/Werner 2003). This may, however, also support our thesis that companies were increasingly able to adopt a "pick of the crop" policy. The fact that the drop-out rate of eleven percent measured by us was significantly lower does not constitute a contradiction of the official statistics. These statistics count all terminated contracts rather than merely genuine drop-outs. We also know that around half of those whose contracts are terminated continue their training directly afterwards, mostly within the same occupation (cf. Schöngen 2003). In addition to this, our study does not take into account terminated training contracts where cancellation of the contract took place before the commencement of training or a few days after.

SCHOOL-BASED TRAINING: MORE LIKELY A WRONG INDIVIDUAL DECISION?

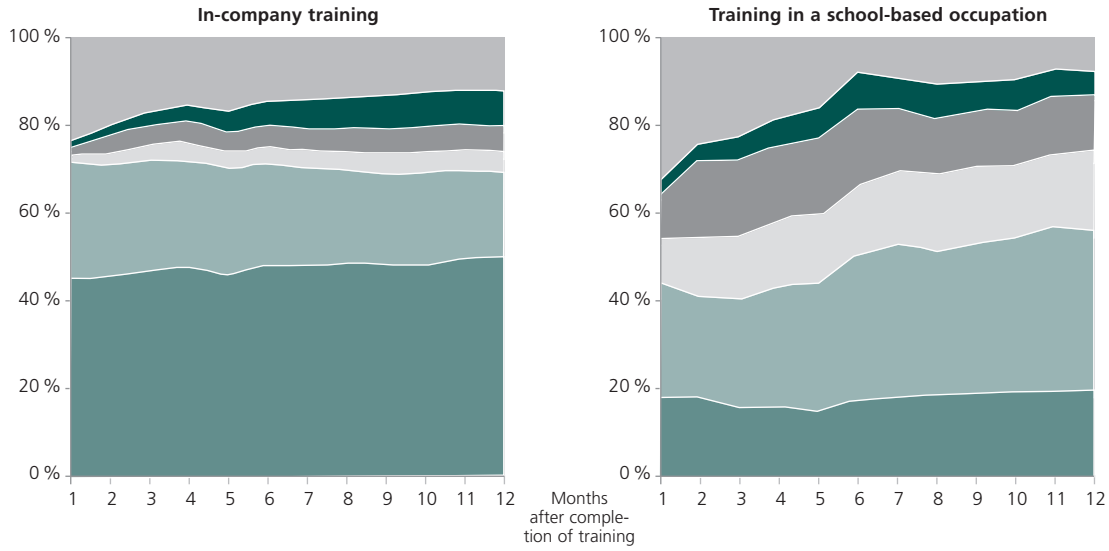
The residual problems at the "first threshold" are likely to be part of the reason for the higher drop-out rate in the school-based occupations, and the anticipated hurdles at

Figure 2

Status distribution in the first twelve months after completion of initial vocational education and training

The figure depicts the numbers of young people finding themselves in a particular situation (such as employment or training) at different points in time after conclusion of training. The graphs provide a precise month-by-month picture of overall distribution in percentage terms (weighted).

The graphs include only young people who completed training in the summer of 2005 or earlier, i.e. those who had already concluded a period of twelve months following training at the time the survey was undertaken.



- Unemployment, Federal Employment Agency scheme (e.g. "one euro job", job creation scheme), seeking/waiting for educational opportunity, at home, other activities
- Military/civilian service, voluntary social or ecological year
- Specialised upper secondary school, specialised grammar school, vocational education scheme including continuing training (except vocational education and training)
- Fully qualifying training including higher education study
- Employment, fixed-term or fewer than 20 hours per week
- Permanent employment involving at least 20 hours per week

Source: BIBB transitional study 2006. Basis: persons born between 1982 and 1988 whose initial vocational education and training took place in in-company or school-based form (unweighted case figures: in-company training: n = 860; training in a school-based occupation: n = 207)

the "second threshold" are probably a second partial aspect. The "first threshold" also plays a part in the process to the extent that a conspicuously large number of young people made career choice compromises at the transition to the school-based occupation system. Within this context just under half of those commencing training in school-based occupations had also sought a training opportunity within the dual system.

It is apparent that the school-based occupation system is being accorded a safety net function, especially given the fact that its access regulations are less dependent on the market. Notwithstanding this, requirements within the school-based occupation vocational education and training system often seem to have been underestimated. The fact that trainees who dropped out relatively often stated a feeling of being out of their depth for doing so indicate that some of these trainees were not in possession of the necessary prior learning to embark upon school-based training.

As the results have shown, young people in school-based training occupations need to expect that they will encounter significantly greater hurdles at the "second threshold". Pupils are obviously aware of this, and the fear of such problems causes some to seek alternative educational courses. A significant number decide to drop out of training in order to be able to embark on such alternatives, although many wait until the conclusion of their initial vocational education and training before doing so. The long-term implications of this double or higher training should certainly not be viewed negatively from an individual point of view. After all, extensive education fundamentally reduces the risk of future unemployment. Having said this, however, the fact remains that the extremely high proportion of those completing training who then immediately re-enter the educational system without having had longer term experience of employment raises issues with regard to the education economy (cf. Feller 2004). ■

Literature

Beicht, U.; Friedrich, M.; Ulrich, J. G.: Deutlich längere Dauer bis zum Ausbildungseinstieg. BIBB Report 2/2007

Beicht, U.; Friedrich, M.; Ulrich, J. G. (Eds.): Ausbildungschancen und Verbleib von Schulabsolventen in Zeiten eines angespannten Lehrstellenmarktes

Bessey, D.; Backes-Gellner, U.: Premature Apprenticeship Terminations: An Economic Analysis. University of Zurich, Institute for Strategy and Company Economics 2007

Brosi, W.; Werner, R.: Lösung von Ausbildungsverträgen – ein bildungspolitisch wichtiges Thema, methodisch statistisch schwierig zu fassen. In: Althoff, H. Et al. (Ed.): Vorzeitige Lösung von Lehrverträgen und Ausbildungsabbruch. Bielefeld 2003

Diekmann, A.; Mitter, P.: Methoden zur Analyse von Zeitverläufen. Stuttgart 1984

Feller, G.: Ausbildungen an Berufsfachschulen – Entwicklungen, Defizite und Chancen. In: BWP Vol. 33 (2004) Issue 4, pp. 48–52

Schöngen, K.: Ausbildungsvertrag gelöst = Ausbildung abgebrochen? In: BWP Vol. 32 (2003) Issue 5, pp. 35-39

Possible ways forward – routes towards the recognition of informally acquired competences

▶ Employability skills are to a considerable extent acquired within informal learning processes, meaning via dealing directly with occupational requirements. This takes place in a context related manner and depends on the characteristics of the work activity, the scope of action and the complexity of the requirements. Acquisition of competences tends to occur in an implicit, incidental and uncontrolled way and without didactic support. Although this leads to the gaining of know-how which can be verbalised only to a limited extent, it is very likely to have its basis in a reflective approach. For this reason, this pathway enables the acquisition of complex skills and cognitive competences rather than merely reduced skills.

The fostering of the measurement, validation, recognition or crediting of informally acquired competences has now become part of the educational policy repertoire. There is no doubt that this is justified. Practically related learning in the world of work and employment or within the family and social environment ought to be upgraded as part of lifelong learning and should be more closely linked with formal learning processes. The aim should be for this to make transitions easier and enable better use to be made of periods of education.

Notwithstanding this, such demands usually remain non-committal and are seldom couched in specific terms. No precise stipulation exists as to the target groups at which recognition of informal learning should be aimed and the instruments and procedures which should be used to realise such an objective. For this reason, evidence of benefits is only available in general rather than in specific form, and there is insufficient clarity as to the requirements for educational policy action which exist. In the absence of specification of this nature, however, demands will largely be unaccompanied by follow-up action. Although everyone is capable of taking ownership of these demands, everyone also interprets them in a different way. Neither does any clarity exist in respect of what the competences should relate to, the rights with which they should be associated or who should undertake competence assessment. In which direction are we then moving? Reviewing the debate enables at least four functions and action areas to be differentiated: competence measurement as a feedback instrument, as a prerequisite for admission to educational courses and final examinations and as a basis for the crediting of competences to educational courses.

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Individual feedback

A competence analysis initially makes sense as a feedback instrument for the purpose of providing the individual with information on strengths and on areas where development is required. With regard to developmental and career planning, such an approach enables important indications to be given on how to establish a better basis for individual decisions. Not the least of the areas where action is required are phases of vocational reorientation, such as resumption of employment after a period of family life or prior to vocational retraining. Competence analyses are currently being deployed in the form of so-called profiling, especially within the scope of training measures pursuant to German Social Security Code III (SGB III).

Competence analyses are undertaken by special service providers. Results are primarily of significance to the individuals themselves and are not associated with any kind of entitlement. In other countries, this instrument is used much more extensively as a part of an advisory concept for individual occupational development rather than merely being deployed for the reorientation of the unemployed. In the light of discontinuous occupational careers, such a model could also act as a template for relevant initiatives in this country.

Access to educational courses

Generally speaking, certain formal requirements apply to access to educational courses. These are achieved via qualifications and certificates which claim to act as the guarantor of a standardised and largely uniform evaluation of level of achievement. Although this is a claim which remains unfulfilled in many cases, they serve as an indicator and evidence of apprenticeship entry maturity and the ability to enter higher education or demonstrate a qualification to pursue academic work. Only in exceptional cases are practical experiences accorded equivalent recognition or at least included as part of evidence of competence in selection procedures.

Trial periods of higher education represent one possibility of according due consideration to practical experiences and achieving access to higher education without formal evidence of qualification. Experiences in some federal states are not, however, encouraging in terms of recommending the trial higher education model generally. The selection procedures conducted by the management of institutes of higher education are a more promising option. Individual institutes of higher education, especially Universities of Applied Sciences, have developed relevant instruments and procedures for this purpose. The result of this is that a chance is given to those who have gained practical experience within their occupations but who do not have formal university entrance qualifications. The records show that those with such practical experience are perfectly able to successfully complete a course of higher education at a University of Applied Sciences. This applies all the more in cases when the institute of higher education facilitates transition to the general specialist foundations of study by providing targeted bridging courses. In the light of the shortage of engineers, such models should be expanded and experiences gained should be evaluated.

Credit towards educational courses

The European Qualifications Framework has established an educational policy perspective for a learning outcomes oriented evaluation of educational qualifications. Any decision in respect of the crediting of informally acquired competences is ultimately one which can only be made by the recipient educational establishment itself, which is the only party capable of evaluating whether the competences displayed by a person interested in entering the establishment are likely to result in a successful educational process.

A series of content overlaps exists between educational courses and courses of higher education at Universities of Applied Sciences in particular. For this reason, the usual practice as far as dual courses of study are concerned is for task assignments from company practice to be directly included in seminars and examination work or for individual units of study to be completed entirely within company practice. In a reversal of this process, specialists from company practice take part in teaching by acting as lecturers. The systematic integration of initial and advanced vocational education and training qualifications ensures systematic recognition of competences acquired in company practice. The functionality of this approach has been acknowledged in dual courses of study and should be transferred to higher education courses of study generally.

Recognition of informally acquired competences would also provide an instrument for shortening duration of participation with regard to advanced vocational training. Not least of the prerequisites involved here would be a modularisation of courses of advanced training. Although consensus on this issue has in principle been in place for decades, very little implementation has been forthcoming.

Access to examinations

The recognition of informally acquired competences does not represent anything new in vocational education and training. The acquisition of practical experiences constitutes a systematic component of in-company training. And in advanced vocational training relevant practical experiences represent a condition for admission to advanced training examinations rather than participation in certain educational courses. In addition to this, there is the possibility of external examinations, an opportunity of which around 30,000 people avail themselves every year. This represents a proportion of just over seven percent of all examination candidates.

In general terms, the competent bodies have considerable discretion in facilitating applicant participation in an external final examination for a training occupation or in an advanced training occupation. Although this regulation allowing the use of discretion enables flexibility to be applied, it also means that those interested in training are often unable to evaluate whether their prior educational and occupational experience will constitute a basis for admission to an examination. Neither is the practice of the chambers necessarily uniform. For this reason, a simple, standardised and transparent procedure could be of assistance in enabling evidence to be provided of competences acquired in practice.

Notwithstanding this, competences acquired during occupational practice will not always be structured in such a manner so as to permit a complete occupational field to be covered. This gives rise to the policy challenge of certifying partial qualifications where appropriate. Training and qualification modules show possible routes in this direction. ■

Assessing competences – developing competences: procedures and quality standards

▶ **Procedures and instruments for the assessment of competences afford a particular opportunity in so-called search and transitional phases such as that from school to work to render personally related areas of potential and resources visible and to make them deployable for development processes. At the same time, they may also play a part in recognising (educational) risks at an early stage and instigating preventative support.**

A multiplicity of various procedures for the assessment and development of competences have emerged and been deployed within the vocational orientation provision of general schools and in school-based and extra-school vocational preparation over the course of recent years. The question arising is which procedures are really suitable for the assessment of competences. The present paper presents various procedures and criteria for their evaluation.

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"Taking competences as a starting point" in the transition from school to work

One point which has always been emphasised in supporting vocational education and training for disadvantaged young people is that every aspect of support given to individual young people should take existing skills and competences as its starting point, meaning that their capabilities and potential should constitute the initial emphasis of pedagogical action rather than any deficits they exhibit (cf. BYLINKSKI 1996). The paradigm shift in vocational education and training from scheme orientation to personal orientation implemented in conjunction with the new specialised concept for vocational preparation schemes implemented by the Federal Employment Agency (cf. www.neueforderstruktur.de) meant that all support provided was made subject to the drawing up of a "competence profile" or an "aptitude analysis". The aim is to record school knowledge, the social and personal skills and competences the young people possess and their personal behaviour. The determination of occupationally relevant competences is then used to inform a "strengths and weaknesses profile" and forms the basis for an individually tailored training plan.

Within the scope of the BQF Programme "Promoting Competences – Vocational Qualification for Target Groups with Special Needs", funded by the Federal Ministry for Education and Research (BMBF), procedures deployed previously were expanded in design concept terms to form a comprehensive competence assessment process. These were subjected to targeted further development in various pedagogical contexts, at a variety of learning venues and with specific target groups in mind (BMBF 2006). The particular value delivered may be viewed in terms of the connection established between vocational orientation and diagnostics and the deployment of this as a basis for the targeted subsequent alignment of support provision aimed at specific occupational, social, school-based and special pedagogical aspects. All the competence assessment procedures developed within this context were fundamentally oriented towards strengths and resources, meaning they all com-

menced by posing the following initial question. Which competences does the person (already) possess and how is this person (already) using these? At the same time, the objective in deploying the procedures was also to strengthen the self-assessment skills of the young people and achieve greater sensitisation on the part of educationalists to the competences of the young people (BMBF 2006).

Quality standards for more transparency and acceptance of the procedures

The clear main focus of the diagnostic procedures and instruments in vocational orientation and preparation is on employability oriented methods of competence assessment (ibid). The aim is for the assessment of competences within the scope of an occupation selection process always to take place within a context related to a specific field where it takes place in conjunction with action situations. The objective is to achieve proximity to realistic work contexts and to the life world of the young people, the reason for this being that specific areas of experience exert a motivating effect and encourage action. Which procedures are actually suited to the assessment of competences depends on several factors needing to be weighed up from pedagogical points of view. Standards describing the quality of the procedures and stipulating indicators offer an assessment framework. This provides users with guidance in deciding which procedure is suitable to the aim they are trying to achieve. At the same time, this enables a greater degree of transparency to be generated in respect of the procedures in a field which now exhibits a virtually total lack of clarity and allows existing procedures to be compared with one another. Quality standards also raise acceptance of the competence profiles within the action area determined within the scope of the procedures. This is of particular significance, especially when these profiles are to be deployed for career pathway planning and when the aim is for them to serve as a basis for both funding provision and training plans.

What characterises "good" competence assessment procedures

Quality standards for the deployment of competence assessment procedures need to emanate from a specific basic pedagogical understanding and afford an opportunity for people to judge the procedures for themselves. Such standards also need to state the conditions necessary within the context for professional implementation and successful deployment (cf. box).

Implementation in practice makes it clear just how important the qualifications are of those who carry out observations, tests, evaluations and judgements within the scope of competence assessment. There is always a close correlation between evaluation and assessment and a person's own perception. For this reason, (self) reflection is accorded a high degree of significance when the aim is to gain a perception of a young person's competences and strengths. A further aspect is concerned with the necessary "framing" of a competence assessment procedure and relates to how and for what purpose findings are used. For this reason, the "quality standards" (Druckery 2007) formulate that there is a "duty" to provide feedback, such as in the form of an individual feedback meeting in which the results of the competence assessment are presented to participants in an understandable manner so as to enable them to serve as the basis for their own setting of objectives. *("Where am I currently, and what would I like to achieve?")*

The quality standard that results need to be recorded individually and in writing and subsequently documented applies to all procedures. The documentation contains agreements in respect of goals pursued and the pathways via which they are to be achieved as well as stating how these objectives can be achieved (cf. e.g. Institute for Vocational Training, Labour Market and Social Policy [INBAS] 2007, pp. 82). In overall terms, written observation reports assist in achieving objectivity in terms of recording the perceptible action (qualitatively) and the frequency with which the action is perceived (quantitatively). The observation itself needs to be criterialed since only characteristics which have been observed on multiple occasions can be deemed "stable". In addition to the standards formulated, the quality criteria relating to validity, objectivity and reliability also apply to all competence assessment tests and procedures.

Quality standards for competence assessment at the transition from school to work

The instruments and procedures deployed should:
- be structured in a resource and process oriented management,
- adhere to fundamental pedagogical principles, such as subject orientation, managing diversity, relation to life and the world of work, competence approach, transparency principle,
- offer an opportunity to be adapted in a manner suitable to the target group and situation.

The following are considered to be necessary contextual conditions:
- appropriate equipment with trained staff,
- an appropriate observational situation and a criteria based evaluation and
- written documentation.

Competence assessment procedures at the transition school – work

The various instruments and procedures provide a range of opportunities. The deployment of such instruments and procedures, however, needs to be weighed up in terms of the respective intention and context. A combination of procedures may also make sense in this regard, and their vario-

Table **Examples of competence assessment procedures**

Category	Procedure	Example	More detailed information (German language)
Biographical procedures	Identification, appraisal, evaluation of competences with reference to an individual biography	Competence balance for migrants	www.integra-net.org/produkte.html
	Career choice orientation (for pupils in all 9th classes)	DIA-KOM, competence check in the North-Rhine Westphalia (NRW) training programme	www.schulministerium.nrw.de/BP/Schulsystem/Projekte/Kompetenzcheck/index.html
Simulation and employability oriented procedures	Assessment centres, vocational orientation instrument, entry and aptitude diagnostics	START (German acronym for Trying out Strengths – Testing Resources)	www.imbse.de
	Combination of diagnostics and training procedures	DIA-TRAIN (German acronym for DIAgnosis and TRAINing Unit)	www.ausbildungsvorbereitung.de
	Assessment of potential and vocational orientation for girls	Taste for girls	www.taste-for-girls.de
	Integrated potential assessment centre procedure for young people in vocational orientation and training	Profil-AC	www.cjd-offenburg.de
Balances/profiling	Individual support plan work	Diagnostics and case history questionnaires	www.foerderplan.de
	Internet based diagnostics systems	e-profiling, tele-profiling	www.e-profiling.de www.kompnet.de
(Partly) standardised test	Knowledge and intelligence tests		www.testzentrale.de
	Aptitude and interest test, personality tests, occupational aptitude test (BET)	Occupational aptitude test (BET)	Hogrefe publishing group Diagnostics Commission of the Swiss Association of Vocational Guidance (SVB): www.testraum.ch
	Craft trades and motor skills aptitude tests	Hamet 2 (modules)	www.hamet.de

us alignments may complement one another effectively. *Biographically oriented procedures* are thus particularly suited to addressing issues relating to career choice in terms of the way these relate to individual life courses and serve to describe the subjects' own (everyday) experiences, interests and future perspectives. The fact that they highlight informally acquired competences more clearly means, for example, that they may be deployed to record the competences of young people from a migrant background. A competence balance is just such an instrument for the identification and evaluation of competences. The main focus here is on establishing awareness of competences and the resources they depict (Central Agency for Continuing Vocational Education and Training in Craft Trades, ZWH, 2007). Further procedures combine biographically oriented approaches with other instruments. DIA-KOM incorporates young people's everyday experiences, and these are then accorded suitable recognition and viewed as a form of competence acquisition (cf. INBAS 2007). This procedure was developed for the competence check in the North-Rhine Westphalia (NRW) training programme. Compiling an inventory of data relating to a young person's own biography usually takes place methodologically using semi-standardised guided interviews. Within the scope of a conversational situation, empathy can be generated and expression lent to the valuing of the young people's experiences.

Assessments are *simulation and employability oriented procedures* serving the purpose of evaluating current competences and pursuing the objective of selecting appropriate applicants for certain positions. The procedures involve the setting of individual and group tasks (work simulation) and observation of the young people by qualified observers in accordance with fixed rules. The results are documented in the form of profiles. Occupational field related assessments simulate situations typical to the occupational field in question and record both the cognitive fine-motor skills and the social competences the participants possess (e.g. START and DIA-Train, cf. Table). The key aspect in applying these simulation and employability oriented procedures is to "evaluate types of behaviour rather than results". The aim of competence assessment procedures should be to address the heterogeneity of participants, recognise and value their diversity and use this in a positive manner for competence development. This also means selecting a designing tasks and tests in such a way so as to make these equally attractive and accessible for participants of different genders and from different cultural backgrounds.

An assessment procedure has been specifically developed for the *assessment of potential* and for vocational orientation for girls at the end of schooling ("taste for girls"). This enables young women to take part in simulated practical situations in order to find out about the requirements which characterise everyday working life in IT, craft trades and technological occupations. Impartial, specially trained observers then try to find out how participants deal with the situation and work in conjunction with the girls on evaluating their observations (self-assessment and evaluation from outside). Individual consultations then take place to develop specific career pathway support steps.

Integrated potential assessment may be viewed as a further development of the assessment procedure. The main focus here is more clearly placed on "matching" the individual competence profile (interests, skills and competences of the participants) against existing occupationally related requirements. Practical employment tasks performed constitute the basis for determining suitable tasks for the conducting of the assessment. Methodological standards within this process are considered to be: the definition of occupational requirements; task orientation and the combining of learning, support and assessment (cf. Arbeiterwohlfahrt 2007). A potential analysis represents a work and requirements situation and thus constitutes a special form of individual aptitude diagnostics.

Balances and profiling and a wide range of forms *of (partly) standardised test procedures* may be deployed as a supplement to the procedures described above in order to determine specific skills and competences. (Partly) standardised test procedures include occupational aptitude tests (such as those known by the German abbreviation of BET) of the kind deployed in vocational guidance and vocational rehabilitation. These record such aspects as accuracy of perception, spatial awareness, practical and technical understanding or arithmetical skills. Personality tests and a craft trades motor skills aptitude test (e.g. modules of "Hamet 2") have also been developed for occupational diagnostic purposes, particularly for young people with a learning disability. Diagnostic and case study questionnaires specially developed to enable an individual support plan to be drawn up are frequently used in the creation of balances and profiles. Computer or Internet aided procedures (e-profiling, tele-profiling) may also form a component of competence assessments. These research selected characteristics from the areas of personality and performance, motivation, ability to learn, flexibility and ability to act as a member of a team.

Evaluation and forecast

Quality standards for competence assessment procedures to act as support instruments in career choice processes and to accompany the transition from school to work need to be very closely tailored to the target group of school pupils and participants in vocational preparation. Procedures for the determination of the occupationally relevant competences of this target group are important instruments in the process of "discovering" the young people's own skills and competences and their own interests and motives. The next phase then involves "harmonising" these with requirements. Since occupational proficiency necessitates methodological, social and personal competence on the part of the individual in addition to professional competence, the main requirement is for employability oriented procedures due to the ability of these to encompass the dimension of cross-disciplinary competences.

The significance of competence assessment is revealed in search and transitional phases. Such phases extend beyond vocational orientation and vocational preparation to constitute important vocational education and training instruments and form the basis of competence development. Within *in-service second chance qualification* for semi-skilled and unskilled young people they provide a training exit, the aim being to complete a vocational qualification. Competence assessment procedures are an indispensable component of all educational policy recommendations relating to vocational training (as demonstrated in the "Innovation in Vocational Education Working Group" and the Report on Vocational Education and Training 2007) as well as within current funding programmes taking place at a Federal Government or federal state level.

Specifying competence assessment procedures in a target group related and resources and biography oriented manner is viewed as an area where further development is required. In addition to this, the identification of competences which have been acquired within non-structured learning processes or in work contexts (non-formal learning) could constitute the establishment of an important foundation for ongoing training for young people pursuing in-service second chance qualification. Competences acquired via informal learning, such as those gained within the family or during leisure time, should also be identified in competence assessment procedures and be accorded recognition as competences. Instruments which have already been developed, such as the "Profile Pass" for young people (www.profilpass-online.de) provide procedures which place the emphasis on areas of potential which can then be linked to the potential inherent in ongoing learning processes.

The developments in the field of competence assessment which have taken place over the course of recent years in the area of the transition from school to work should form a basis for the systematic honing and specific further development of the procedures for deployment in training processes and in other occupational areas of activity. ■

Literature

Arbeiterwohlfahrt Bundesverband: Das Integrierte Potenzial-Assessment im Übergang Schule – Beruf. Potenziale erkennen – Verantwortung stärken – Kompetenzen entwickeln. Bonn 2007

Arbeitskreis Assessment-Center e.V. Hamburg 2004

BMBF (2006): Bausteine zur nachhaltigen Gestaltung einer individualisierten beruflichen Integrationsförderung junger Menschen. Ergebnisse der Entwicklungsplattform 3 „Individuelle Förderung". Volume IIc „Kompetenzen fördern – Berufliche Qualifizierung für Zielgruppen mit besonderem Förderbedarf (BQF Programm)". Bonn/Berlin 2006

Bylinski, U.: Defizite beschreiben – Potentiale erkennen – an den Kompetenzen ansetzen. Zum Kompetenzansatz in der Benachteiligtenförderung. In: Jugend/Beruf/Gesellschaft. Volume 47 (1996) Issue 1–2, pp. 32–41

Druckrey, P.: Qualitätsstandards für Verfahren zur Kompetenzfeststellung im Übergang Schule – Beruf. Edited by Federal Institute for Vocational Education and Training, BIBB/Institute for Measures to Promote Occupational and Social Integration, IMBSE. Bonn/Moers 2007. – www.kompetenzen-foerdern.de/imbse_qualitaetsstandard.pdf (viewed 10 April 2008)

Hutter, J.: Kompetenzfeststellungen. Expertise inklusive eines Handlungsleitfadens. Work commissioned by the Good Practice Center (GPC). Bonn 2004. – www.good-practice.de/expertise_kompetenzfeststellungen.pdf (viewed 10 April 2008)

INBAS: Kompetenzfeststellung, Teil II: Instrumente und Verfahren. Berichte und Materialien. Volume 9. Offenbach 2003

INBAS: Berufsvorbereitende Bildungsmaßnahmen: Kompetenzen feststellen – Ausbildungsreife fördern. Berichte und Materialien. Volume 18. Offenbach 2007

Mähler-Bidabadi, Ch.: Potenzialanalyse – eine Methode zur Kompetenzfeststellung bei Schülern/-innen. In: berufsbildung Volume 59 (2005) 94/95, pp. 47–50

ZWH: Praxishandreichung. Qualitätsstandards und migrationsspezifische Instrumente zur Kompetenzfeststellung und Profiling. Düsseldorf 2007

Structuring dual vocational education and training in a competence oriented manner
Aerospace occupations set the standard

BARBARA BURGER, GISELA DYBOWSKI

▶ **The present paper reports on the MOVE PRO EUROPE pilot project conducted by the German companies involved in the European Aeronautic Defence and Space Company (EADS) and which came to a conclusion in August. The main focus of the pilot project was on two objectives: to use the skills potential within real work processes in a targeted way in training and to make a contribution towards the European debate surrounding competence oriented occupational standards.**

Using the potential within work processes for training

Funded by the Federal Ministry of Education and Research (BMBF) and operating in conjunction with the Institute of Education and Technology at the University of Bremen (ITB) and the Federal Institute for Vocational Education and Training (BIBB), the MOVE PRO EUROPE pilot project[1] was launched at five EADS locations in September 2004. One of the major goals of the pilot project was to make more targeted use of the learning potential inherent within work processes for training in aeronautical occupations. The aim was for trainees to experience the complex requirements of modern skilled work in the aerospace industry within real work situations. Workshops were instigated with skilled workers, executive management at EADS and other aeronautical companies to identify typical work tasks within the occupations of "aircraft electronics technician" and "electronics technician for aerospace systems" and to map these against existing regulatory provision for the two training occupations. A further stage involved the investigation of real work processes to discover which employability skills may be acquired at any given learning station (company place of deployment for trainees). The analysis of the learning stations revealed that these exhibited a consistently high level of learning potential for the work tasks within the occupation forming the object of investigation. This led to collaboration with trainers on the joint drawing up of recommendations for the optimisation of the process and for the didactic structuring of the learning stations. This procedure also served the parallel purpose of training the training staff responsible to conduct learning station analyses autonomously and enabling them to carry out further stages of improvement.

In addition to this, the pilot project developed and tested procedures and instruments to enable domain specific employability skills to be rendered transparent and evidenced. Existing approaches and the experiences associated with these were accorded consideration in the drawing up of these instruments. The procedures were then piloted during the further course of the project, the instruments being designed in such a way so as to be applicable to other training courses rather than merely to the two technical aerospace occupations, something which they had in common with all other procedures within the pilot project (cf. Figure).

Fostering transparency and comparability of competences in Europe

A second major objective of the pilot project encompassed a European dimension. The aim was to describe the competences acquired at the EADS locations during the course of vocational education and training in such a way so as to be able to align these as learning outcomes within national qualifications frameworks and to render them comparable in international terms via the European Qualifications Framework. The lists of occupational requirements drawn up by skilled workers and experts within the workshops formed the basis for a systematic description of the target learning outcomes. Learning station analyses and procedures for the assessment of employability skills

1 *For detailed German language information on the pilot project, please refer to the BIBB MIDO database at www.good-practice.de/mido/. Please also consult www.eads.com/ausbildung for more German language information on contact partners for the pilot project.*

then provide a vehicle for evidencing actual learning outcomes. The occupational work tasks also form a basis for the definition of partial qualifications/units which are capable of certification within the scope of a vocational credit point system (ECVET). The characteristic features of these units/lists of occupational requirements are that they encompass complete actions rather than having their foundations in isolated areas of knowledge and/or skills.

The European pilot project AEROnet (funded by the EU Leonardo-da-Vinci Programme) involved the participation of aerospace companies in France, Spain, the United Kingdom and Germany and was conducted in close conjunction with the MOVE PRO EUROPE pilot project.[2] The aim was to use a survey and comparison of national lists of occupational requirements within the technical aerospace domains of "mechanics" and "electronics" to analyse the extent to which occupational requirements in Europe exhibited either deviation or congruency, irrespective of the educational systems within which the necessary competences were acquired.

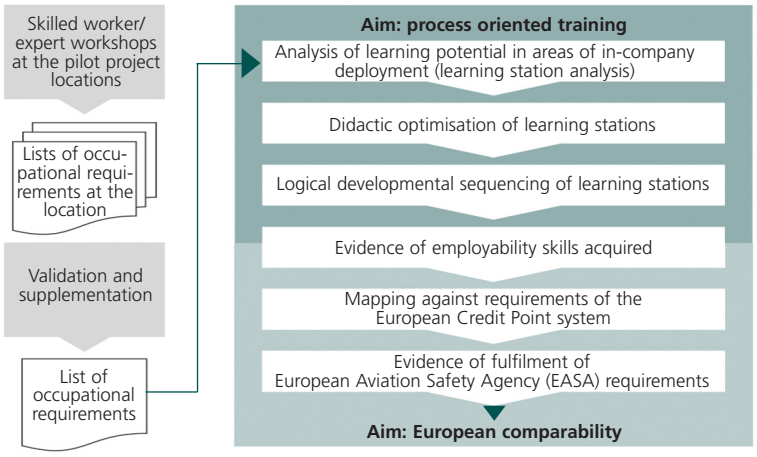
The results showed the following:

- a joint core of occupational work tasks exists in all four countries investigated;
- all four countries divided the main tasks areas of aircraft production into the domains of electronics and mechanics with identical delineation between the domains;
- this meant that the total of occupational work tasks occurring everywhere could be defined as a European core competence in terms of technical aerospace vocationalism.

The results of the AEROnet project also confirmed that occupational work tasks certainly represent a yardstick of comparability below the systematic vocational education and training level within the meaning of the units to be defined within an ECVET system. One further finding is also of interest. Notwithstanding all the differences in the (vocational) training systems of the four countries, training in the aeronautical industry takes place in virtually the same work process related manner (only Spain constituting an exception in this regard). This is all the more remarkable given the fact that vocational education and training, and in-company training in particular, remains systematically undervalued in European comparative terms. The results achieved within the AEROnet project, which were based on a validation of employability skills as learning outcomes, therefore suggest that a new evaluation of the efficiency of in-company learning strategies is taking place in the imparting of occupational competences.

2 *For further information in English on the AEROnet pilot project, please visit www.pilot-aero.net.*

Figure **EADS vocational education and training pilot project in Germany: MOVE PRO EUROPE**



A further area of momentum within the European dimension of the pilot project has its basis in investigating whether the basic certificates for technical staff issued by the European Aviation Safety Agency (EASA) can be integrated into the training for the two technical aerospace occupations. With this in mind, regulatory provision has been investigated to determine whether amendments are required and the aim is to document the competences acquired during the course of the three and a half years of process oriented training in such a way so as to achieve EASA recognition for the awarding of the certificates. The EASA continues to insist on evidence of knowledge in the form of standardised multiple-choice tests featuring a pass mark of 75 percent. Transparent documentation of the competences and the mapping of these against the requirements of the EASA are, however, only available as an interim project result. Additional realignment of the training occupations would be necessary for full integration of the EASA certificates.

Conclusion

The results underline the effectiveness of work process oriented training strategies and may lend a new impetus to European vocational education and training debate within this perspective. The pilot project and a parallel Leonardo da Vinci project in four European countries also demonstrated that it is possible for occupational work tasks to act as a comparative yardstick for vocational qualifications, and this may act as a vehicle for the identification of sectorally specific European core qualifications. Occupational work tasks ultimately provide a basis for the definition of competence based units which are capable of accreditation and certification as partial qualifications via credit points. ■

Learning within the work process – often demanded, rarely supported!?

▶ People wanting to become employable need a solid and broad-based programme of initial vocational education and training. People wanting to remain employable and have successful careers must develop their competencies continuously. Often training offers the one way out of unemployment into long-term employment. Companies trying to remain competitive and administrations aiming to provide first-class services need to train up junior employees and effectively support the constant development of vocational competence in their employees.

These insights have become commonplace in vocational education and training (VET) policy and are largely undisputed. Countless papers and resolutions from political, business and non-governmental bodies at national, European and international level have emphasised that continuous 'lifelong learning' is the key to positive development for individuals, the economy and society. As to the question of how to anchor lifelong learning in society, the education system and the world of work, a range of proposals and demands have been put forward, some fairly general and some more specific in nature.

The crusade to promote and support continuous vocational competence development in Germany is directed at a target group of around 40 million working people plus the current total of at least 3.6 million job-seekers. 'Learning within the work process' is the magic formula that offers a feasible means of accomplishing the essential.

Indeed, the life experiences and career biographies of a great many people are proof that learning is never more self-evident, more productive, more successful and sustainable than in real work situations. Putting this fundamental insight into practice in active and work-process-oriented teaching and learning concepts and curricula (e.g. Germany's training regulations) is the formula for success in a modern dual system of initial vocational training. This formula for success is increasingly being emulated elsewhere: work placement phases and vocational orientation as part of bachelors' degrees; dual (campus and workplace) programmes of study; the dual organisation of school-based initial vocational training; efforts in EU countries with school-based VET systems to involve companies more actively; all these are evidence of the efficiency and appeal of practice-based and work-oriented learning.

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President of the BIBB

The scientific discourse on the advantages and disadvantages of knowledge-based or experience-based competence acquisition in the vocational learning context does, however, raise certain dilemmas which are very difficult to resolve within routine work processes in the workplace context. In our knowledge society, the acquisition of systematic theoretical knowledge is undoubtedly gaining in importance. But formal teaching in structured learning situations does not automatically result in full occupational competence. This can only be acquired by gaining real practical experience at work. Moreover, learning in structured (artificial) learning situations predominantly appeals to groups who are already well qualified. Structured learning situations also carry heavy time and cost implications, which prevent the broad diffusion of this form of learning. In contrast, concepts which rely merely on organising work to be more conducive to learning hold a fundamental appeal for all groups, even the low-qualified and those unused to learning. This approach is well suited to fostering vocational competence development as a work-integrated – and hence, at least, cost-neutral – activity. But its limits become apparent when it comes to teaching the heavily cognitive and theoretical competencies required in order to master highly complex, abstract work processes. And as a final, realistic observation, the majority of companies and administrations are not necessarily willing or able to consider their work processes from the angle of human resources, competence development and organisational development. Silence has fallen on the subject of group

work concepts, which were once praised with so much hope. Some observers are already talking in terms of a return to Taylorisation.

Yet systematic acquisition of knowledge and experiential learning are by no means mutually exclusive. Well-designed initial vocational training on the dual principle is planned and strategically directed learning within real work processes; it is systematised and intentional experiential learning, designed not to gloss over theoretical principles but to provide integrated practice of them within workplace processes. Indeed the same is true of modern learning concepts within continuing vocational education and training (CVET), e.g. the process-oriented system of continuing education in IT. However, such ambitious concepts of systematised experiential learning currently have little resonance in company-based CVET practice.

Particularly in smaller and medium-sized companies, dual-system vocational training is based on company projects and work processes. These are used as a systematic curricular foundation for competence development supported by workplace learning coaches. In CVET practice this runs up against organisational constraints as well as sceptical views about the cost-benefit ratio. An surely significant factor may be a certain reluctance to give certification agencies and examiners deep insights into company processes and projects of potential interest to competitors. By and large, these comments apply equally to less elaborate models of work-integrated continuing education, like those introduced as good examples in BWP issue 2/2008.

Experience with dual-system vocational training gives German companies and education providers a head start, but so far they have not taken the lead in implementing work-integrated concepts of CVET or competence development. As yet, we have not essentially progressed beyond the stage of piloting developments and reviewing them scientifically. On a self-critical note, it is fair to say that BIBB research has treated the thematic complex of vocational competence development through learning within the work process rather diffidently so far, and the transfer of positive and encouraging results from relevant BIBB pilot projects into VET practice has been moderately successful at best. In international and European comparisons of in-company CVET and competence development, Germany achieves only a mid-table ranking – both for activities by companies and for employees' participation in continuing education – with no sign of the all-important upward trend. However, the lack of dynamic development is what separates Germany from many European countries, where the expansion of CVET is being tackled at a brisk pace.

The pace of progress in certain other countries, particularly in Europe, has been stimulated by education policy initiatives at EU level, not least the Bruges-Copenhagen process. The centrepiece of these processes is the development of the European Qualifications Framework (EQF) and corresponding national qualifications frameworks (NQF).

Experience with dual-system vocational training gives German companies and education providers a head start, this we should use more offensively.

Potentially, the EQF and NQFs could upgrade the value of on-the-job learning quite substantially in relation to formal training courses. From the German viewpoint, they introduce a paradigm shift away from the dominance of formal qualifications and towards the recognition of acquired competencies. For example, the qualifications frameworks assume competencies on the same level to have equivalent value, irrespective of whether they were acquired through informal processes of vocational learning and work experience or, for instance, through university studies. With their concentration on competencies, they also emphasise the importance of occupational proficiency as the definitive standard-setting element.

Despite the necessity for constructive criticism of the details, we should conceive of this primarily as an opportunity to upgrade and promote continuous vocational competence development and to implement lateral mobility within and between parts of the education system, and between the employment and education system, by means of recognition and credit transfer for vocational competencies. If Germany wants to move up from the middle rankings to join the leaders of the field, to compete within Europe to develop the vocational competencies of working people and the unemployed, it would do well to make active use of this opportunity to strengthen the links between the education and employment systems. This also means supporting and continuously developing competence-oriented learning within the work process, geared towards integrated occupational proficiency. ■

Work oriented continuing training for semi-skilled and unskilled employees

An example from the metal and electrical industry

Semi-skilled and unskilled employees working in "reduced skill" areas have an important role to play in some branches. Despite the growing skills requirements in the workplace, however, this particular employment group is underrepresented in terms of participation in continuing training. The present paper portrays a work oriented continuing training concept for semi-skilled and unskilled employees which was developed within the scope of a three-year project involving companies from the metal and electrical industry and which has undergone successful piloting. The concept facilitates systemisation and promotion of self-directed learning in the workplace and is capable of autonomous and relatively rapid implementation by companies.

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Up to 33 percent of those employed in the metal and electrical industry are semi-skilled or unskilled (cf. IG METALL 2003; GESAMTMETALL 2004). It is a notable fact that recent years have seen a significant increase in the requirements for "reduced-skills work" in production, manufacturing and assembly, and that these requirements have reached skilled worker level in some areas. Some of the very many attributes called for are an ability to deal with complex technologies, process competence, IT competences, flexibility, responsibility, involvement in work organisation, an awareness of quality and participation in continuing training measures (cf. LOEBE/SEVERING 2004). The consequence of this is that although workplace related skills requirements are rising for many "reduced- skills" work activities this is not accompanied by an increase in the provision of appropriate (formal) qualifications.

Notwithstanding the fact that semi-skilled and unskilled employees are dependent on continuing training both in terms of their own individual needs and with regard to the requirements of the workplace, they display the lowest level of participation in organised continuing training provision. This is an area where the opportunities for upgrading training for the semi-skilled and unskilled provide a possible way of tackling the shortage of skilled workers. Nevertheless, the group of semi-skilled and unskilled workers contains a large number of persons who may be categorised as unused to learning (such as employees from a migrant background or older employees). Such people frequently experience major difficulties in school oriented forms of learning such as seminars or similar courses. For this reason, continuing training for this target group needs to involve innovative forms of learning addressing particular learning requirements.

Semi-skilled and unskilled workers are often in possession of well founded know-how (implicit knowledge) on company organisation and company working tasks and processes. When learning takes place, it is essential that the integration of new content into an existing knowledge structure is facilitated in order to enable a link to be established between existing and new knowledge content.

If, however, knowledge is already in place in an implicit form, abstract learning content represents an inadequate and inappropriate method of tapping into this knowledge. Work-oriented continuing training measures, on the other hand, are capable of being designed in such a way so as to link in with implicit knowledge and make such knowledge usable for company organisational tasks. This means that work-oriented continuing training exhibits significant benefits compared to seminar-based forms of continuing training.

- Learner motivation is increased because learners notice that their experience and implicit knowledge is being used to process learning tasks.
- Learning is effective because learners confront challenges directly within their own work areas. There is no need for transfer of theoretical content to practical application, something which is often difficult for the target group of semi-skilled and unskilled workers.
- Learning is efficient because what has been learned is capable of direct application within the work process, and the processing of organisational tasks also results in a specific benefit for the company.
- Acquiring competences by working together practically within the company environment directly promotes employability skills and/or advancement opportunities for learners.

The WAP Project: objectives and approach adopted

The first stage of the project "Continuing Training in the Work Process for Skilled Workers in the Metal and Electrical Industry in Baden-Württemberg" (known by the German acronym of WAP) involved using continuing training requirements analyses to identify company structures which fostered or hindered learning. This then served as a basis for generating findings in relation to areas of work and groups of persons where there was a requirement for continuing training. (cf. Bauer et al. 2007a). The results of these analyses then provided a foundation for determining the areas of work (such as the work activity of a plant driver) for which the aim was to develop work oriented continuing training programmes. Since real work constituted the point of reference within the WAP Project for the definition of the objectives and contents of continuing training, the second stage involved an empirical analysis of the selected in-company areas of activity. This took place with the assistance of the participative method in the form of expert workshops, in which experts from a field of activity convene and use a structured approach as a means of investigating their own company tasks (cf. Kleiner et al. 2002). The workshop conducted an analysis and description of current work within the relevant field of activity in the form of characteristic work tasks and a systematisation of tasks in accordance with a competence development model.

Development of profiles as a reference system for work oriented continuing training

The results of the workshop (list of work tasks) define the target profile for the continuing training programme, the aim of this being to prepare for the field of activity. Ten company continuing training profiles were drawn up within the scope of the project (cf. Bauer et al. 2007b): Machine operator, Machine setter, Internal logistics operator, Manufacturing operative, Group coordinator and group leader, Laminator, Quality operative, Die component producer/gear cutter, Screen printer.

Persons without formal qualifications and semi-skilled workers who have completed vocational training in a non-technical occupation are employed in most of the work areas listed. Some adjusters are skilled workers. All die component producers/gear cutters are skilled workers. Each profile comprises a list of work tasks which describe the context, objects, contents and requirements of work within the area. Figure 2 depicts an example of the work tasks of a machine setter.

The work tasks map the characteristic contents and requirements constituting a field of activity. In order to use this as the basis for the drawing up of a curriculum or a continuing training programme, the work tasks need to be structured in accordance with a didactic principle. The alignment of tasks in the WAP Project took place on the basis of a competence model ranging from beginner to expert (cf. Rauner 1999). The characteristics of the tasks, the way in which tasks are tackled and the required competences all form criteria for the differentiation of the type of task. Three areas were defined, each of which group work tasks with a similar level of requirements.

- *Tasks for beginners:* everyday, regular work (e.g. simple production orders) which are processed systematically and in accordance with fixed rules
- *Tasks for advanced workers:* work which is significantly more complex and associated with problems (such as the alteration and maintenance of components)
- *Tasks for experts:* Unpredictable tasks requiring a high degree of experience and intuitive problem solving (such as the identification and elimination of complex malfunctions).

Work oriented continuing training concept – work-based learning projects

The so-called work-based learning projects (cf. box) make up the central learning concept of the WAP Project. Work-based learning projects (WLP) are developed for a work area on the basis of the continuing training profiles and attendant competences described above and are closely tailored to the requirements of the organisational unit and staff carrying out these projects. This renders the bundle of tasks constituting a specific field of company activity a reference system for the design concept of the continuing training programme.

It is in principle possible to develop a multitude of work-based learning projects for each work task, these projects comprising a meaningful reason for learning or action within the relevant working context. Figure 1 depicts the general principle of developing the WLP on the basis of the work tasks; Figure 2 shows the development of the WLP taking the profile of an machine setter as an example.
The expertise of employees who have complete mastery of the tasks within the work area was also integrated into the development of the work-based learning projects. An initial workshop was held to familiarise the in-company stakeholders with the concept of using the profile as a basis for the development of work-based learning projects. This was followed by a discursive process which generated a number of example WLP's for selected work tasks. Autonomous completion of the WLP set for the whole of the profile became possible once the internal company project groups had internalised the concept, structure and quality characteristics of the WLP's.

The consolidation of an internal WLP development group is in line with the objective of achieving sustainable establishment of the learning concept within the companies.
The ultimate aim is to enable companies to use the instruments introduced in an autonomous manner after the end of the project and to implement the learning concept as an integral part of the organisational culture. An internal project group charged with identifying learning incentives or reasons for learning on an ongoing basis, structuring such learning incentives or reasons for learning and formulating appropriate task assignments for the WLP's has been demonstrated to be a useful way forwards in this area.
The box below documents the aims of the six work-based learning projects for the work task of "Planning and implementing work processes directly within the production process" within the example continuing training profile of "machine operator".
This covers all the objects and contents of the work task. All projects add value, and some also accord consideration to the further development or optimisation of company standards. As long as such projects are successfully completed, individual learning may also provide impetuses for the organisation. The above example also makes clear the various levels of difficulty which are involved. The first three WLP's were developed for work task beginners and enable the parallel or sequential acquisition of specific competences for the purpose of completing these partial tasks. By way of contrast, the other WLP's are more complex and require competences from the previous WLP's for their completion. These are designed for advanced participants and should not be undertaken until the first three WLP's have been successfully worked through. Once continuing training participants have successfully completed the set of WLP's they will have acquired the competences they need to be able to tackle expert task 7 from the machine setter profile.

Self-directed learning with learning advisory support

The challenges presented to the learners by the WLP's can only be mastered if learners develop the necessary competences to process the tasks and if they learn within the work process. A WLP begins with the description of a problem or task assignment, and this constitutes the reason for learning or action on the part of the learner. Possible action stages for the processing of the project are put in place in order to provide assistance for management of the learner's own learning process. The degree of difficulty of each WLP is capable of variation in a needs oriented and individual manner depending on the structure of the task assignment and action stages (close or open management). One example of a WLP task assignment ("Carrying out shift transfers") is presented in Figure 2.
The learning process largely takes place in a self-directed manner. This means that the method of working and learning and the approach towards identifying a solution need to be worked out by the continuing training participants themselves rather than being pre-stipulated. This does not mean, however, that participants are left entirely to their own devices within the learning process or in working their way through a WLP. Specially trained in-company learning advisors, who are ideally employed in the same work area or department as the participants, support learners in their self-directed learning by providing process related advisory input. This learning advisory support uses targeted interview techniques to stimulate reflection on the part of the learner and helps open up a new perspective. The tasks of the learning advisors encompass the following:

- drawing up an agreement on the specific aims and forms of the continuing training in conjunction with the learner;
- supporting and managing the learning process on the basis of the WLP and the agreement on objectives;
- advising on all learning related problems;

- reflection on and evaluation of competence acquisition via special evaluation meetings (follow-up to the learning process);
- assistance in the preparation of presentation of the results (in front of a committee, colleagues, line manager, specialist advisor etc.);
- assistance in documenting learning processes and results;
- drawing up feedback on the learning processes and results for the company and documenting these where required.

Learning advisors are provided with training extending over several days and comprising a number of modules for the purpose of preparing them for their tasks and are also supervised during the term of the project[1] (cf. Röben 2007).

Conclusion

The following conclusions may be drawn in respect of the individual stages of the process, the concepts and methods deployed and the results of the WAP Project.

- The continuing training requirements analysis instrument assisted in identifying action and thematic areas for work oriented continuing training within the companies.
- The expert workshop method is also an appropriate tool for the analysis and description of work in the field of "reduced skills" work or for the work areas of employees with a low level of qualification. Company stakeholders accord the profiles a high degree of acceptance and relevance. At the same time, the participative development of work-based learning projects via in-company groups of experts facilitates the systematic use of the areas of learning potential within the work processes and the structuring of learning in the workplace.
- An analysis of the contents of the company profiles or work tasks confirms the fact that the requirements placed in "reduced skills" work have increased and that employees are not generally extensively prepared for activities involving a high degree of responsibility.
- Work oriented learning in the form of work-based learning projects enjoys a high degree of acceptance and is accorded considerable relevance for learners and their working environment. The direct practical reference of the continuing training measures, the fostering of correlative and process understanding, the promotion of personal competences and the strengthening of motivation and confidence are all areas which are evaluated particularly positively by participants.

1 *Training for the learning advisors within the scope of the WAP Project was conducted by the Heidelberg Institute of Education in its capacity as project partner.*

Figure 1 **Participative development of the WLP on the basis of the work tasks**

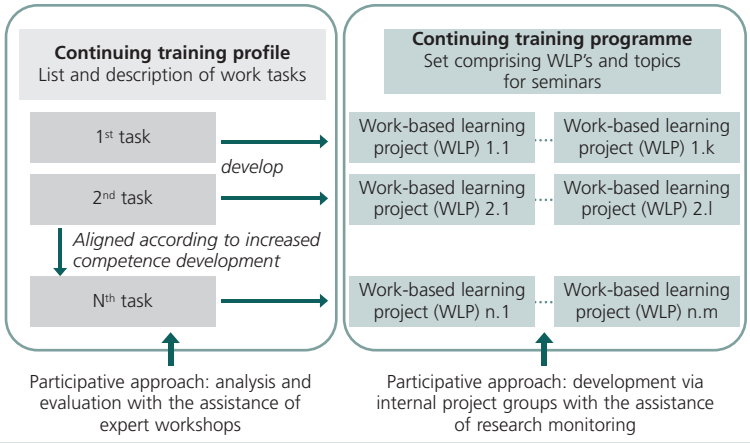
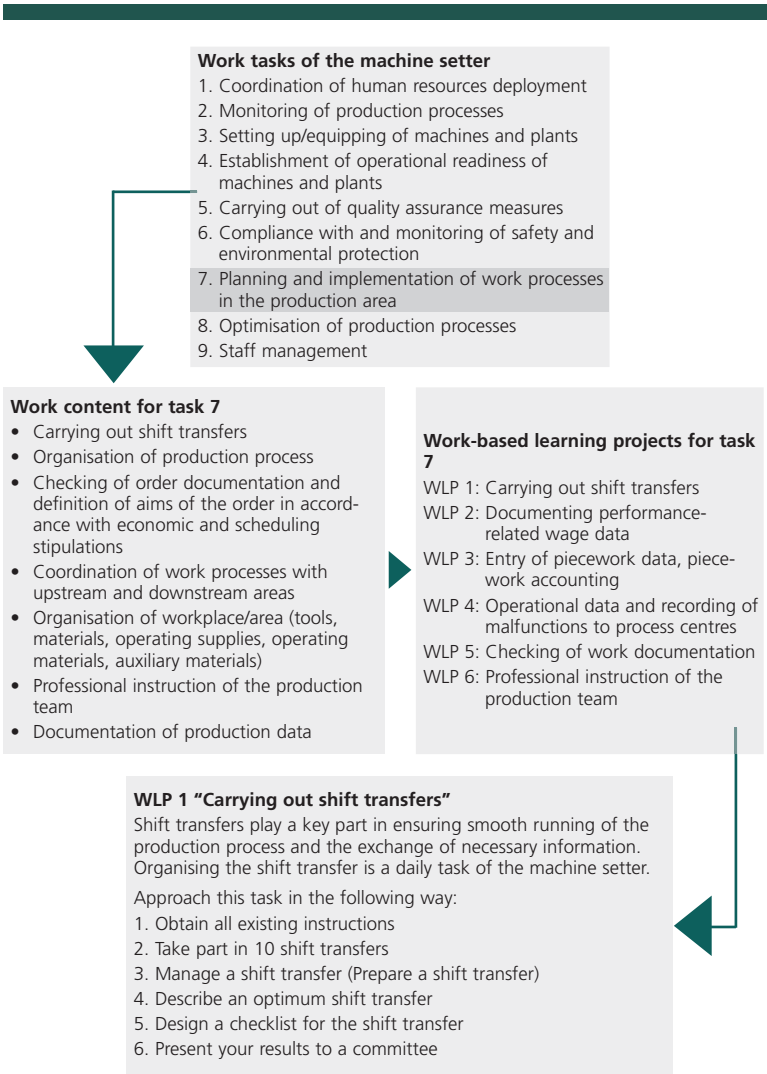
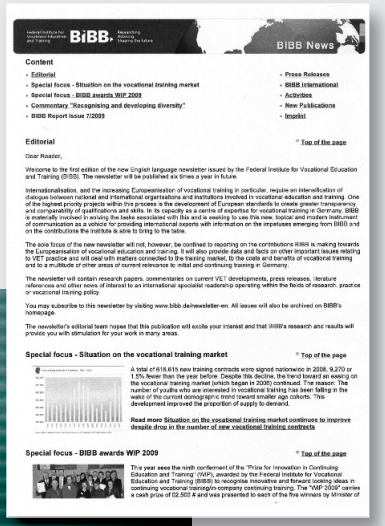


Figure 2 **Development of the WLP's using the example of the machine setter**



BIBB News


BIBB News

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Editorial

Dear Reader,

Welcome to the first edition of the new English language newsletter issues by the Federal Institute for Vocational Education and Training (BIBB). The newsletter will be published six times a year in future.

Internationalisation, and the increasing Europeanisation of vocational training in particular, require an intensification of dialogue between national and international organisations and institutions involved in vocational education and training. One of the highest priority projects within this process is the development of European standards to create greater transparency and comparability of qualifications and skills. In its capacity as a centre of expertise for vocational training in Germany, BIBB is materially involved in solving the tasks associated with this and is seeking to use this new, topical and modern instrument of communication as a vehicle for providing international experts with information on the impetuses emerging from BIBB and on the contributions the institute is able to bring to the table.

The sole focus of the new newsletter will not, however, be confined to reporting on the contributions BIBB is making towards the Europeanisation of vocational education and training. It will also provide data and facts on other important issues relating to VET practice and will deal with matters connected to the training market, to the costs and benefits of vocational training and to a multitude of other areas of current relevance to initial and continuing training in Germany.

The newsletter will contain research papers, commentaries on current VET developments, press releases, literature references and other news of interest to an international specialist readership operating within the fields of research, practice or vocational training policy.

You may subscribe to this newsletter by visiting www.bibb.de/newsletter-en. All issues will also be archived on BIBB's homepage.

The newsletter's editorial team hopes that this publication will excite your interest and that BIBB's research and results will provide you with stimulation for your work in many areas.

Special focus - Situation on the vocational training market

Special focus - BIBB awards WIP 2009

The BIBB English language newsletter presents itself in the year 2009 with new content as well as new design.

As a future digital newsletter will anyone who subscribed to the e-mail format of BIBB News www.bibb.de/newsletter-en automatically receive the new designed newsletter as an e-mail six times a year.

In its capacity as a centre of expertise for vocational training in Germany, the "Federal Institute for Vocational Education and Training" (BIBB) is materially involved in solving the tasks associated with this and is seeking to use this new, topical and modern instrument of communication as a vehicle for providing international experts with information on the impetuses emerging from BIBB and on the contributions the institute is able to bring to the table.

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- The introduction of learning advisors and project groups within the company is significant for the success of the learning concept and represents a key factor in its sustainable establishment within the companies.
- The temporal availability of participants is a fundamental problem implementing work-integrated continuing training. Economic constraints, company bottlenecks and the like meant that sufficient time was not always made available to participants to enable them to take part in the continuing training measures.
- Affording participants in continuing training the opportunity to implement the task assignments contained within the WLP's via practical application rather than merely responding on paper is of importance in terms of successful completion. These in-company deployment possibilities are of particular significance to those being prepared for a working field in which they do not currently operate.
- The instruments deployed within the WAP Project provide a way of interlinking human resources with organisational development.

All the instruments piloted in the project met with a high degree of acceptance on the part of the companies involved. Support from line managers, transparency, and the provision of information to all staff in the relevant work area are all factors in the successful implementation of the WLP method. In overall terms, the project succeeded in fostering a culture of permanent learning within the company and in promoting human resources and organisational development. This enabled companies to structure learning within the work process in a systematic manner from the initial identification of needs via the planning of continuing training measures and extending to encompass the evaluation of the measures. ■

Literature

Arbeitgeberverband Gesamtmetall: Zukunft der Metall- und Elektroindustrie. Berlin 2004

Bauer, W.; Koring, C.; Schnitger M.; Röben, P.: Weiterbildungsbedarfsanalysen. Ergebnisse aus dem Projekt „Weiterbildung im Prozess der Arbeit" (WAP). ITB-Forschungsbericht No. 27. University of Bremen 2007a

Bauer, W.; Koring, C.; Schnitger M.; Röben, P.: Weiterbildungsprofile und Arbeits- und Lernprojekte. Ergebnisse aus dem Projekt „Weiterbildung im Prozess der Arbeit" (WAP). ITB-Forschungsbericht No. 28. University of Bremen 2007b.

IG Metall: Elektrotechnik/Elektronik Branchenanalyse 2003. Frankfurt/Main 2003

Kleiner, M. et al.: Curriculum-Design I. Arbeitsaufgaben für eine moderne Beruflichkeit. Konstanz 2002

Loebe, H.; Severing, E.: Zukunft der einfachen Arbeit. Bielefeld 2004

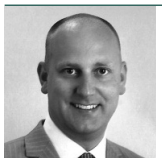
Rauner, F.: Entwicklungslogisch strukturierte berufliche Curricula: Vom Neuling zur reflektierten Meisterschaft. In: Zeitschrift für Berufs- und Wirtschaftspädagogik, Volume 95 (1999) Issue 3, pp. 424–446

Röben, P.: Lernberater für das Lernen im Prozess der Arbeit Heidelberg 2007

Occupational competence in modern production structures

Development of competences for the production of tomorrow

▶ **Modern production concepts and holistic production systems form the basis for current and future production. The main focus is on consistent process orientation and the streamlining of these processes. The effects of these developments extend to exerting a direct impact on operative employees rather than merely affecting executive management and require new and changed competences. The present paper concentrates on presenting these new competences and other competences gaining in significance. It also highlights further competences of relevance due to teamwork, the characteristic feature of modern production concepts alongside process orientation. This "broad-based" development necessitates a widening of and a change in our understanding of occupational competence in overall terms. The paper concludes by outlining a profile for employability skills for skilled work within modern production concepts.**



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Process specific competences

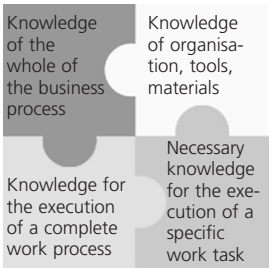
The initial implication of *process orientation* is that the full execution of and responsibility for a work process is transferred to employees (cf. Oess 1991, p. 105). The abilities to obtain the required information in an autonomous manner and to plan, execute, monitor and evaluate the process constitute the basis for this. At this micro level, there is an initial correlation between process competence and the theoretical interpretative approach applied to occupational competence although this does not yet provide a vehicle for the definition of contents. The following will supply a content related description of process specific competences categorised according to knowledge, skills and competences.

(WORK) PROCESS KNOWLEDGE

Process oriented restructuring does not enable a work process to be observed in isolation from upstream and downstream processes or from the operational process as a whole. Process knowledge therefore encompasses knowledge of the interrelations and reciprocal effects of a person's own work process as well as incorporating the way in which this is embedded into the operational business process. Knowledge of the process structure also embraces structural and organisational knowledge of the function and tasks of others involved within the process. As far as process organisation is concerned, this further includes knowledge of specific phases of the operational process. The objective is to understand the influence a person's own work process exerts on the next stage of the process, which parameters of a person's own work process influence the subsequent process in terms of performance and how these can be affected and optimised (cf. Kling 2000, p. 84).

To this structural knowledge must be added knowledge of process performance. This includes the quality, customer satisfaction, time and cost dimensions of current performance. Although this does not represent knowledge in the strictest sense of the term, it is essential for the ability to address weaknesses within the process in a targeted way or to bring about improvement (cf. Kling 2000, p. 150).

Figure
Dimensions of work process knowledge
(Source: SCHEIB 2004, p. 221)



Knowledge of tools and materials deployed, which constitutes a partial area of work process knowledge, is also of significance for this purpose (cf. FISCHER 2000, p. 150). Increasing distance and abstraction from the production process render the acquisition of this knowledge more difficult, however. This area of work process knowledge, which includes knowledge on how to prevent, recognise and remedy malfunctions, is of virtually no significance within the "regular" process, although it takes on particular importance if the work process is disturbed.

In contrast to purely specialist knowledge, work process knowledge in overall terms constitutes knowledge of the whole of the work process rather than merely knowledge for the execution of individual activities (cf. Figure). One particularly new aspect is knowledge of the interlinking of work processes, although work process knowledge is specific to the operational and work process and is generated via the linking of declaratively associated specialist knowledge and experience of work. Process orientation does not bring about any initial change in terms of content to the actual technical specialist knowledge required for the execution of the work process. Notwithstanding this, this knowledge is also undergoing expansion.

PROCESS SPECIFIC SKILLS AND COMPETENCES

Process orientation represents the alignment of work processes along the operational business process and also requires the ability to move beyond "specialist limits" in cooperating and communicating with those involved. The customer orientation exhibited by TQM in its capacity as a comprehensive quality management system encompassing all areas of an organisation sheds a particular light on this competence, requiring customer desires and expectations to be taken on board and customers to be dealt with in an appropriate manner. Although this ability has always been of significance within service sector occupations, the importance accorded to it in respect of commercial and technical skilled work within companies has until now been subordinate. This view of communication skills needs to be accorded a new place in the canon of employability skills for commercial and technical occupations within the scope of process orientation.

Process specific skills and competences continue to arise as holistic tasks are structured at the operative level. The self-monitoring concept included within TQM expands the spectrum of competences required for mere execution of tasks by providing staff with monitoring competences. Extension is also taking place in the direction of strategic and materials planning competences. Workers require the ability to align orders and plan the sequences and deadlines for orders and materials requirements.

The horizontal extension of tasks occasioned by work in areas such as the procuring of equipment, maintenance and transport is leading to greater complexity of task planning and an attendant increase in planning skills required rather than merely calling for competences related to the execution of such tasks.

The objective is to achieve mastery of the complexity and reciprocal interdependence of tasks when planning work. This increase in tasks requires workers who are capable of dealing fully with the constant changes in task. Swapping tasks requires a form of functional flexibility (cf. CURTAIN 2000, p. 37). Customer orientation and the continuous improvement process mean that flexibility in the wider sense is becoming a core ability within the competence profile of staff operating in modern process oriented production structures. Flexible reactions to the changes to the product and within the working environment are required.

Process and product changes are constantly generating new demands and an attendant competence requirement. A person's ability to resolve this for him or herself is a competence which is becoming more and more important for staff in modern process oriented production structures. The process optimisation within the scope of CIP in particular is an area where (self-directed) training and the self-learning competence this exhibits are indispensable for employees operating in task fields subject to change.

Autonomy and the ability to self-direct on the part of staff are competences on which modern production concepts depend and also constitute the foundations on which such concepts are based. There is also a close association with the competence of staff assuming responsibility for their own activities. This responsibility is extended and linked to the principle of customer orientation and does not merely relate to the work process itself. This is an area where knowledge and the willingness to undertake relevant action are especially required to go alongside occupational ability.

The attitude and willingness to use existing competences and establish new competences is a prerequisite for all process specific competences presented here and not only a precondition for the ability to assume responsibility. The CIP approach and the change this brings in its wake accord a particular increase in significance to the willingness and motivation of staff to embrace such change and to their fle-

xibility in reacting to change. Management concepts for continuous improvement are based on empowerment of employees. The competences required for this, which were of little significance in Tayloristic production processes, are an essential factor in the success of modern production concepts. Due to the importance attached to such competences, they will be presented separately under the concepts of "empowerment".

EMPOWERMENT

Empowerment has its origins in the fact that continuous improvement processes require involvement at the operative level and that the objective of modern production concepts is to make full use of all human resources. Empowerment is the competence and willingness of staff to co-determine their own work process in a constructive manner, to contribute towards the solution of both problems associated with the work process and problems which extend beyond it and to become involved in decision-making processes (Binner 2003, p. 22). Since constructive involvement cannot be imposed, empowerment fundamentally requires readiness to participate. This means that there is a change in the self-perception of staff. They become the producers of solutions to problems rather than any longer merely being the recipients of such solutions (cf. Arnold 2001, p. 2). Active involvement and the willingness to embrace change need to be viewed as the new guiding principle of occupational activity. Notwithstanding this, this change in values requires the ability for employees to monitor their own values and attitudes and make corrections (capacity for self-reflection).

Empowerment encompasses both a technical and a work organisation dimension. The aim is empowerment for structuring processes and work organisation as well as involvement in the structuring of technology. This requires imagination, creativity and methods for identifying ideas, appropriate methods and social competences in particular being in demand for the purposes of carrying out evaluations and decision making within the team. One objective is for staff to use participative and communication competences as a vehicle for involving themselves in the decision making process, a further aim being to demonstrate the ability to exercise criticism and engage in dialogue in the course of the joint decision making process. In order to implement the solution to a problem, staff require knowledge and competences to enable them to plan and organise work processes (planning competences). The evaluation of improvements which have been instigated represents a further starting point for further improvement processes and requires self-assessment competences.

Team competences

The initial understanding of *team competences* is competences which enable the communicative and cooperative working together with other people. The joint nature of the work order, the absence of any time limit and the reciprocal dependency of cooperation represent a particular form of cooperation involving (partially) autonomous working groups operating within fractal structures. Within this process, the staff constituting these groups require competences which extend beyond purely social competences. The specialist dimension of (partially) autonomous working groups is determined by the transfer of the work task. This task needs to be divided into manifest partial tasks by the working group itself, and the assignment of the task requires organisation. The autonomy of the working groups gives rise to a work organisation dimension of competences which needs to be revaluated for the operative level. In conjunction with this, identification can take place of further planning competences such as the coordination of work processes and tasks within the group, human resources deployment planning, holiday planning and the organisation of learning processes (cf. Curtain 2000, p. 37). The partial tasks are executed by the members of the working group in accordance with the principle of job rotation. In order to do this, they require both the ability and the readiness to adapt to the changing nature of the partial tasks on an ongoing basis and deliver a high level of performance throughout the course of the partial tasks in order to be able to ensure the quality of the overall process of the group. This requires (specialist) knowledge and (specialist) skills from every member of staff at every workplace within the group. Self-directed learning competences and the ability and willingness to pass on "knowledge" are also being accorded a higher level of significance (cf. Spöttl 2002, p. 36). The fact is that employees need to organise and execute necessary learning actions independently and autonomously.

As far as communication in teams is concerned, mention should also be made of the ability to exchange work related information and the ability to engage in relevant discussion, this being further underlined by the cross-functional nature of the cooperation or by the integration of cross-functional tasks (cf. Heuser 2002, p. 330). The ability to work together in a cooperative manner firstly involves being able to coordinate work tasks and work processes in respect of one another. In the case of (partially) autonomous working groups, this also involves assuming joint responsibility for the work result. Staff ability to take responsibility for their own work result whilst focussing on the joint whole picture is a prerequisite. This means it is also necessary to assume co-responsibility for the other members of the group (cf. Spöttl 2002, p. 32). Group oriented types of behaviour, often summarised as "team spirit", constitute the foundations for this.

Vocational Education and Training as the Path of the Future
Mobilising potential Shaping change

5th BIBB Congress 2007

What direction are initial and continuing vocational education and training taking in Germany?
This question was discussed by the some 2,000 participants attending the 5th Congress of the Federal Institute of Vocational Education and Training in Düsseldorf, Germany, in September 2007. This compilation and corresponding CD-ROMs present the results of the forums, working groups and presentations, in some cases with sound and images. A critical assessment, reports on models currently being tested and a look at the latest research findings provided impetus for research, day-to-day VET practice and VET policy work.

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Social interaction and/or specialist problems in conjunction with joint responsibility are the starting point for conflicts. Mutual dependency renders it particularly important to solve these problems. For this reason, the ability to function as a team player includes the ability to engage successfully in social situations (cf. Ziehm 2002, p. 16). The competence to address and resolve conflicts forms the basis of any form of cooperative work. Conflict management skills mean the ability to express criticism in an adequate, constructive and problem related manner, the ability to accept relevant criticism and the ability to reflect on one's own actions and make any changes to these if necessary. Values and forms of behaviour such as fairness and integrity are a prerequisite for both.

Profile of employability skills

In overall terms, the activity of employees at the shop floor level in modern production concepts encompasses the autonomous setting of goals, preparation for action (planning) and the monitoring and evaluation of the work process rather than any longer being restricted to production elements. A shift is taking place towards the up-front phases of action (planning and materials planning). The delineations between production and planning work, and therefore the boundaries between engineers and skilled workers, are shifting or becoming blurred (cf. Ziehm 2002, pp. 16). Accordingly, an employee within modern production systems can be described as "anyone who is able to solve work tasks in an independent and flexible way and is able and willing to become involved in planning within his or her occupational environment and within the work organisation" (Bunk 1994, p. 10). Bunk (1994 p. 10) has already designated this as "occupational competence" some time ago, thus providing a more apposite description of the ability to cooperate in modern production structures than is rendered via "employability skills" due to the fact that explicit consideration is accorded to work organisation and because planning and participative competence are emphasised. ■

Literature

Arnold, R.: Veränderungskompetenz – Wandel gestalten und Krisen überwinden. In: Berufsbildung, Volume 55 (2001) Issue 72, p. 2

Binner, H. F.: Prozessorientierte Personalentwicklung. In: REFANachrichten, Volume 2003, Issue 56, pp. 18–23

Bunk, G.: Kompetenzvermittlung in der beruflichen Aus- und Weiterbildung in Deutschland. In: Berufsbildung. Europäische Zeitschrift 1 (1994) Issue 1, pp. 9–15

Curtain, R.: Der Betrieb der Zukunft: Auswirkungen auf die Berufsbildung. In: Berufsbildung. Europäische Zeitschrift 7 (2000) Issue 19, pp. 33–43

Eidenmüller, B.: Die Produktion als Wettbewerbsfaktor. Cologne (TÜV Rheinland) 1995

Fischer, M.: Von der Arbeitserfahrung zum Arbeitsprozesswissen. Rechnergestützte Facharbeit im Kontext beruflichen Lernens. Opladen 2000

Heuser, M.: Prozessorientierung im Supply Chain Management. In: Controlling 14 (2002) Issue 6, pp. 327–335

Kling, J.: Geschäftsprozessorientierte Personalentwicklung. Wiesbaden 2000

Kruse, W.: Von der Notwendigkeit des Arbeitsprozeß-Wissens. In: Schweitzer, J. (Ed.): Bildung für eine menschliche Zukunft. Weinheim 1986, pp. 188–193

Oess, A.: Total-Quality-Management. Die ganzheitliche Qualitätsstrategie. Wiesbaden 1993

Scheib, Th.: Indikatoren für die ganzheitliche Leistungsmessung beruflicher Handlungskompetenz in Produktionsprozessen. Bielefeld 2005

Scheib, Th.: Work Process Knowledge. From: Zülch, G.; Jagdev, H. S.; Stock, P. (Eds.): Integrating Human Aspects in Production Management. Dortrecht 2004, pp. 217–228

Schweres, M.: Das Konzept der vollständigen Tätigkeit. In: FB/IE – Zeitschrift für Unternehmensentwicklung und Industrial Engineering, Volume 46 (1997) Issue 4, pp. 166–171

Spöttl, G.: Der neue Facharbeiter – ein dienstleistungsorientierter „K-Worker". In: Becker, M.; Schwenger, U.; Spöttl, G.; Vollmer, Th. (Eds.): Metallberufe auf dem Weg zur Neuordnung. Bielefeld 2002, pp. 22–42

Würz, T.: Produktionstechnik – aktueller Stand und Perspektiven. In: Becker, M.; Schwenger, U.; Spöttl, G.; Vollmer, Th. (Eds.): Metallberufe auf dem Weg zur Neuordnung. Bielefeld 2002, pp. 75–89

Ziehm, S.: Berufseignung aus betrieblicher Sicht. In: Berufsbildung, Volume 56 (2002) Issue 73, pp. 16–18

The long road to sustainability

▶ Do you also find that you are coming across the term sustainability on an ever more frequent basis? What, however, does it mean? And to what extent does it affect our living and working environment? Sustainability has often been misused as a political slogan and has been thoughtlessly popularised to refer to such areas as the sustainable development of share prices. All of which has dulled the meaning of the term sustainability, or to be more precise sustainable development, to the point that it has become far removed from its original significance.

Sustainable development is a protracted, complex and self-contradictory process, not easy to comprehend or structure in light of the difficulty of juggling such divergent interests as cost-effectiveness and social or ecological objectives. Nevertheless, endeavours need to be undertaken to accord sustainable development the significance it is due.

The aim of sustainable development is to satisfy the basic requirements of all people without exceeding the viability of the planet. It should serve as a vehicle for preserving, protecting and regenerating the earth's ecological system and for ensuring that future generations will also be able to have their needs met.

The fulfilment of such high requirements requires complete specialist, practical and emotional commitment to the development and expansion of global, national, societal and individual implementation strategies. (Vocational) training has an important part to play within this process, and this was the reason behind the declaration made by the General Assembly of the United Nations in 2002 that the period between 2005 and 2014 would be the UN World Decade of "Education for Sustainable Development". The aim was to anchor the principles of sustainable development in national education systems across the world. 2006 also saw the European Union accord particular significance to sustainable development in education in the form of the Revised EU Strategy for Sustainable Development. The objective here is for education to play a part in creating equality of opportunity for everyone, to foster the knowledge society and to strengthen the competitiveness of the European Union.

Strategies for the implementation of "sustainable" objectives have been enshrined within the National Plan of Action for Germany. The extent to which these objectives have been realised is scrutinised via an ongoing monitoring process and recorded in progress reports published on a biannual basis. The Federal Statistical Office was also commissioned by the Federal Government to present the Indicators Report for 2006 documenting the progression and status of sustainable development in Germany. The Council for Sustainable Development also provides the Federal Government with advice on all issues relating to sustainable development.

What, however, is the current state of affairs in vocational education and training? Sustainability in vocational education and training is capable of interpretation in two ways. The first of these is in respect of the sustainable effectiveness of vocational training measures, particularly in terms of the successful transfer of innovations and the permanent efficacy of vocational teaching and learning processes. The second aspect of sustainability is as an overall concept to integrate the requirements of sustainable development into vocational education and training.

The Federal Institute for Vocational Education and Training (BIBB) acted on this matter as early as 2001 by instigating the "Vocational Education and Training for Sustainable Development" action programme (known by its German abbreviation of BBNE) to act as a mission statement for the development, piloting and transfer of innovative research and development projects. A range of activities has been undertaken since this time in pursuit of the objec-

MANFRED KREMER
President of the BIBB

Permanently sustainable behaviour can only be attained when sustainability becomes a genuine reality and a component of vocational socialisation.

tive of implementing Vocational Education and Training for Sustainable Development into vocational education and training. These have included specialist conferences and congresses ("Sustainability in Vocational Education and Training and work", 2005, "University Conference on Vocational Education and Training", 2004 and 2006, forums at the Didacta" Transparent Specialist Conference", 2006, "Sustainable Forestry", 2007 and the BIBB Congress forum "Sustainable Development in Vocational Education and Training", 2007) as well as a series of pilot projects focussing on "sustainability", some of which are presented in the present issue of BWP. Within the scope of the "Sustainable Forestry" research programme, BIBB is conducting a cross-sectional project to determine training requirements along the length of the valueadded chain in the forestry and woodworking sector. Measures undertaken have included the establishment of the Berlin Forest and Woodworking pilot region to map vocational education and training for sustainable development in forestry and woodworking on an exemplary basis and at a regional level. The Federal Institute is also involved in a range of working groups and committees connected to the UN Decade (National Committee, Round Table and the Federal Working Group on Initial and Continuing Vocational Education and Training chaired by BIBB). A German language Internet portal provides ongoing information on the status of the sustainability projects (www.bibb.de/nachhaltigkeit), and BIBB's Good Practice Agency (GPA) reports on successful practical examples of the implementation of sustainable vocational education and training.

Within the scope of its statutory duties and acting in the interests of strengthening the idea of sustainability within vocational education and training, the Federal Institute for Vocational Education and Training has also funded a pilot project in Cottbus to plan and set up an inter-company vocational training centre constructed and established along ecological lines. The feasibility of such projects has now been shown, and it has further become evident that energy efficient construction is not only economically viable but also, in terms of operating costs, more cost effective in the long term. In addition to this, this demonstration object acts in accordance with the principle of building object = teaching object in serving the purpose of establishing and strengthening the idea of sustainability within inter-company training and in-company continuing training.

Not the least of the tasks the Federal Institute for Vocational Education and Training has set itself is the integration of overarching and occupationally specific aspects and requirements related to sustainable business in the development and modernisation of training occupations and the instigation of these as elements of a modern VET system.

The activities of the Federal Institute for Vocational Education and Training are not, however, restricted to the major endeavours it is undertaking to integrate the principle of sustainable development in vocational education and training. We are also demonstrating sustainability within the confines of our own organisation via BIBB's participation in the "ECOPROFIT BONN 2007" Project operated by the City of Bonn. This is a cooperative project funded by the State of North Rhine-Westphalia for the development of an in-company, cost-saving environmental management system in which 17 Bonn-based government departments and companies are taking part. BIBB will also seek certification in accordance with the EU EMAS Standard (**E**CO **M**anagement and **A**udit **S**cheme). More than half of the steps required for EMAS certification have been fulfilled by taking part in ECOPROFIT BONN 2007.

Sustainability is something which affects us all, whether we are individuals, pressure groups, companies and government bodies or whether we are involved in research, academia or vocational education and training. Sustainable development can only be comprehensively secured once cooperation and participation from the various levels and venues are in place. Fundamental understanding of and basic behaviour towards sustainable development should be practised in pre-school and primary school in order to provide a later point of reference for vocational education and training.

Making sustainable development a self-evident component of the imparting of employability skills within initial and continuing training processes will not, however, be enough to ensure that the mission statement for Vocational Education and Training for Sustainable Development does not merely remain a vision. Permanently sustainable behaviour within occupations and beyond can only be attained when sustainability becomes a genuine reality within the working processes of companies and government bodies and thus also becomes a component of vocational socialisation. ■

Vocational education and training for sustainable development: backgrounds, activities, initial results

▶ Education for sustainable development has received something of a boost, this being evidenced by the UN Report on Climate Development, by the declared will of politicians and political parties to strengthen climate protection and drive sustainability forwards and by the UN Decade of "Education for Sustainable Development" and its attendant national follow-up activities. The present paper explains the educational dimension of the central idea of "sustainable development" and describes the processes and findings which have emerged from the "Vocational Education and Training for Sustainable Development" programme (known by its German abbreviation of BBNE).

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From the central idea of sustainable development to the World Decade of Education for Sustainable Development

The concept of sustainable development was developed against the background of increasing findings relating to observed or forecast changes to the environment caused by humans. In 1987, the World Commission on Environment and Development defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs and to choose their own lifestyle". The concept accords equal status to the aims of social justice, ecological sustainability and economic performance ("sustainable development triangle").

In December 2002, the General Assembly of the United Nations resolved that the period between 2005 and 2014 would be the UN World Decade of "Education for Sustainable Development", the objective being to use educational measures as a vehicle for contributing to the implementation of Agenda 21 Chapter 36[1], agreed in Rio de Janeiro and reinforced in Johannesburg, and firmly establishing the principles of sustainable development on a worldwide basis within national education systems. UNESCO was assigned the coordination of this World Decade.

The German UNESCO Commission developed a national action plan founded on a series of principles relating to Education for Sustainable Development. These principles served as the basis for the formulation of four overarching goals.

1. Further development, bundling of activities and broadly based transfer of good practice.
2. Networking of educational stakeholders for sustainable development.
3. Improving public perception of Education for Sustainable Development.
4. Strengthening of international cooperation.

1 Agenda 21, Conference of the United Nations for Environment and Development, staged in Rio de Janeiro in June 1992.

Principles of Education for Sustainable Development (ESD)

- ESD is relevant for everyone
- ESD is an ongoing, continuous process and promotes acceptance of processes of societal change
- ESD is a cross-sectoral task that has an integrative function
- ESD is aimed at improving the contexts in which people live
- ESD creates new opportunities for individuals, society and economic life
- ESD promotes global responsibility

Source: National Plan of Action for Germany. UN Decade „Education for Sustainable Development", Berlin 2005 (www.dekade.org).

These aims are also in accordance with the "Revised EU Strategy for Sustainable Development", which was passed in June 2006 and which accords particular significance to education. European commitment towards the implementation of these objectives in the interest of Education for Sustainable Development was also reinforced via the Berlin Conference on the UN Decade staged in May 2007 within the scope of the German EU Council Presidency.

Former Secretary General of the United Nations Kofi Annan summed up the problems associated with implementing "Education for Sustainable Development" and the aims of the UN Decade in the following terms. "Our biggest challenge in this new century is to take an idea that seems abstract – sustainable development – and turn it into a daily reality for all the world's people." In order to make an idea which may appear abstract reality for all, the idea needs to be acted upon and made a part of everyday life. This is also a primary task for the educational sector. For this reason, the Federal Government coalition agreement has accorded sustainable development a high degree of significance for government action at a domestic, European and international level. Federal Minister of Education and Research Annette Schavan emphasises that ESD connects past and future, conserves the old and shapes the new. This process means much more than passing down facts and techniques. Education for sustainable development involves the formation of values and attitudes whilst combining subject knowledge and "orientation" knowledge by networking scientific/technical, socio-cultural and philosophical/ethical teaching contents. In this manner, ESD "promotes economic, cultural, social and political participation in a world that is speeding up and becoming ever more complex".[2]

"Vocational Education and Training for Sustainable Development" action programme

The implementation of the sustainable development mission statement also represents a major challenge for vocational education and training stakeholders. In scarcely any other field of education does the acquisition of competences for sustainable employability skills exert such a major effect on the future viability of economic, technical, social and ecological developments than is the case in companies involved in trade and industry. For this reason, the task of vocational education and training is to provide people at all levels from skilled worker to management with the ability to assume responsibility and conduct economic activity in a resource-efficient and sustainable manner whilst also shaping globalisation in a just and socially acceptable way. Both the inherent insecurities and contradictions involved and the increasing attendant complexity and networking require an expert approach to be adopted.

Once a feasibility study had been completed[3], the Federal Institute for Vocational Education and Training (BIBB) was commissioned by the Federal Ministry of Education and Research (BMBF) to spend the period between 2000 and 2003 in preparing a "Vocational Education and Training for Sustainable Development" action programme (known by its German abbreviation of BBNE). Around 20 so-called stakeholder conferences were staged during this preparatory period, which focussed on sounding out how thematic or sectoral occupational activity related to sustainable development and on drawing up the structural correlations between sectors of trade and industry and a raft of issues related to the topic.

From 2004 onwards, BIBB acted within the scope of its statutory duty to "promote pilot projects including the provision of academic research support" by making the implementation of the sustainable development mission statement within vocational education and training a central focus of its work. Within this context, economic pilot projects funded by the BMBF are being conducted in the areas of: sustainable development as an economic factor and management strategy in industry and the craft trades; energy efficiency and efficient use of resources and sustainability in vocational education and training. In addition to this, BIBB has since 2005 been conducting analyses of the effects of specialist and sociological research in respect of further developments of occupations within the forestry and woodworking sector in pursuit of the objective of determining training requirements and preparing such qualification needs for vocational education and training practice.

The Project for Sustainable Forestry (Sustainability Research, referred to by its German abbreviation of FONA) comprises 23 cooperative projects. The central focus is on

2 *Based on a quotation from Schavan, A.: Die UN-Dekade "Bildung für nachhaltige Entwicklung" aus der Sicht der Budesregierung. In: unesco heute, Issue 1/2006, p.9*

3 *Cf. Mertineit, K.-D., Nikolaus, R., Schnurpel, U.: Berufsbildung für eine nachhaltige Entwicklung – Machbarkeitsstudie im Auftrag des BMBF, Bonn 2001*

how regional, national and global forestry and woodworking added value chains – including forestry where the emphasis is on operating in harmony with nature, the innovative use of wood and technological development – can be optimised in a profits oriented, ecologically acceptable and socially just manner and how further developments can take place.

Activities and implementation strategies for establishing BBNE on a firm footing

The BBNE concept is being implemented within BIBB via a dialogue-based participative process which integrates as many stakeholders as possible. The stakeholder conferences enabled a network to be created, culminating in the staging of a first national conference in 2003.[4] This conference acted in accordance with the principles and objectives of the National Plan of Action for Germany formulated by the German UNESCO Commission in deciding upon a Guidance Framework for BBNE which set out the essential structures for further implementation in the form of six action areas.

Action areas for the implementation of BBNE

1. Identification of general occupational core competences for sustainable development and piloting of relevant didactic concepts.
2. Identification of occupationally specific skills within the new mission statement and the implementation of these within teaching and learning arrangements.
3. Identification of relevant sustainable fields of activity to act as a basis for the determination of additional qualifications and/or new training content for initial and advanced training occupations including the development of new advanced training regulations where necessary.
4. International cooperation on sustainable development encompassing global and intercultural learning.
5. Creation of permanent and dynamic sustainability structures within initial and continuing vocational education and training.
6. Establishment of a communication and dissemination structure of networks and cooperative ventures to further raise awareness of sustainable development and for the purpose of actively disseminating findings and examples of good practice.[5]

The implementation of the mission statement involved the rolling out of a series of various activities and the pursuit of a range of implementation strategies (cf. Figure 1).

Development of the Good Practice Agency (GPA)

The BIBB Sustainability Portal has been documenting "examples of good practice" in the form of a Good Practice Agency since 2003. The difference between successful examples and theoretical reasonings and considerations is that the former provide encouragement and stimulate similar projects. The Good Practice Agency is used by a wide range of working groups as a network (NiBA) and now contains documentation of over 100 examples from practice complete with suggestions for implementation. These include 50 examples relating to vocational training which have won awards during the UN Decade. The "examples of good practice" listed encompass such areas as factory and work projects, teaching projects, simulated companies for young people and competitions.[6] These act as a vehicle for rendering BBNE visible at the various learning venues (vocational training centres, companies, vocational schools).[7] These learning arrangements have proved to constitute particularly effective learning activities for introducing trainees/pupils at vocational schools to a sustainable approach.

Examples of projects which can be mentioned here include "Rasselstein saves resources". In the "Pack the future" competition, a team of trainees carried out research in their own training proving company (a thin sheet metal manufacturer) into opportunities for saving process heat and compressed air and also looked into the more effective use and clarification of coolant water. The team made a significant contribution to reducing operating costs as well as winning first prize. Such a positive example may well generate further sustainability activities and may also act as a stimulus for other trainees/pupils at vocational schools to instigate their own projects.

The "examples of good practice" listed in the GPA provide for main starting points for BBNE.

1. Indications of (publicly effective) didactic and methodological models for competence acquisition within BBNE.
2. Examples and strategies for the structuring of vocational training centres with regard to sustainable development.
3. Communicative networking of stakeholders to establish BBNE in a broadly based and qualitative manner.

4 *Cf. BMBF (Ed.): Erste bundesweite Fachtagung "Berufsbildung für nachhaltige Entwicklung", 26 and 27 March 2003 in Osnabrück, Bonn 2003*

5 *BMBF (Ed.): pp. 174*

6 *Cf. in this regard German language documentation relating to the competition "Pack the future", available on the BIBB Portal "Berufsbildung für eine nachhaltige Entwicklung". – www.bibb.de/de/nh_16467.htm*

7 *Cf. in this regard "Good Practice" German language documentation in the BIBB Portal "Berufsbildung für eine nachhaltige Entwicklung". – www.bibb.de/de/nh_8966.htm*

Figure 1

Activities and implementation strategies for establishing BBNE on a firm footing

▶ Internet-Portal

www.bibb.de/nachhaltigkeit
continually updated since 2003
linked to the UN Decade Portal since June 2007

▶ Specialist conferences /specialist congresses

Specialist conference "Sustainability in Vocational Education and Training" 2006
University Conference on Vocational Education and Training 2004 and 2006
Didacta: Forums "Transparent Specialist Conference" (2006) and "Sustainable Forestry" (2007)
BIBB Congress: Forum „Sustainable Development in Vocational Education and Training" (2007)

▶ Pilot projects

Main focus Vocational Education and Training for Sustainable Development
Term: 2001–2010
A total of 11 pilot projects, including:
- Development of an indicator model for the measurement of sustainable development
- Development of a course "Renewable raw materials – biogas"

▶ Research programme

"Sustainable forestry"
Term: 2005–2009
Focussing on such aspects as the establishment of a pilot region "Berlin Forest"[8]
Vocational Education and Training for Sustainable Development 2003–2005

▶ Working groups /committees

UN Decade 2005–2014:
National Committee[9]
Round-table discussion forum for all educational sectors
Federal Working Group on Initial and Continuing Vocational Education and Training (chaired by BIBB)

4. Development of central questions relating to the acquisition of quality criteria and standards for good practice for Vocational Education and Training for Sustainable Development through comparative observation of the examples.

Analysis of "examples of good practice" takes place via central questions which serve the purpose of operating within the context of BBNE to identify, describe and explain innovative approaches and ultimately evaluate these in terms of their transferability and effectiveness. The eventual aim is the further conceptualisation of the idea of sustainability within vocational education and training and the transfer of good practice.

In individual terms, evaluation of the practical examples needs particularly to take place with regard to the following issues.

- *Understanding of sustainability:* Which correlations with the dimensions of sustainable development are explicitly or implicitly discernable in the example? Is due consideration accorded to the three dimensions of sustainability (ecological, economic and social aspects)?
- *Learning understanding/didactic concept:* To which extent are development and self-direction of the initiative on the part of the trainees/learners or by the teacher or trainer clearly represented in proportional terms?
- *Marketing and transfer:* How open are the projects to dialogue once they have been included in the Good Practice Agency? What side-effects does the project exert within its own educational establishment? Are projects given feedback once analysis has taken place? How are the results and products achieved transferred? Do Decade Projects win further awards after a period of, for example, 2 years when they are presented in a redeveloped or further developed form?
- *Correlation with occupation and training:* Which thematic categories are capable of being mapped in terms of the aim of occupational implementation and which vocational training levels are affected?

Implementation of Vocational Education and Training for Sustainable Development (BBNE)

The central questions are currently serving as a vehicle for the development of quality standards for all levels of BBNE on the basis of the examples from practice. Although the analysis of the GPA and of the further activities has not yet been completed, it is already apparent that the implementation of BBNE needs to address all three levels of the vocational education and training system (macro, meso and micro levels) in order ultimately to be able to fulfil the objectives of a modernisation strategy (cf. Figure 2).
At the micro level of vocational training, the aim is to develop practice related VET work and learning situations which are capable of implementation in everyday working life and which will operate in accordance with quality standards still to be defined (such as correlation with the lifeworld of the learners and relevance of learning content in terms of education and utilisation).

Evaluation questions in respect of the quality standard and sustainability at the meso level, the level at which companies, educational providers, vocational schools and other educational establishments operate, need to provide information on how it will be possible to act in the interest of sustainability by facilitating high-quality learning outcomes at an institutional level. The quality criteria act as a vehicle for such aspects as determining the suitability of learning venues for certain content, the further development of learning venues to form sustainable vocational

8 *The Berlin Forest pilot region implements regionally sustainable projects related to the theme of forestry and wood. One example was a cross-occupational and cross-sectoral project involving trainees from the branches of forestry, joinery, the book trade and the media who worked jointly on the establishment of a forestry and wood value-added chain extending the whole length of the production process form the tree to the book. Results oriented exchange takes place between the pilot region and selected cooperative projects.*

9 *Cf. www.dekade.org and www.bne.de*

training centres or for cooperation between learning venues in learning regions committed to the axiom of sustainability.

A third quality criteria level encompasses such areas as the potential of initiatives, proposals and pilot projects to bring about change in current vocational education and training to move in the direction of Vocational Education and Training for Sustainable Development. This means that we need to address the issue of whether implications may be drawn from the individual activities for the further development of the vocational education and training system (macro level) and the extent to which such implications may be drawn. These implications may relate to such aspects as regulatory work or permeability between the educational sectors.

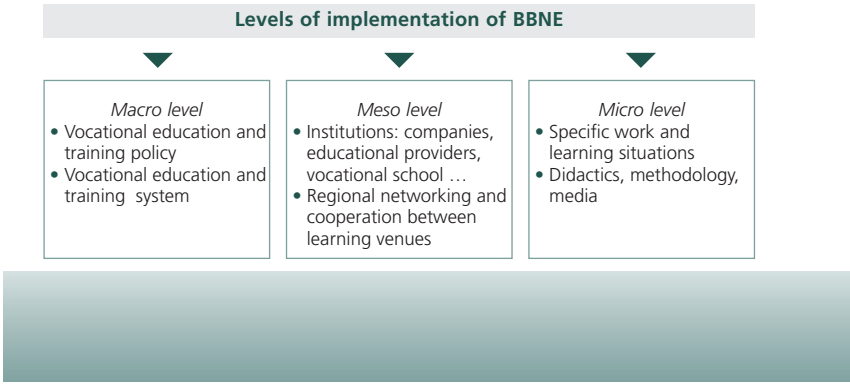
How things stand as of 2007: Vocational Education and Training for Sustainable Development (BBNE) as a modernisation strategy for vocational education and training

An obvious step would be to use the BBNE Programme as a comprehensive modernisation strategy in vocational education and training and to undertake relevant differentiation. The main focus here is on four main aspects.

Although there is evidence of positive approaches towards implementing BBNE in companies, a rise in the number of Bachelor and Masters courses of study relating to sustainability and an increase in the amount of advanced vocational training provision (especially in the areas of renewable energies, energy consultancy and sustainable building services engineering), vocational education and training stakeholders still find themselves engaged in a discussion, development and piloting process. This has been revealed via such measures as the training place initiative instigated by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The span of implementation opportunities which has been expressed ranges from the view that training regulations and their relevant skeleton curricula need to contain sufficient training content to permit activity within a sustainable area to demands for the creation of an independent training occupation, preferably in the renewable energies sector.

A further positive aspect is the fact that the craft trades have committed themselves to sustainable development and to the objectives contained within Agenda 21. The construction industry and its associated craft trades are leading the way in terms of commitment to saving energy, increasing energy efficiency and climate protection. The link between environmental policy and employment policy is important

Figure 2 **Implementation of BBNE**



given the emergence of new environmental markets within the craft trades sector such as via low energy construction methods, recycling (scrap cars and electrical waste) and the use of environmentally friendly sources of energy (photo voltaic, wind energy, biomass, geothermal energy). This implies new skills needs for employees and will require the implementation of new learning concepts together with new strategies for initial and continuing training for training staff.

Vocational Education and Training for Sustainable Development (BBNE) requires:

- new forms of sensitisation to sustainable development in all areas where insights as to the necessity of sustainable development are not yet sufficiently advanced, enabling this to serve as a basis for further development. Such interventions to raise awareness may comprise "workshops of the future", presentations using the special "sustainability case" or a company check involving a self-assessment instrument;
- innovative didactic and methodological concepts for the implementation of BBNE in teaching and learning arrangements via such vehicles as simulated companies for young people;
- learning venues which implement sustainable development in a credible manner. These may take such forms as the demonstration of sustainable use of energy. In addition to this, sustainability indicators[10] have been developed for educational establishments to make the sustainability of a vocational training centre measurable in terms of its management, organisation, educational provision and cooperation with other learning venues, thus enabling a comprehensive representation of the quality criterion for the vocational training centre;
- systematic integration into the vocational education and training system, whether this takes place in the form of additional qualifications for selected occupations or occupational groups or via the introduction of a standard occupational profile item into training regulations addressing sustainability in the same way as such an item already exists for environmental protection or in the same way that the concept of "responsible care" has already been introduced into laboratory occupations. Debate needs to continue on the implementation of sustainable training content into examination regulations and skeleton curricula. Suggestions are available in relevant brochures.[11]

10 Mertineit, K.-D.; Hilgers, M.: Nachhaltigkeitsindikatoren für Bildungsstätten. Edited by BIBB, Bielefeld 2004

11 BMBF (Ed.): Duale Berufsausbildung im Bereich erneuerbarer Energien, Bonn 2007

Notwithstanding this, there remains a perception on the part of those involved in practice that further action is required in terms of implementing sustainable business practices. A study conducted by the Chambers of Industry and Commerce of the States of Rhineland Palatinate and Saarland has, for example, revealed that 73 percent of companies involved in production would like to receive assistance in increasing energy efficiency due to the fact that insufficient knowledge means that insufficient use is being made of the potential to save energy.

General schools and their organisations have already moved one step further than many companies. Both the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) and the German UNESCO Commission (DUK) have expressly committed themselves to the curricular implementation of sustainability in education. "Education for Sustainable Development (ESD) may change teaching and schools in such a way so as to make our world more sustainable. We will redouble our efforts in all areas of school education in order to achieve the objectives of the World Decade. Both the KMK and the DUK support schools in implementing Education for Sustainable Development." The joint declaration[12] issued by the two bodies provides specific assistance for the implementation of ESD in schools and lays out the general conditions under which funding can take place.

In addition to this, a guidance framework for the learning area of "global development" drawn up by a KMK-BMZ (Federal Ministry for Economic Cooperation and Development) working group demonstrates how competences in this important ESD learning area are being firmly anchored in curricular terms, across a range of subjects and in cross-disciplinary and inter-disciplinary forms of teaching or learning fields. The implementation of ESD within teaching and school development also requires the fostering of relevant competences in all phases of teacher training. During their initial training, teachers should be able to acquire competences enabling them to impart the topic of sustainable development in a professional manner both in terms of content and methodology.

A principle focus of vocational education and training research both within the scope of occupational skills research and within the context of the research undertaken by educational specialists in their own respective occupational fields and occupations is developing sustainable actions and business practices within companies as an essential aspect of sustainable development and laying down the didactic ground for initial and continuing training.

In the case of complex processes and products, computer aided simulations and simulated management games may provide effect support in identifying areas where there is scope for action. The focus here extends beyond company and branch specific analyses to encompass analyses of activities, products and services. This is another area where a link can be established to the successful work conducted in the stakeholder conferences. Pilot studies and projects assist in identifying scope for action. A synopsis of initial and advanced training regulations with references to sustainability and of the relevant school-based skeleton curricula according particular attention to items within the occupational profile exhibiting correlations with sustainability could support the investigation into work conducted during vocational training.

Forecast

The concept of Vocational Education and Training for Sustainable Development does not yet currently enjoy the level of significance with vocational education and training practice, research and policy which would permit it to lay a justified claim to constituting a comprehensive modernising strategy. Firstly, a number of potentially uncovered areas and research desiderata remain to be identified within BBNE. These include such aspects as cooperation between learning venues, sensitisation and training for educational staff. Secondly, it has thus far only proved possible to meet the structural requirements of vocational education and training practice in part. A new and comprehensive "BBNE Development programme" may serve as a vehicle for a firmer implementation of the philosophy of sustainability within vocational training and enable it to be established on a broader basis. BBNE could become a future joint future project to be undertaken by (vocational education and training) practice, policy and academic research if it builds on the previous experiences of BIBB, the continuous inflow of new findings emerging from research projects and a further generation of pilot projects focussing on BBNE, the development of comprehensive media and methods, the bundling and organisation of action programmes and PR measures. ■

12 *Recommendation of the KMK and the German UNESCO COMMISSION on ESD in Schools, 27 June 2007*

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The BIBB was founded in 1970 on the basis of the Vocational Education and Training Act (BBiG). Its present legal basis is the Vocational Training Reform Act (BerBiRefG) of 23 March 2005, which describes the tasks of the Institute.

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