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Trends in German VET 2011/2012

Learning – developing – improving together

Securing skills for the future

Towards permeability:
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EDITORIAL

3 Learning – developing – improving together

Friedrich Hubert Esser, Birgit Thomann



SECURING SKILLS FOR THE FUTURE

4 (Mis-)matching in Germany: An analysis on the basis of employees' formal qualifications and skills

Daniela Rohrbach-Schmidt, Michael Tiemann

9 MINT occupations – claims of a skills shortage are often overstated

Analyses from the first BIBB-IAB Qualification and Major Occupational Field Projection

Peter Bott, Robert Helmrich, Gerd Zika

14 Different routes – one goal: how companies recruit apprentices

Margit Ebbinghaus

19 Diversity instead of competition and displacement

Diversification of in-company vocational education as a strategy for securing the skilled workforce

Anke Bahl, Agnes Dietzen, Marlies Dorsch-Schweizer



TOWARDS PERMEABILITY: OPENING PATHWAYS TO EDUCATION AND TRAINING

24 Systemic interlinking of school, transition system and training

An interview with Peter Thiele

27 Parity between advanced training qualifications and university degrees: ultimately the labour market decides

Reinhold Weiß

29 Dual courses of study – the supply and demand situation

Franziska Kupfer, Andrea Stertz

31 Systematising career progression

Advanced and continuing training in the electrical sector

Karlheinz Müller, Harald Schenk

35 Can the German Qualifications Framework contribute to the recognition of non-formal and informal learning?

Katrin Gutschow, Sabine Seidel



MONITORING THE VET SYSTEM

39 Measuring the world of (vocational) education - the Report on Vocational Education and Training and the BIBB Data Report

Michael Friedrich, Elisabeth M. Krekel

44 Chances of fully fledged employment after a dual-system apprenticeship

Tobias Maier, Ralf Dorau

46 Recruitment of skilled workers in companies that do not provide initial vocational training and measures to encourage more of them to do so

Felix Wenzelmann, Gudrun Schönfeld

48 Improved access to research data in the field of vocational education and training

BIBB's Research Data Centre

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Authors

Imprint

Learning – developing – improving together

Dear readers,

In times of globalisation and worldwide mobility, the sharing of knowledge, exchange of experience and cooperation on an international level are matters of general concern. This is particularly true in vocational education and training, where international exchange among practitioners and scholars has been greatly enhanced over the past few decades. Around the world, vocational education systems are faced with the challenge of offering qualifications tailored to the needs of the labour market and meeting the requirements of trade and industry for skilled workers. Due to demographic developments, meeting the increased demand for skilled labour has become of the utmost importance. Thus, there is barely any vocational education system that is not undergoing reform efforts in order to improve quality and outcomes, to make qualifications more employment-oriented and more closely aligned with the world of work.

In light of these ongoing processes of reforming and adapting VET systems, exchange, networking and international cooperation are matters of particular concern and interest to the Federal Institute for Vocational Education and Training (BIBB). Founded more than 40 years ago, the BIBB is a governmental institution under legal supervision of the Federal Ministry for Education and Research (BMBF). It is well established as a national centre of competence for policy, research, and practice in the field of initial and continuing vocational education and training in Germany. Within its core activities, BIBB offers advice on the development and modernisation of vocational education and training on a national and international level. BIBB's annual data report represents a key publication for monitoring the German VET system. The Institute initiates and maintains networks with partner institutes in more than 30 countries abroad. It hosts high-ranking international delegations, thus offering a forum for exchange between researchers, education practitioners and policymakers.

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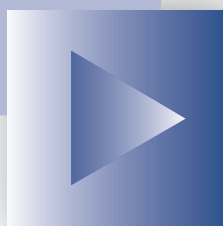


Throughout the world, the German system of vocational education and training has an excellent reputation. Germany's dual system is even recognised as setting an international benchmark in work-based learning, acceptance of national training and quality standards, and cooperation between state, private sector and social partners. Yet it takes continuous efforts to foster its efficiency and competitiveness. While looking for the best and most suitable solutions to our challenges in German VET, such as securing skills or facilitating permeability, international cooperation and collaboration also offer the chance to discover new ideas and perspectives. Discussion and exchange advance knowledge transfer and promote innovation, providing benefits for all partners involved, and for this reason, opportunities for dialogue and joint learning are crucial.

Accordingly, BIBB's German language journal "Berufsbildung in Wissenschaft und Praxis" (Vocational Training in Research and Practice), in general referred to as BWP, constitutes a periodical for exchange between scholars and practitioners in vocational education and training. As such, it is meant to spread news, experiences, research findings and relevant results of pilot projects within the professional and academic community.

The articles compiled in this special edition, all of which were published in BWP in recent months, offer an overview of current trends and developments within the German system of vocational education and training, with a particular focus on questions of skills shortage, permeability and monitoring VET. By making them available in English, we wish to foster the exchange of ideas and experiences about VET on an international level in order to give new impulses for the discussion and development of vocational education and training.

Enjoy the reading!



(Mis-)matching in Germany

An analysis on the basis of employees' formal qualifications and skills

► People are not always employed in jobs that perfectly match their skills and abilities. Research on the question as to what constitutes a good match is usually based on the empirical correspondence between employees' formal qualifications and the formal qualification requirements of their jobs, but so far no up-to-date and in-depth information exists on the incidence of skill-based mismatching in Germany. This article uses the BIBB/BAuA Employment Survey 2006, which yields rich information fitting the job-requirement approach, to provide up-to-date and in-depth figures on the incidence of formal and skill-based mismatching in Germany. Moreover, it studies the extent to which mismatching varies with employees' socio-demographic and qualification characteristics and with job tasks.

Current research

Mismatching, i. e. a lack of correspondence between the skills of an employee and the skill requirements of that person's job, might have negative consequences for the individual concerned (e. g. in the form of wage penalties¹ or job dissatisfaction), for the employer's business, and for the national economy. Studies of Germany and other economically advanced countries demonstrate that mismatching is a relevant phenomenon in labour markets (cf. MCGUINNESS 2006). Meta-analyses of international studies (mainly from the 1980s and 1990s) which incorporate estimates for Germany (cf. MCGUINNESS 2006; GROOT/VAN DEN BRINK 2000) indicate comparatively low rates of formal mismatching in Germany (cf. MCGUINNESS 2006, p. 388; GREEN/MCINTOSH 2000), but so far there is no information on the incidence of skill-based mismatching in Germany. International research shows that the proportion of over-qualified employees exceeds the proportion of under-qualified employees in most countries. The extent to which this currently applies to Germany, and whether this is valid for both types of matching (formal and skill-based) is a further issue requiring investigation. Moreover, some studies also show that younger employees, women and people with migrant backgrounds are more frequently over-qualified, whereas male employees are less likely to be over-qualified (cf. MCGUINNESS 2006, p. 388; GREEN/MCINTOSH 2000).

An analysis of formal matching in Germany (POLLMANN-SCHULT/MAYER 2004) shows differences between cohorts within matching categories between various vocational qualifications below the tertiary level. Another series of studies (including BIRSACK et al. 2008; FEHSE/KERST 2007) addresses the issue of adequate employment of tertiary-level graduates from various disciplines. The Educational Reporting Consortium (Konsortium Bildungsberichterstattung 2006, pp. 185 ff.) has shown that formal over-qualification has increased for graduates from academic tertiary-



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¹ As regards wage penalties from mismatching in Germany cf. ROHRBACH-SCHMIDT/TIEMANN 2011a.

level institutions between 1984/1995 and 2004 (19.8 %) and is currently slightly above the level of over-qualification of graduates from (upper secondary) vocational education and training institutions (2004: 17.2 %). As far as we know, no study has focused on how far the differences between various vocational qualifications at the secondary and tertiary-level affect both types of matching in Germany. Finally, some studies see signs of an increase in over-education in Europe in recent years (cf. GREEN 2006; KORPI/TAHLIN 2009). Even though we are unable to demonstrate whether mismatching has increased or decreased in Germany, to look for trends we extend our analyses by considering job tasks. We use a classification of occupational activities into cognitive (analytical and interactive) and manual routine and non-routine job tasks, which are linked to assumptions about labour market demand over time (cf. AUTOR et al. 2003). Thus, it is predicted that while the relative demand for cognitive and manual routine job tasks should decline, the relative demand for high-skilled cognitive and (simple) manual non-routine activities should increase over time (cf. Table 3, p. 7; for evidence of such a development in Europe, cf. GOOS/MANNING/SALOMONS 2009).

(Mis)matching in Germany

A feature common to previous studies on mismatching in Germany is their focus on formal matching (DALY/BÜCHEL/DUNCAN 2000; BÜCHEL 2002; BAUER 2002). The data of the BIBB/BAuA Employment Survey 2006 (cf. box) which was conducted by the Federal Institute for Vocational Education and Training (BIBB) and the Federal Institute for Occupational Safety and Health (BAuA) enables direct comparisons between formal qualifications and the formal requirements for employees. In addition to this, the survey also allows for analysis of the relationship between employees' skills and the requirements of the workplace.

The BIBB/BAuA Employment Survey 2006

The Employment Survey of the Working Population on Qualification and Working Conditions in Germany 2006, carried out by the Federal Institute for Vocational Education and Training (BIBB) and the Federal Institute for Occupational Safety and Health (BAuA), covers a representative cross-section of the labour force. It includes information on the respondents' qualifications and career history (school education, initial and continuing vocational education and training, career development and change of occupation, usefulness of vocational qualifications etc.), as well as on detailed job-related information (organisational information, job tasks, job skill requirements, working conditions, health etc.). With a total sample size of 20,000 it is well suited to the study of specific social groups (such as the elderly, females, employees with non-formal qualifications, employees with different national backgrounds) and developments within detailed occupations, industries and vocational fields.

Information on the BIBB/BAuA Employment Survey 2006 is available at www.bibb.de/arbeit-im-wandel (in German). For information in English on the data and how to access it, please visit www.bibb.de/en/50113.htm.

INCIDENCE OF MISMATCHING

To measure formal (mis)matching we use the information on respondents' educational attainment and respondents' assessment of the typical vocational qualification that is required to do their current job.² Comparing both variables³ it can be shown that approximately ten per cent of employees are under-qualified and fewer than twenty per cent are over-qualified in their current job. Thus, around 70 per cent are matched in terms of formal qualifications (cf. Table 1). Additionally, the BIBB/BAuA survey asked employees whether, in their job, they generally feel being up to, overstrained or undertrained by the requirements against their skills. On the basis of this definition of matching, i. e. the matching between the skills and knowledge of the job holder and the job's skill requirements, more than 80 per cent of employees are adequately employed (cf. *ibid*). As with formal matching, it is observable that higher proportions of employees are over- than under-qualified. This corresponds with results from other countries (cf. GREEN/McINTOSH 2007; McGUINNESS 2006). With minor exceptions (less than 5 %), German employees thus feel matched to the requirements of their jobs.

Combining the various matching measures (cf. Table 2, p. 6) reveals that, to a large extent, the different types of mismatching are independent of one another. "Twofold" over-qualification and under-qualification, i. e. an over-qualification or under-qualification in both formal and skills-based terms, are extremely rare in Germany (4.3 % and

Table 1 Formal and skill-based (mis)matching

	Formal matching		Skill-based matching	
	Thousands	Per cent	Thousands	Per cent
Under-qualified	3,503	10.6	925	4.6
Matched	23,663	71.2	16,295	81.6
Over-qualified	6,047	18.2	2,749	13.8
Total	33,213	100.0	33,189	100.0

Note: Differences are due to missing values.

Source: BIBB/BAuA Employment Survey 2006, weighted values, own calculations.

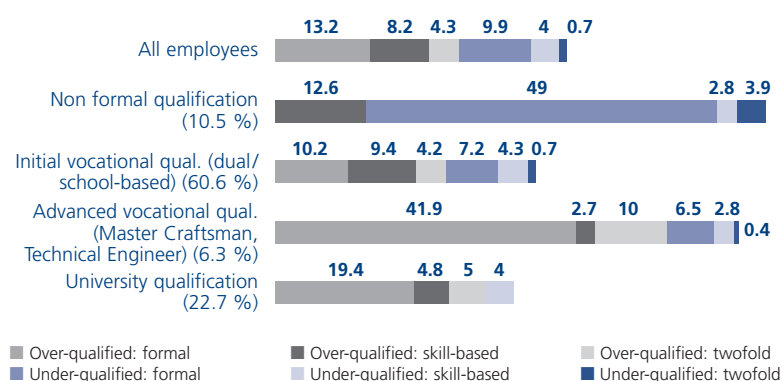
- 2 In other surveys, apart from self-assessments, expert ratings or average educational levels are used in order to measure the qualification requirements of jobs. However, both suffer from not capturing within-occupational heterogeneity, being less current and possibly less valid (e. g. expert ratings are based on single raters). For a detailed discussion of various measurement methods, cf. HARTOG (2000).
- 3 Both variables were surveyed using the same response items: "no vocational education and training qualification" (no qualification), "completed vocational education and training qualification, including school-based vocational training" (dual/school-based training), "Master Craftsman or Technical Engineer qualification, trade and technical school qualification" (advanced training) and "university of applied sciences or university qualification" (higher education qualification).

Table 2 Formal and skill-based (mis)matching combined

Type of (mis)matching	Thousands	Per cent
Under-qualification	4,804	14.5
• Twofold	220	0.7
• Skill-based	1,310	4.0
• Formal	3,274	9.9
Matched qualification and skills	19,806	59.7
Over-qualification	8,548	25.8
• Formal	4,387	13.2
• Skill-based	2,733	8.2
• Twofold	1,428	4.3
Total	33,158	100.0

Source: BIBB/BAuA Employment Survey 2006, weighted values, own calculations.

Figure (Mis)matching by qualifications (in %)



Source: BIBB/BAuA Employment Survey 2006, weighted values, own calculations.

Note: Differences between totals and 100 correspond to the matched proportions in each qualification group.

0.7 % respectively). Moreover, a larger share of employees is (only) inappropriately employed in terms of their formal qualifications (13.2 % and 9.9 %). Skill-based mismatching without formal mismatching occurs less frequently (8.2 % and 4.0 %). These results indicate that over-qualification and under-qualification in Germany are comparatively low, particularly compared to Anglophone countries (cf. McGUINNESS 2006; GROOT/VAN DEN BRINK 2000).

SOCIO-DEMOGRAPHIC DIFFERENCES IN (MIS)MATCHING

Both formal and skill-based mismatching vary significantly with employees' socio-demographic characteristics. Whereas the chance of being matched is equally distributed between men and women, the direction of mismatching varies by employees' sex. The incidence of formal and twofold under-qualification is higher for men and that of formal and twofold over-qualification is higher for women. Also, the incidence of mismatching (most notably twofold and skill-based) is higher for employees with a migrant background. However, a migrant background does not have an independent effect on mismatching – the bivariate tabulation hides the impact of intervening variables such as qualification, age and industry (cf. ROHRBACH-

SCHMIDT/TIEMANN 2011a). An analysis of mismatching by age-cohorts shows that compared to the main working-age population, young employees aged 15 to 24 and older employees (age 65 and above) are matched less often. Whereas young workers entering the labour market may possibly accept a mismatched position with the aim of obtaining an initial "foothold in the market", mismatched employment of workers aged 65 and over possibly occurs on grounds of securing any kind of earning opportunity.

QUALIFICATION-RELATED DIFFERENCES IN (MIS)MATCHING

Relating mismatching to different qualification levels (highest level of vocational education attained) reveals some decisive matching patterns (cf. Figure): firstly, employees with an apprenticeship qualification (in the German vocational education and training (VET) sector) and university graduates perform equally well in finding a matched job. This clearly underlines the particular position of the VET system in Germany. In the case of over- or under-qualification in terms of formal credentials, employees with an apprenticeship do slightly better than graduates from tertiary-level academic institutions (19.4 % as opposed to 17.4 %). With regard to skills and knowledge, however, employees who have completed dual and school-based VET are more likely to be over-qualified than university graduates. Compared to these two groups, employees without qualifications and those who have undergone advanced training to obtain a Master Craftsman or Technical Engineer qualification are significantly less likely to have a matched job. However, the completion of a Master Craftsman or Technical Engineer qualification generally leads to over-qualified employment only from a formal point of view, not necessarily with regard to the required skills.

JOB-TASK-RELATED DIFFERENCES IN (MIS)MATCHING

Differences within the matching categories also emerge with regard to job-task-related characteristics, i. e. groups of occupational activities introduced by AUTOR et al. (2003) – cf. Tables 3 and 4. Roughly speaking, cognitive non-routine tasks which exhibit a particularly rising labour market demand are less likely to be executed by employees who are mismatched in formal and skill-based terms. On the contrary, mismatched employees perform both cognitive and manual routine tasks more frequently. Non-routine manual tasks are more frequent with under-qualified employees and less frequent with over-qualified employees. Overall, the results might be interpreted as a sign of (rising) mismatching in routine tasks and in non-routine manual tasks through displacement processes. This interpretation is supported by an analysis of occupational groups and industries (results are available on

request). Lower occupational groups (ISCO-88 Main Groups 8 and 9) and commercial occupations are particularly characterised by formal and skill-based over-qualification. From all industry branches, commercial occupations also display the highest values for routine cognitive tasks. Against that background, a decrease in the demand for routine tasks could lead to an increase in mismatched employment in Germany, as in other European countries.

Trend towards more mismatching in Germany?

Formal and skill-based over-qualification and under-qualification are relevant phenomena of the German labour market, albeit to a limited extent. Over-qualification, as is the case for other countries, plays a greater role than under-qualification. Employees tend to be mismatched in terms of formal credentials rather than with regard to their skills. This means that although relevant proportions of employees are formally under- or over-qualified, their skills or abilities are in fact appropriate for the jobs that they do. We find some striking patterns for relevant subgroups of employees of different socio-demographic and qualification characteristics, among them that employees with an initial vocational qualification from the German apprenticeship training system perform as well as university graduates in obtaining a matched job.

This might play a part in explaining why the incidence of mismatching is somewhat lower in Germany than in other countries. Moreover, matching is linked with more non-routine activities and fewer routine activities. Against the background of an increase in formal over-qualification in some European countries, our analyses suggest that mis-

Table 3 **Operationalisation of occupational activities within the routine/non-routine scheme developed by Autor et al. (2003)**

Task group	Typical level of qualification	Assumed labour market demand	Item in BIBB/BAuA 2006a, b
Non-routine cognitive: analytical	High	Rising	F310, F311, F313, F318
Non-routine cognitive: interactive	High	Rising	F312, F314
Routine: cognitive	Medium	Falling	F307, F308
Routine: manual	Medium/low	Falling	F304, F305, F306
Non-routine: manual	Low	Constant/rising	F315, F316, F317

^a Alignments are initially based on a factor analysis solution. The variables of the first of the four factors were subsequently aligned to the sub-categories "analytical" and "interactive," respectively.

^b The question posed was how often the following activities (random order) occur at work – frequently, sometimes or never. The index is the sum of the employee's point scores (frequently = 1, sometimes = 0.5, never = 0) divided by the total number of activities in the respective task group.

F303	Manufacturing, producing of products and goods* **
F304	Measuring, testing, quality control
F305	Operating, controlling machines, plants, technical processes
F306	Repairing, maintenance
F307	Buying, providing, selling
F308	Transporting, stocking, posting
F309	Promoting, marketing, public relations*
F310	Organising, planning/preparing work processes
F311	Researching, developing, designing
F312	Training, teaching, tutoring, education
F313	Gathering information, investigating, documenting
F314	Consulting, advising
F315	Entertaining, accommodating, preparing food
F316	Nursing, caring, healing
F317	Securing, protecting, guarding, monitoring, traffic
F318	Working with computers
F319a	Cleaning, waste disposal, recycling*

* Items were not included in the index because they have high loadings on more than one factor.

** Additionally included in "routine manual" in ROHRBACH-SCHMIDT/TIEMANN 2011a. Also see ROHRBACH-SCHMIDT/TIEMANN 2011b.

	Under-qualification			Match	Over-qualification			All employees
	Twofold	Skill-based	Formal		Formal	Skill-based	Twofold	
Task indicator (0-100, mean values)								
Non-routine-cognitive: analytical (F 310, F311, F313, F318)	47.5	50.3	56.6	53.6	41.5	46.3	30.8	50.6
Non-routine-cognitive: interactive (F312, F314)	48.4	51.6	56.7	56.5	43.6	50.0	34.0	53.1
Routine-cognitive (F307, F308)	41.1	38.5	39.6	36.5	38.8	39.2	37.0	37.5
Routine-manual (F304, F305, F306)	47.9	46.8	43.6	41.4	36.1	43.4	32.4	41.0
Non-routine manual (F315, F316, F317)	32.6	27.2	23.4	21.3	18.1	21.0	16.5	21.2

Source: BIBB/BAuA Employment Survey 2006, weighted values, own calculations.

Note: The values in the table are mean values of the various matching categories for the task indices and state how much the various matching categories are characterised by these tasks – measured as the frequency with which such activities are exercised. For example, employees who are twofold under-qualified perform non-routine analytic activities less frequently than matched employees (47.5 versus 53.6).

Table 4
Matching according to task groups

matching could also rise with changes in the demand for skills in Germany. However, to validate this assumption, the analyses presented here would need to be supplemented by an analysis of longitudinal data. ■

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MINT occupations – claims of a skills shortage are often overstated

Analyses from the first BIBB-IAB Qualification and Major Occupational Field Projection

► MINT occupations, the umbrella term for job qualifications involving mathematics, information technology, natural sciences and technology, are often cited as a prime example of the imminent skills shortage. This apparent perception of a skills shortage is the subject of the following article. The principal question is whether there is actually any problem with the supply of newly qualified workers. With the help of reference data from official statistics on this occupational field and the first interpretations of the BIBB-IAB Qualification and Major Occupational Field Projections, the article aims to give a more nuanced description of the real situation in this occupational field.

Basis of the occupational projections

Research into qualification trends at BIBB follows a stringent logic (cf. BOTT 2010) that builds on the results of longer-term labour market and occupational field projections carried out by BIBB in cooperation with the Institute for Employment Research (IAB) (cf. HELMRICH/ZIKA 2010). It takes account of current developments by combining different official employment and education statistics, is verified and validated by means of structured dialogues with industry experts, and is finally analysed in individual projects using a variety of methodological approaches (cf. ABICHT et al. 2007). The foundation of the occupational projections are the 54 occupational fields developed by BIBB, which are grouped at the level of the occupational categories (3-digit codes) from the official German classification of occupations KldB 92 (Klassifikation der Berufe 1992) on the basis of comparable job characteristics and branch dominance (cf. TIEMANN et al. 2008). Thus, in contrast to the occupational categories of the 1992 classification scheme, they show greater intra-homogeneity and, at the same time, greater inter-heterogeneity. For methodological reasons, the analyses in the following will be confined exclusively to the “Major Occupational Field” (MOF) level.

Overview of MINT occupations

The MINT occupations are grouped under MOF 8, “Technical-scientific occupations”. These include the occupational categories listed in Table 1 (p. 10).

As can be seen, the MOF encompasses around 3.2 million employed people (2005) and has expanded by around 400,000 employees (+12.5 %) since 1996,¹ which makes it a distinct growth area in employment terms.

In relation to the number of notified job vacancies, the time taken to fill a reported vacancy (vacancy period) and the number of unemployed, the individual occupations within MOF 8 are very heterogeneous but uniformly and

¹ The sources of data for these discussions are Microcensus data and own calculations by BIBB and IAB.



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Table 1
MINT occupations: Numbers employed in occupation, vacancy period, notified vacancies, number unemployed (2005 and 2007)

Occupational field	Designation of occupational field	Number employed in the occupation	Notified vacancies for normal employees subject to social insurance Total for Germany		Vacancy period (days to fill notified job vacancies)		Total unemployed	
		2005	2005	2007	2005	2007	2005	2007
21	Engineers	1,028,776	7,684	12,037	390	556	59,623	25,611
22	Chemists, physicists, natural scientists	157,569	610	888	124	192	17,134	9,353
23	Technicians	1,033,918	4,185	8,544	378	665	45,697	24,352
24	Technical draftsmen and draftswomen, allied occupations	133,996	896	2,122	38	61	24,336	11,236
25	Surveying	57,084	65	158	45	90	3,878	1,862
26	Specialised technicians	118,313	462	1,043	158	244	9,840	5,709
38	Core IT occupations	679,883	3,927	6,594	57	78	60,214	33,975
	Arithmetical means across all occupational fields		2,823	4,975	288	468	58,815	44,072

Source: Microcensus of the Federal Statistical Office, own calculations; Federal Employment Agency (BA), job vacancy statistics, unemployment statistics, BIBB Arbeitsmarktradar (labour market radar)

recognisably on the increase across all variables in the period 2005 to 2007 (cf. Table 1).

The lengthening of the vacancy period to fill notified job vacancies, particularly for engineers and technicians, indicates an increasingly strained labour market from the companies' viewpoint. It must also be borne in mind that only around 30 % of all job vacancies are notified to the Federal Employment Agency – and the rate is lower still for academic jobs. Figure 1 therefore tends to understate the actual labour market situation as regards skilled workers in the MINT occupations.

The main concentrations of employment (2007)² are in the industry branches "Provision of business services" (12 %) followed by "Data processing and databases" (11.1 %) and "Mechanical engineering" (8.5 %). Ten years earlier (1996) the main concentrations were in "Construction industry" (11.1 %), "Mechanical engineering" (10.0 %) and "Provision of business services" (9.3 %).

MINT occupations in the future³

According to the projection of workforce needs compiled with the IAB/INFORGE model,⁴ the "Services for companies" sector among the MINT occupations will be the only one to rise substantially by 2025, and will form the most important branch of industry for this Major Occupational Field (MOF). Other branches that will remain significant are "Public administration" and "Construction industry", although these will show a slightly declining trend on average. The numbers employed in public administration will decrease from 3.0 million to around 2.4 million. A slightly modified picture, but following a similar trajectory, is seen in the construction industry with a downturn from 3.1 million to 2.0 million employees. The other significant industry branches for MINT occupations are remaining at a relatively constant level over time.

Until now, labour market projections have only been calculated on the level of a small set of qualification-stages (Bund-Länder Commission for Educational Planning and Research Promotion (BLK) 1996, 2002) or career stages (BONIN et al. 2007; Prognos 2008) or abstract job characteristics (IAB-Prognos 1998; cf. DOSTAL 2002), and have yielded only demand-side results, for the most part. One reason for this is that, until now, either the data sources have lacked complete information on employment and on qualifications attained (Federal Employment Agency statistics on employees subject to social insurance), or else the data on qualifications attained was not recorded in conjunction with the specific occupation.

Since 2005, Microcensus data has captured the highest vocational qualification plus the specialisation of initial vocational training for all economically active individuals, which BIBB has subsequently translated into the system of occupational classification. This forms the data basis for the projection of both supply and demand (cf. BOTT et al. 2010). This measure of the highest vocational qualification, i. e. proficiency in a recognised occupation, represents the level of qualification produced by the education system, which can then be set against labour market demand on the balance sheet. A net difference between

² The following presentations of the projections are based on Microcensus data from the year 2005, while structural data on current labour market trends is from the year 2007.

³ The data basis used in the BIBB-IAB Qualification and Major Occupational Field Projections is the Microcensus. This is the official representative statistical data from the Federal Statistical Office on the population and labour market, in which one per cent of all German households participate every year (continuous household sampling).

⁴ The INFORGE model is an econometric forecasting model that is deeply disaggregated by production sectors and product groups for the Federal Republic of Germany. Detailed model descriptions are found in: SCHNUR et al. 2009; MEYER et al. 2007.

these two values can reflect a possible mismatch between demand and suitably qualified supply.

A striking finding about the MINT occupations is that although the supply of persons trained in a relevant occupation declines in the period from 2005 to 2025, it is still very markedly higher than the demand, which rises only slightly (cf. Figure 1).

Starting from the long-term trend of a continuous increase in tertiary skills, particularly in knowledge-intensive occupations (cf. TIEMANN 2010), the projection shows a continuous expansion of the supply of persons with an academic qualification in a MINT occupation (ISCED 5A, 6). In proportional terms, this is primarily at the expense of the middle-grade specialist and management level (Master Craftsman, Technical Engineer, advanced technical school and healthcare school qualifications, ISCED 5B). On the other hand, the proportion of skilled workers (ISCED 3B, 4) will only decrease slightly over this period (cf. Figure 2).

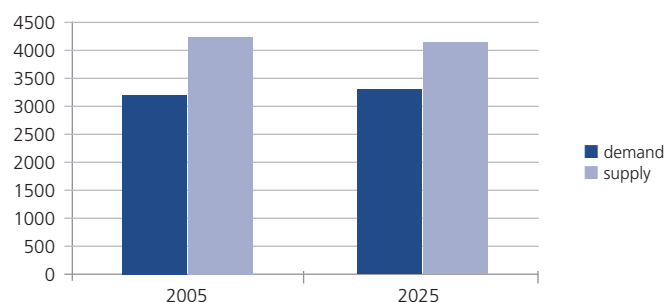
Ultimate employment of individuals with MINT qualifications

A flexibility matrix has been compiled for the year 2005⁵ which shows how many economically active people who trained in MINT occupations are actually working in MINT occupations, or have migrated to other occupational fields. The matrix also shows in which other occupational fields those now working in MINT occupations were originally trained. Using this matrix, it is possible to incorporate changes of occupation and hence an empirically verifiable flexibility into the balance sheet, and thereby simulate a possible adaptation scenario.

Next, considering that only around 52% of economically active people in MINT occupations remain within the MOF in which they were trained, and around 36% of individuals now working in this area are skilled workers from different fields of specialisation (cf. HELMRICH/ZIKA 2010), the result from Figure 1 is relativised. For in the long term, assuming that the distribution remains as in 2005, initially the rising demand can only be met by those trained in other specialisations, taking account of movements out of the MOF (cf. Figure 3). In the long term, however, a shortage will set in for demographic reasons.

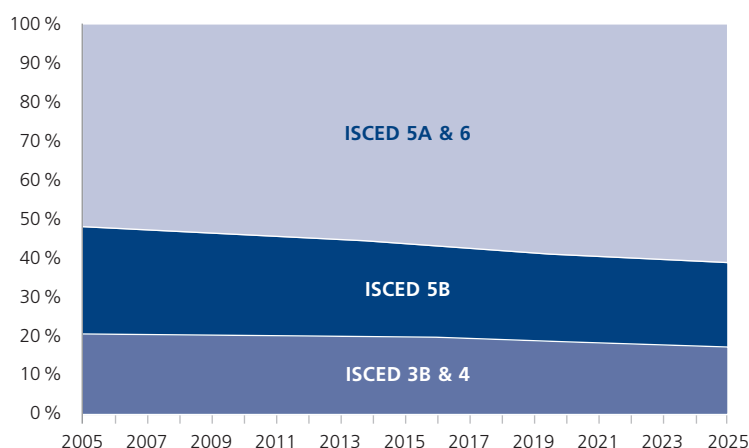
The high level of migration out of this MOF applies to all the occupational fields associated with it. 55% of engineers and 57% of specialists in the core IT occupations remain in their original training occupations; the figure for all other technical and scientific occupations is less than 30%

Figure 1 Numbers economically active / gainfully employed in MOF 8: "Technical-scientific occupations" – without flexibility (thousands)



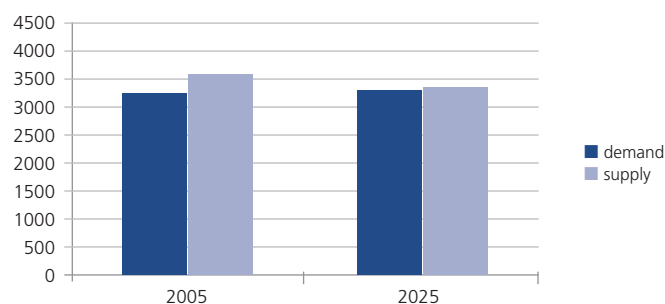
Source: Microcensus of the Federal Statistical Office; own calculations

Figure 2 MOF 8 "Technical-scientific occupations": Composition of economically active population by qualification tiers – before occupational flexibility



Source: Microcensus of the Federal Statistical Office; own calculations

Figure 3 Numbers economically active / gainfully employed in MOF 8: "Technical-scientific occupations" – including flexibility (thousands)



Source: Microcensus of the Federal Statistical Office; own calculations

⁵ Data for the following years (2006-2008) was still being processed at the time of original publication.

Table 2 Flexibility matrix for MINT occupations on the level of MOFs

	Present working occupation	Orig. training occupation		
		21	23	38
7	Metal, plant and sheet metal construction, installation, assembly workers	0.8 %	4.4 %	0.2 %
8	Industrial and tools mechanics	0.5 %	5.2 %	0.3 %
9	Vehicle and aircraft construction, servicing occupations	0.1 %	6.6 %	0.1 %
11	Electrical occupations	0.7 %	6.7 %	0.5 %
18	Construction occupations, wood and plastic working and processing	0.7 %	2.0 %	0.1 %
21	Engineers	54.8 %	5.2 %	4.5 %
23	Technicians	4.2 %	27.8 %	4.1 %
28	Wholesale and retail clerks	1.3 %	2.0 %	1.1 %
30	Other clerical occupations (except wholesale, retailing, banking)	1.9 %	2.0 %	1.2 %
32	Transport occupations	0.7 %	2.5 %	0.7 %
35	Business management, auditing, business consulting	9.6 %	5.4 %	6.5 %
36	Public administration occupations	1.9 %	1.3 %	1.8 %
37	Finance, accounting, cost-accounting	1.0 %	0.8 %	1.6 %
38	Core IT occupations	4.4 %	2.0 %	56.9 %
39	Clerical office occupations	3.1 %	3.5 %	6.0 %
43	Safety and security occupations	0.9 %	1.4 %	1.2 %
50	Teachers	2.8 %	1.6 %	2.1 %
51	Publishing, librarianship, translation and associated research occupations	1.3 %	0.3 %	1.7 %
Column percentages		90.7 %	80.7 %	90.6 %

* Shows only vocational fields in which one of the original training occupations accounts for 1 % or more.

Guide to interpretation: e. g. see grey-shaded cell: 9.6 % of those originally trained in the occupation of "Engineer" are working as managing directors, auditors, business consultants or similar in 2005.

Source: Microcensus of the Federal Statistical Office; own calculations

(cf. Table 2, which shows the original occupations of greatest numerical significance: engineers, technicians, core IT occupations). Working individuals trained in an occupation within this MOF have a particular propensity to switch into MOF 2 "Working, processing and repairing occupations", MOF 7 "Office and clerical service occupations" and MOF 9 "Legal, management and economic occupations".

There can be a host of reasons leading to a change of occupation. They are both gender and age-dependent. What exactly these reasons are cannot be set out here in detail. People may switch occupations out of personal motives or due to career-related constraints (cf. MAIER et al. 2010; HALL 2010).

There are, however, limitations to the projection of labour force supply and demand, which need to be borne in mind when interpreting the results. The supply and demand projections compared side-by-side for the labour market analyses give an indication of which future scenarios might be anticipated in the given labour market segment. In reality, labour market scenarios in which demand cannot be satisfied are bound to cause reactions on the demand side

(e. g. company owners may alter production processes) and/or on the supply side (e. g. expansion of the volume of supplied working time).

Analyses on qualification trends in individual occupations and branches

Substantive in-depth analyses on questions of detail concerning individual occupations (e. g. current qualification requirements in certain occupations) or comparative breakdowns of different training courses in the labour market cannot be accomplished by means of relatively broad-brush projections (from a birds-eye perspective, so to speak) but require the use of elaborated and validated methods in individual projects. Thus, while there is still a great deal of debate and speculation over the range of positions suitable for graduates of the new, phased degree programmes and the recruitment behaviour of companies for middle management positions, to date no really robust empirical studies exist from which solid conclusions can be drawn. For example, the expertise prepared by IW Köln, the Cologne Institute for Economic Research (cf. HOLLMANN et al. 2008) does not elaborate on the selection of study courses for analysis, and looks at university of applied sciences graduates in place of Bachelor programme graduates. BIBB's current research project on "Impacts of the new phased degree programmes on qualifications in initial and further vocational training" also focuses on the occupational group of IT specialists as representative of the MINT occupations, not least because this has been one of the programmes with the highest numbers of graduates from universities of applied sciences and universities since 2003. Targeted surveys of companies that have notified vacancies for IT workers to the Federal Employment Agency are undertaken to investigate the recruitment practices used by companies recruiting to fill positions for mid-level specialist and management staff. Thus sub-aspects of MINT occupations, e. g. the possible competition in the labour market between graduate recruits and skilled workers with dual-system qualifications at apprenticeship and continuing vocational education levels, are analysed in greater detail than the projection findings revealed.

At the start of the year 2010, the German Physical Society (DPG 2010) stressed the following point:

"The shortage of skilled workers in the MINT areas (mathematics, IT, natural sciences and technology) has unleashed an intensive debate in the recent past. In particular, heated discussion surrounds measures and initiatives to improve the situation. The knowledge that the future of our country and particularly the general state of the labour market depends most essentially on junior MINT staff, has rallied the associations and politicians and ensured that the problem is raised for thorough public debate." (DPG 2010, p. 3).

On the basis of the BIBB-IAB projections of qualifications and occupational fields, the articulated fears of an impending shortage of skilled workers in the MINT occupations appear to be far less dramatic in reality. For the time being, there is still sufficient latent potential in the form of well-trained skilled workers who are migrating into other occupational fields or have already done so.

Thought should be given to ways in which skilled workers might be retained in their original training occupations, for in the long term even the MINT sector will be no exception to the demographic trend. ■

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VET Data Report Germany

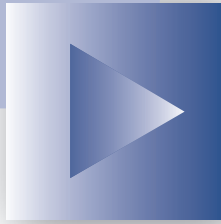
Since 2009 the Federal Institute for Vocational Education and Training (BIBB) publishes a Data Report to serve as a central data compendium containing essential information and data relating to vocational education and training and to supplement the annual Report on Vocational Education and Training issued by the Federal Ministry of Education and Research (BMBF).

The Data Report presents the current situation in initial and continuing vocational training in Germany as well as highlighting the changes which have taken place over the course of time. The report provides information on international indicators and finally on mobility as part of VET. In addition, each issue has a main thematic focus.

In 2010, BIBB first published a short version of the Data Report in English, which contains a selection of the main findings.

The full text of the report in German as well as additional information and the short version in English are available on the BIBB internet portal at www.bibb.de/vet-data-report.

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Different routes – one goal: how companies recruit apprentices

► “Trainees – a scarce commodity” was the headline in *Technology Review* in December 2009. Increasingly often this kind of report appears in the press, drawing attention to the impacts of demographic change, falling numbers of school-leavers, fewer applicants for training places and the resulting unfilled apprenticeship vacancies. Since this demographic downturn is set to continue for the time being, the question that arises is, what are companies doing in order to get hold of this “scarce commodity”? The article focuses on the beginning of the process of filling an apprenticeship vacancy – i. e. recruiting potential applicants – and the strategies adopted by companies.

Growing importance of gaining applicants’ attention

Between the decision to offer a training place and the young person’s arrival at the firm, a considerable period of time will normally elapse. This can be divided into different phases, each of which is characterised by a specific set of tasks associated with filling the training place (cf. DGfP 2004, p. 15).

In the past, the main task faced by companies offering initial vocational training (“training companies”) was to sift the numerous applications for an apprenticeship and select those young people who best fulfilled the specified requirements. In future, owing to the decline in school-leaver numbers, the question that will come to the forefront is how companies can attract apprenticeship applicants. Time-honoured recruitment practices need to change, suggests a study by GERICKE/KRUPP/TROLTSCH (2009), among others. Their results show that the apprentice-recruitment routes chosen by companies have a clear influence on their ability to fill training places. Vacancy-filling difficulties arose particularly when firms used only a small number of recruitment channels and relied mainly on notifying their training place vacancies to employment offices and chambers (of industry, crafts etc.).

Against this backdrop, this article takes a closer look at company recruitment practices. It examines which strategies companies use to attract potential apprentices, drawing on data from 1,068 training companies in Germany, collected by BIBB in the course of a representative company survey at the end of 2008 (cf. Table 1). In addition to information on the companies’ structural characteristics, the data includes responses on

- the use of eight applicant-recruitment methods¹,
- the start of the recruitment phase, and
- difficulties with filling apprenticeship vacancies.

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¹ Of the recruitment channels mentioned in the relevant research literature (e. g. BREISIG 2005), the present study considered only those which are appropriate to initial vocational training contexts and which also presuppose some action taken by the companies themselves. Speculative applications are not therefore classified as recruitment channels in the sense understood here.

Use of recruitment channels

Extreme variation is found in the intensity with which companies use the individual recruitment channels (cf. Figure 1). Notifying the employment office of vacant apprenticeship places is by far the most intensely-used instrument for attracting applicants. Radical change in people's information-seeking behaviour, most notably in the younger generation, is having a noticeable effect on the placement of advertisements. The Internet has clearly outstripped the "traditional" newspaper advertisement as a means of informing young people about training opportunities. All the same, around half of companies refrain from using any form of written text – in any medium whatsoever – to reach young people. With the exception of work experience placements, strategies for meeting young people face to face are used sparingly. Over three-quarters of companies completely refrain from holding open days to showcase themselves to the target group as a training company. Less than three per cent of companies make "very intense" use of this instrument.

The utilisation of the different recruitment channels varies markedly with company size. Smaller companies are generally less outgoing in their approach to gaining the attention of potential apprentices. Apart from notifying the employment office of vacant apprenticeship places, more than a quarter of smaller companies make intense use of no other instrument. Quite the opposite: a significant portion of small companies barely take advantage of any of the opportunities available. In contrast, larger companies are significantly more proactive, and the largest companies most of all. Only a few of these rule out one of the options completely.

Four different recruitment strategies

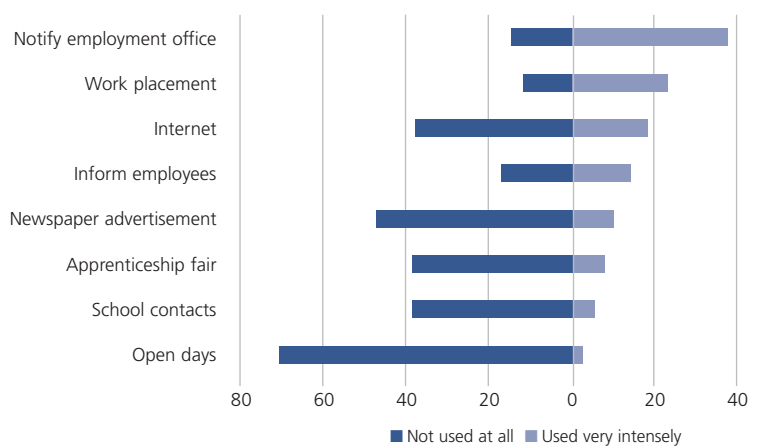
So far the recruitment channels have been considered singly. In reality, companies use several recruitment channels simultaneously to gain the attention of training-place applicants. Differences can still be found between companies as to which recruitment channels they favour and which ones they use as a secondary approach. In other words, there is variation in how the use of the individual channels fits in to an overall recruitment strategy. A possible means of identifying such recruitment strategies consists in the use of cluster analysis techniques (cf. box). Using this method, four clusters could be identified among the companies surveyed, each of which is characterised by a specific approach to finding applicants.

The first cluster encompasses almost a quarter of all companies (cf. Table 2, p. 16). This group's recruitment strategy is dominated by channels which enable indirect, non-personal contact to be initiated with the potential

Table 1 Design of the company survey

Total population	All companies in the secondary, tertiary and public sector which employed at least one apprentice pursuant to the Vocational Training Act (BBiG) or the Crafts Code (HwO) in one of the years 2005, 2006 or 2007
Basis	"Establishment Register" (Betriebsdatei) of the Federal Employment Agency (BA) as of 30.06.2007
Sampling method	Disproportionate stratified sample by company size and industry sector
Data collection method	Postal written survey after preliminary telephone screening
Target persons	Company-based initial vocational training managers or coordinators
Weighting	Adjustment to the distribution in the total population with regard to company size and industry sector
Details	EBBINGHAUS (2009)

Figure 1 Use of different recruitment channels (all companies; responses in %)



Response categories "Not at all" and "Very intensely" extracted from the total of six options on the response scale.

apprentices, predominantly mediated via the Internet, the press and the employment office (cf. Figure 2, p. 16).

Ways of introducing themselves directly to young people as a training company – such as presentations in schools and at apprenticeship fairs – are distinctly under-represented in this group. To that extent, the Cluster I companies pursue an *indirect-distanced* recruitment strategy.

The companies of Cluster II, which is the largest cluster by far, accounting for a good 50 per cent, are rather defensive overall in their recruitment behaviour. With the

Cluster analyses

Cluster analysis techniques make it possible to determine whether the respondents can be divided into groups (= clusters). Usually clustering is done in such a way that respondents within a group show strong similarities on the attributes of interest, while clear differentiations exist between the groups.

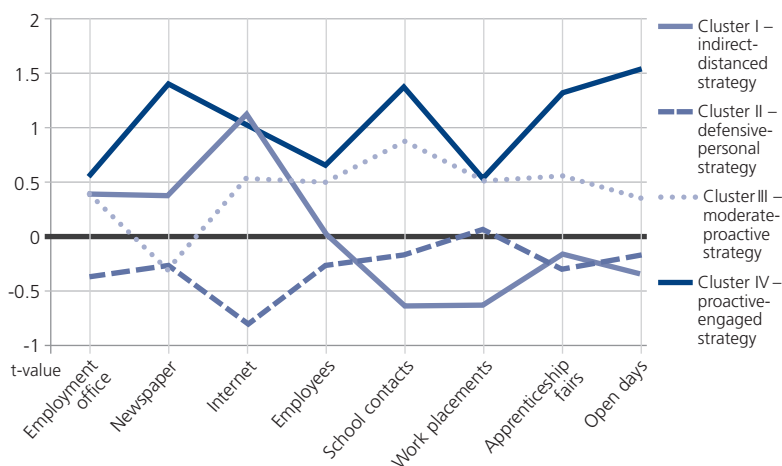
In the present case, cluster analysis was used to explore whether the companies could be divided into groups on the basis of similarities between the recruitment strategies they used. The number of clusters was obtained by hierarchical cluster analysis according to Ward's method. The companies were assigned to clusters by means of a cluster centre analysis applying the k-means algorithm (cf. inter alia BACHER 2002).

Table 2 **Cluster affiliation according to selected structural attributes** (figures as row percentages)

		Distributions				One-dimensional Chi2 test*	
		Cluster I indirect-distanced	Cluster II defensive-personal	Cluster III moderate-proactive	Cluster IV proactive-engaged	χ^2	p
All companies		24.3	51.6	16.8	7.2		
Company size	under 50 employees	24.1	55.0	16.1	4.8	2.58	.462
	50 or more employees	25.7	30.4	21.6	22.3	279.10	.000
Economic sector	Secondary sector	18.4	55.0	20.2	6.3	18.92	.000
	Tertiary sector	32.7	45.2	15.4	6.6	9.77	.021
	Public sector	9.0	66.3	14.6	10.1	54.83	.000
Region	West	21.2	54.6	17.5	6.6	10.30	.016
	East (incl. Berlin)	38.3	38.3	13.5	9.8	25.58	.000

* Explanatory note: The method adopted was one-dimensional chi-square testing under the assumption of non-equal distribution. This is indicated if, on the basis of existing knowledge, a certain distribution can be expected. In the present case, this is the distribution of the total sample. One-dimensional chi2 tests examine whether the actual distribution within a group – for instance, secondary sector companies – matches or deviates from the expected distribution. Significance levels (p) of .05 or lower indicate a statistically significant deviation in the actual from the expected distribution.

Figure 2 **Normalised recruitment strategies of the identified clusters**



Explanatory notes: The chart shows plotted t-values. These are normalised mean deviations between cluster and total sample with regard to the use of recruitment channels, where the mean intensity of use in the total sample is set to "0." Accordingly, negative values indicate that use of a recruitment channel is less intense in the cluster than in the total sample. Positive t-values indicate that the recruitment channel is used more intensely in the cluster than in the total sample.

exception of offering work placements (Betriebspraktikum), they make less intense use of all other recruitment channels than the "average company" (the zero line in Figure 2). At the same time, the data indicate that – unlike Cluster I – they tend to favour direct and personal communication over indirect contact. Against this background, the recruitment strategy of Cluster II can be characterised as *defensive-personal*.

The third cluster groups together one-sixth of companies. Overall, the companies in this cluster invest rather more effort in acquiring applicants than the average. Only the use of newspaper advertising is under-represented in this cluster. Its recruitment strategy can thus be characterised as *moderate-proactive*.

Cluster IV, accounting for a good seven per cent of companies, is the smallest. It comprises companies which go even further than the Cluster III companies in their efforts to gain the attention of applicants. Particularly with regard to the direct approaches – presentations as part of school events, apprenticeship fairs and open days – their efforts go considerably beyond those of the other companies. Thus, these companies are pursuing a *proactive-engaged* recruitment strategy.

Which companies pursue which recruitment strategies?

From the above consideration of the individual recruitment channels, correlations emerged between intensity of use and company size. The next aspect to investigate is the extent to which company size, as well as other structural attributes, also have an effect on the overall recruitment strategy. For this purpose, one-dimensional chi-square tests were calculated as a means of determining for each company size-class – and similarly, each category of the other two structural attributes considered – whether the distribution of companies of the respective size-classes in the four identified clusters differed from the total sample. As Table 2 shows, this was not the case for smaller companies (fewer than 50 employees) whereas it certainly was for larger companies (50 employees or more). The latter are distinctly under-represented in the cluster with a *defensive-personal* recruitment strategy (Cluster II) and account for a disproportionately large share of the *proactive-engaged* group of companies (Cluster IV). Economic sector also has a noticeable effect on cluster affiliation, the main differences being apparent in relation to Clusters I and II. Companies from the secondary and the public sector are under-represented in Cluster I and over-represented in Cluster II. The converse is true for companies in the tertiary sector. From a differentiation by regions, the most striking finding is that companies from the new (post-unification) German federal states are distinctly under-represented in Cluster II, slightly under-represented in Cluster III, but are over-represented in Cluster I and show a similar tendency in Cluster IV.

Table 3
Correlations between recruitment strategies and difficulties in filling apprenticeship vacancies (responses in %)

		Distributions					Two-dimensional chi2 test*	
		Total	Cluster I indirect-distanced	Cluster II defensive-personal	Cluster III moderate-proactive	Cluster IV proactive-engaged	χ^2	p
There were too few applicants (N = 1,026)	yes	17.0	21.7	15.2	15.2	17.3	5.5	.139
	no	83.0	78.3	84.8	84.8	82.7		
There were too few suitable applicants (N = 1,050)	yes	55.8	58.3	53.3	57.1	62.2	3.32	.345
	no	44.2	41.7	46.7	42.9	37.8		
Applicants did not attend the interview (N = 1,032)	yes	33.7	43.2	25.7	26.6	74.3	84.31	.000
	no	66.3	56.8	74.3	73.4	25.7		
Recruits did not start apprenticeships (N = 1,041)	yes	14.2	18.9	8.7	18.8	27.0	30.86	.000
	no	85.8	81.1	91.3	81.2	73.0		
Apprenticeship contracts were terminated prematurely (N = 1,041)	yes	27.7	26.3	25.3	38.0	25.7	11.02	.012
	no	72.3	73.7	74.7	62.0	74.3		
Available training places remained unfilled (N = 1,059)	yes	15.5	20.0	12.1	10.0	38.4	47.18	.000
	no	84.5	80.0	87.9	90.0	61.6		

* **Explanatory note:** The two-dimensional chi2 test is a refinement of the one-dimensional test. The test examines whether a statistical correlation exists between the two attributes under consideration; in the present case, between cluster affiliation and the occurrence of difficulty with filling apprenticeship places. Significance levels (p) of .05 or lower indicate that such a correlation can be assumed.

PROACTIVE RECRUITERS ANTICIPATE HIGHER DEMAND FOR SKILLED WORKERS

It would stand to reason that the type of recruitment strategy correlates with the anticipated demand for skilled workers. The analyses confirmed this hypothesis. Companies adopting a *moderate-* or *proactive-engaged* approach (Clusters III and IV) to finding training-place applicants anticipate high demand for skilled workers, with significantly higher frequency than companies pursuing the other two recruitment strategies (24.9 % and 32.1 % respectively in Clusters III and IV compared with 20.0 % and 22.7 % in Clusters I and II respectively).² In contrast, the (roughly) ten per cent of companies trying to recruit potential applicants by *indirect-distanced* means (Cluster I) state with twice to seven times the frequency of the comparison groups that they have no demand at all for skilled workers in the immediate future. An additional aspect on which there are clear differences between the clusters is the significance attributed to in-house initial vocational training for meeting the anticipated demand for skilled workers. For three out of four companies from Cluster III (*moderate-proactive*), in-house initial vocational training takes priority over all other options for meeting skilled workforce needs. This applies to two out of three companies in Cluster II (*defensive-personal*) and at least one in two companies in Clu-

ster I (*indirect-distanced*). In Cluster IV (*proactive-engaged*), by re-markable contrast, only four companies in ten see in-house initial vocational training as the “first-choice method” of covering their demand for skilled workers.

AN ENGAGED APPROACH IMPLIES AN EARLY STARTING TO THE SEARCH

Although companies in Cluster IV (*proactive-engaged*) attribute less importance to in-house initial vocational training for their personnel policy than the comparison groups, they more frequently start prospecting for apprentices a long time in advance than other companies. Around 21 per cent of companies from Cluster IV embark on recruitment one year or more before the commencement of initial vocational training. In the comparison groups (Clusters I to III) only between four and eleven per cent start looking for potential apprentices at such an early stage.

The majority of companies with *indirect-distanced* and *moderate-proactive* recruitment strategies embark on the active prospecting phase six months to one year in advance, while companies with a *defensive-personal strategy* start between three and twelve months ahead of the commencement of initial vocational training.

² It should be borne in mind that the survey was carried out at a time when the current economic crisis was only foreshadowed.

Do the four different recruitment strategies vary in effectiveness?

An interesting question at this juncture is whether variations in effectiveness are found between the identified recruitment strategies. This final line of inquiry is pursued with reference to the companies' responses concerning difficulties that arose in the course of filling apprenticeship places. The questions asked included whether the company managed to attract sufficient applicants, to what extent this group yielded enough apparently suitable young people, whether applicants invited to interview failed to attend, and whether any vacant apprenticeship places were left unfilled (cf. Table 3, cf. p. 17).

The findings are both interesting and surprising. For, as Table 3 shows, the most highly engaged recruiters (particularly Cluster IV) contend with a far higher frequency of vacancy-filling problems than the companies which do not show such keen engagement (particularly Cluster II). Especially massive differences exist with regard to non-attendance of applicants at interviews. Companies with *proactive-engaged* recruitment strategies (Cluster IV) find themselves affected by this problem more than twice as frequently as the average of all companies. Moreover, they are left with unfilled training places three or four times more frequently than all other companies.³ Once they have filled a training place, however, premature termination of their apprenticeship contracts occurs no more frequently than the average for all companies. In fact, this is a problem that arises disproportionately often for companies with a *moderate-proactive* recruitment strategy (Cluster I). Taking an overall perspective, only companies which adopt a *defensive-personal* approach to finding applicants (Cluster II) report that problems filling vacancies are comparatively infrequent.

Recruitment behaviour as a reaction to changes in the apprenticeship market

Developments in the apprenticeship market are not yet dramatic but indicate that the issue of filling training places should be taken seriously, as it is likely to become more acute in the foreseeable future for demographic reasons.

³ At this point, however, it must be noted that the survey only asked whether any vacancies remained, not what proportion of the offered training places were left unfilled. The fact that larger companies are over-represented in Cluster IV must also be taken into account. Since larger companies can generally offer – numerically – more apprenticeship places than smaller ones, there is a higher probability that applicants might fail to attend interviews or a training place remain unfilled. By way of corroboration, unfilled training places are comparatively infrequent in Cluster II, where smaller companies are over-represented.

This will heighten the importance attached to the recruitment of future apprentices. What emerges from the companies' self-reports is that they apply very diverse strategies to the recruitment of apprentices. The spectrum ranges from approaches that can be summed up as rather narrow and undynamic to strategies in which the different companies embrace all the options open to them for attracting applicants with comparatively high intensity. The fact that only a relatively small proportion of companies exhibit the latter recruitment behaviour, whereas the majority are distinctly more casual in their approach to recruiting applicants, can be explained with the rationale that the crisis in the apprenticeship market is only just beginning, and so far situations of heightened competition between companies have only affected particular regions or branches of industry (cf. GERICKE et al. 2008). This also casts a new light on the initially disturbing findings on correlations between recruitment strategies and difficulties in the process of filling vacancies. Seen in this light, the frequent occurrence of vacancy-filling problems in companies which recruit very dynamically seems to be more of a catalyst for their chosen recruitment behaviour rather than the outcome of it. Reinforcing this view, this type of recruitment behaviour is found to be somewhat more prevalent among companies in the eastern German federal states – i. e. regions in which the demographic downturn is already a tangible reality. So far, however, the state of knowledge on company recruitment strategy is too sparse to provide a comprehension explanation for all its manifestations. In addition to the companies' structural attributes, which prove just as significant here as in GERICKE/KRUPP/TROLTSCH (2009), other factors that certainly come into play are economic and employment structures as well as the business cycle. But young people's expectations concerning vocational training offers and the subsequent usefulness of the acquired certificates and qualifications in the labour market may have an influence on the recruitment behaviour of training companies. ■

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Diversity instead of competition and displacement

Diversification of in-company vocational education as a strategy for securing the skilled workforce

► This article examines the options open to companies for meeting qualifications needs, with particular attention to company-based initial and continuing vocational education and training (IVET/CVET). It presents selected results from a survey of experts which shed light on present assumptions about the trend for companies to recruit more academically qualified employees and erosion of the significance of occupational training in the workplace. The findings show that companies are increasingly relying on internal recruitment strategies and developing initiatives to combine company-based competence development with academic learning. Far from exhibiting a general bias towards academic qualifications, companies are seeking to recruit staff from diverse educational backgrounds.



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Arguments from the current academic discourse in vocational education

Despite successful modernisation of the vocational education and training (VET) system over the last decade, once again the academic discourse about the effectiveness and sustainability of VET has intensified. This debate is prompted on the one hand by the higher competence requirements imposed by the expanding knowledge and service economy and, on the other hand, by a perception of graduates with Bachelor's degrees that also confer a professional qualification as potential new competitors for the same jobs as vocationally qualified skilled workers.

BAETHGE/SOLGA/WIECK (2007) start from the assumption that job-types and knowledge-forms associated with industrial production are changing with the advent of the knowledge society, such that vocational education, with its adherence to the acquisition of competence and experience-based knowledge as an integral part of the work process, is lagging ever further behind higher secondary general and university education, with their emphasis on imparting systematic knowledge. This is shown, they assert, in the recruitment practice of companies. Positions that used to be taken by skilled workers trained within the dual system are increasingly being filled with graduates from universities and universities of applied sciences. The main impacts are said to affect the middle-grade qualification tier, where competition between skilled workers with dual-system vocational qualifications and graduates with Bachelor's degrees is likely (cf. BAETHGE/SOLGA/WIECK 2007, p. 74 f.).

Arguing along similar lines, DREXEL (2010) investigates the possible consequences of an increase in university degrees for companies' recruitment practices. In her judgement, companies see academics as having special potentials – such as abstract thinking, planning skills, IT competence, social skills and certain habitual traits – which they want to utilise to a greater extent. At the same time, however, they find that recent graduates lack occupationally-relevant experiential learning and practical know-how, and want to

prevent these shortcomings from negatively affecting business performance. According to DREXEL, companies are solving this qualification mismatch by restructuring their work organisation in the direction of (re-)Taylorisation, i. e. extricating more demanding activities from the range of tasks assigned to middle-grade positions and aggregating them to create new positions for university graduates. The middle-grade positions dismembered in this process are then aggregated into simpler mid-level positions, or else annexed to skilled-worker positions. As a consequence, it is suggested, the middle-grade tier of skilled workers could disappear, resulting in polarisation between the university-graduate and skilled-worker tiers (cf. DREXEL 2010, p. 48).

If these assumptions were correct, the consequences for the VET system would be very grave, since they imply that the significance of established development and career-advancement routes for qualified skilled workers might be eroded. This internal track proves to be a strong force for innovation in VET, since the specialists and executives who gain qualifications through upgrading training already possess application-oriented, extended and consolidated knowledge acquired through practical experience (cf. BOSCH 2010).

The BIBB project on meeting company qualification needs

So far, however, empirical VET research has found little evidence to support the thesis of any erosion of the middle-grade qualification tier or consequences for the VET system. Quite the opposite: in the field of knowledge-based services, complementary development of middle-grade and high-qualified employment can be observed (cf. DIETZEN 2010; UHLY/TROLTSCH 2009).

An ongoing BIBB study on meeting company qualification needs aims to contribute to the establishment of firmer empirical foundations in this area. It looks not only at the classic areas of company-based IVET, CVET and competence-development activities, but also at that of staff recruitment. Some preliminary findings are now available, which are based on an expert survey of company and sector representatives. It took the form of 25 semi-structured interviews with ten industry spokespeople and 15 representatives of small, medium and large companies from eleven sectors¹ in which employment expanded in the years 2003 to 2007 (cf. box).

Question-clusters from the semi-structured interviews

In addition to general information on company/sector profile, staffing structure and details about the particular interviewee, the following areas were discussed:

- General characterisation of the company/sector and its requirements and qualifications,
- Current trends,
- Typical activities and tasks,
- Demands with regard to qualification, competence and change,
- Consequences for recruitment and human resources development, experience so far with university graduates and with external staff,
- Consequences for IVET and CVET in the company,
- Decision-making processes in the company,
- Interests of the company and sector.

The described findings are based on this data material but represent only a sub-aspect of the actual research project. Currently a representative company survey is being conducted to round off the qualitative study.²

Companies' perception of the problem and options for addressing it

The views of sector and company representatives as expressed in the interviews shed some interesting light on the research rationales mentioned in the introduction. Without wishing to pre-empt particular findings, the following analysis is prefaced with the remark that, judging from the responses of the experts questioned, the trend towards more academically qualified staff and the possibility of repercussions for skilled workers with vocational qualifications is a non-issue. In contrast, the crucial question for the experts is how they can use a company-based socialisation strategy to develop qualified skilled workers from the very start, and to retain them in the medium to long term. The requisite competence profiles call for a combination of demanding standards of specialised systematic knowledge and understanding, along with strong experience-based knowledge and practical know-how relevant to the given occupation.

UPGRADING REQUIREMENTS AND MORE COMPLEX COMPETENCE DEMANDS IN ALL JOB AREAS

Those interviewed discuss the need to develop extended competences, which they bundle – for the most part separately from the required occupation-specific skills – into a range of “generic” competences or key qualifications for the workplace. While process- and customer-orientation and the associated communication skills as well as systematic thinking and the ability for self-organisation are

1 Selected sectors: call centres, electrical, energy, health care, information technology, management/consulting, mechanical engineering, shipping/logistics, telecommunications, transport, temporary employment.

2 Further information on the BIBB project “Meeting company qualification needs at skilled-worker level in growing fields of employment” (Betriebliche Qualifikationsbedarfsdeckung) can be found at www.bibb.de/de/wlk30785.htm (in German).

expected at almost all levels of work, the job profiles that are filled with university graduates are associated with heightened requirements. Some of those cited are greater systematic knowledge and meta-cognitive competences as well as management skills.

The requirements upon employees seem to be rising at all levels in equal measure. In their responses, there is no discernible indication that work profiles are being carved up to create scaled-down roles for the low qualified, on the one hand, and more demanding work profiles for the highly qualified, on the other. In fact, in certain areas where many older unskilled workers are employed – such as the transport industry, for example – companies seem to be systematically endeavouring to replace them with vocationally qualified staff as they retire. In the view of one company representative, the still very new occupation of the “Skilled Transport Employee” offers ideal conditions for future drivers to gain such a broad qualification from the outset that it will not only avert the known problem of incapacity for driving work after 25 years of service, but will at the same time impart the team- and service-orientation that is increasingly demanded in all workplaces nowadays. Because of their hybrid qualification, it will also be possible to deploy these employees in sales, public relations and vehicle servicing roles; in this way they are responding effectively to the massive shift in roles within the sector.

Since the image of the sector is not rated as very appealing, all the more is invested in high-quality IVET and CVET in order to retain people within the company and assure them of long-term prospects. Across all the sectors, in-company IVET is functioning as an important retention strategy from the very outset.

“We have already learned that if the right foundations are laid early on, something akin to – a sense of community grows, and the bond with the company is certainly deeper than for external recruits.” (Medium-sized transport company)

Apart from this, companies appreciate the ability to exert an influence on “what the young people learn,” whereas they criticise purely university-based training programmes for their lack of relevance to practice.

“And that’s what we criticise about university to some extent, that it’s often too theory-laden and simply lacks this practical relevance. We have high drop-out rates there as well. But in our apprenticeship training, I can steer things very firmly myself.” (Mechanical engineering sector)

INITIAL VOCATIONAL TRAINING AS A FOUNDATION

In general, as the above example from the transport industry shows, those surveyed advocated a type of IVET that is not too rigid in its content but imparts a solid foundation in the specialist domain of the company’s core business.

In particular, the flexibility resulting from a broad occupational profile enables companies to bolt on the required specialisations successively as the need arises, while at the same time giving young people time to identify their own personal preferences more precisely before they join the company permanently as skilled workers.

“We don’t know what the year 2040 will bring, any more than people in 1980 knew the PC would be such a big deal. We can’t show today’s trainees the technology of the future, because we don’t know what that will be. What we do know is that when they have to master the technology of 2040, a solid grounding in electro-technical skills will be important. And that’s why we lay a relatively deep, solid, heavy-duty foundation – to build on.” (Large company, energy sector)

INTERNAL PROGRESSION FOR MASTER CRAFTSMEN, BACHELORS AS NEW EXTERNAL COMPETITORS TO TECHNICIANS

In the industrial-technical sector, companies reap the benefits of their highly qualified skilled workers, many of whom will stick with tradition by following up their journeyman’s certificate, sooner or later, with a Master Craftsman’s or Technician’s examination, even if there is no immediate prospect of a job at the appropriate level. Master Craftsman positions are usually filled internally, for this function is closely dependent on precise knowledge of the company’s internal procedures and products and specific leadership competencies within the team. Technicians, on the other hand, could possibly find themselves in competition with holders of the new Bachelor degrees because of the nature of their work, which predominantly consists of theoretical and planning tasks.

“Yes, there is a typical field of work for Bachelors, which is planning. Planning networks, [...] that’s where I see a possibility that more Bachelors could also be employed rather than the Technicians of the past, who actually had their own self-chosen niche there, partly because it fitted their interests quite well. In sections of the company where the key issues are staff leadership, staff deployment, planning of practical works and projects in general, the Master Craftsman will continue to have good opportunities in future and scope for development.” (Energy company)

VOCATIONAL AND ACADEMIC TRACKS AS SEPARATE BUT COMPLEMENTARY EDUCATIONAL PATHWAYS

The interviewees’ responses make it clear that nuanced assessments regarding the qualification demands for the different job levels and fields already exist within companies, and they care about deploying their staff appropriately. Apart from achieving an efficient distribution of salary grades, they very much seek to offer employees the right degree of personal challenge. In order to have a good “qualification mix that addresses the mix of competence requi-

rements", in the words of a spokesman from the IT sector, companies pragmatically pick and choose from the full range of qualifications on offer, be they vocational or academic, and "scale" these individually for the given field of work. A personnel development spokesman from a medium-sized mechanical engineering company also refers to the mix of dual system initial vocational training, trainee programmes, degrees from universities and universities of applied science as a "smorgasbord, the way we take people and internally place them where we want them."

EXTERNAL RECRUITMENT CONFINED TO EXCEPTIONAL CASES AND GRADUATES

The larger and older the companies in traditional sectors such as transport, energy, metal and electrical, the more likely they are to have a repertoire of established advancement routes built around vocational qualifications. To fill skilled-worker and skilled-clerk positions, they draw exclusively from their own staff body. External recruitment is only used to attract university graduates. This applies particularly to engineers, although even here efforts are made to develop them from in-house staff if possible, for external candidates are associated with a comparatively high risk of misappointment. Moreover, it is highly desirable to have a certain percentage of graduates on the staff as "lateral thinkers" from an external background.

"That is how we add the spice, if I can call it that, to our own dual study courses, by taking candidates from technical universities; what we say about them is, we need lateral thinkers, who haven't previously been cultivated [within the company], but have lots of work placements and experience from other companies." (Large company, energy sector)

"More and more, we're finding it's a 50:50 chance whether an external recruit will or won't work out, in whatever function. Any external appointment carries a certain degree of risk, which is why we do a great deal of development internally – from the managing director to operational managers or field technicians coming up through our junior service-engineer programme, or let's say, the fitters in the factory starting from our own apprenticeships. The internal route is very, very important for us." (Mechanical engineering company)

A similar situation prevails even for companies in newer industries such as the call-centre industry, where similar structures as in long established sectors are taking shape: these days, management positions are almost exclusively filled by staff promoted from the company's own ranks. Two sector-specific training occupations have already been established, even if the sector continues to profit from the high educational status of many external entrants who have acquired their qualifications in other vocational fields.

DUAL STUDY COURSES WELCOMED AS A TAILORED ALTERNATIVE IN THE CENTRE GROUND

Generally a great interest is noted in dual courses of study and any associated cooperation with universities. The responses of those surveyed suggest that a new type of educational course is emerging which precisely meets the need for heightened qualification requirements whilst maintaining the desired contact with company practice. Dual study courses are assessed very positively because they combine theory and practice and also convey the necessary theoretical know-how for the management of technological progress. There is no perceived danger of a gradual displacement of staff with conventional dual-system qualifications. Instead, the new provision is welcomed as an answer to "the previous lack of differentiation among university graduates" (IT sector).

"Apprentices and dual students or graduates are always complementary. We envision ourselves as a fully rounded company and ultimately we aspire to have well-qualified staff at all levels. So for us there is not going to be one particular emphasis anywhere [...], but really we see them as paths of equal importance and status, running side by side." (Large company, electrical sector)

Conclusions to inform the further debate

Companies need a diverse and flexible repertoire of options for attracting staff, adapting to changing qualification needs and developing competence. They view their own in-company initial and advanced vocational training as an important prerequisite for securing this broader flexibility within their repertoire of options. The clarity of this finding is astonishing, considering that for many years the initial and advanced vocational training system has been accused of rigidity and poor adaptability, based solely on the organisation of its structures and content (cf. BAETHGE/BAETHGE-KINSKY 1998).

The fact that human resources managers consider the dual system of initial vocational education and training to have proven its worth in practice, despite its somewhat negative reputation in the educational discourse, is not a new insight (cf. STRUCK/SIMONSON 2001). What is new, however, is that companies are initiating and refining options for career advancement which complement the classic trajectory from initial vocational training via occupational experience to upgrading training. The interviews particularly touched on dual study courses, study programmes at universities of cooperative education, and the possibility of a degree at a university of applied sciences – following on from dual system vocational training or after completion of advanced vocational training – as alternative options.

Companies seem to be making increasing use of these options, which have been available for some long time, in order to combine the advantages of an academic education with those of occupational training in the workplace so as to piece together their own internal recruitment track. In this context, the companies repeatedly emphasise the great importance of imparting experiential learning relevant to the occupation along with practical know-how, and also socialisation into the company's practices as indispensable elements of training programmes.

On the basis of the findings presented here, no indications are found of the kind of polarisation at skilled worker level that was suggested in the introduction. On the contrary, vocationally trained skilled workers are in demand in companies, and their career-advancement routes are not "obstructed." For the time being, however, it remains to be seen how the occupational positions and activities ultimately branch out at management level, and whether the advancement opportunities hitherto available to skilled workers trained via the classic dual-system vocational route remain open to them in the same form. ■

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Systemic interlinking of school, transition system and training

An interview with Peter Thiele on the BMBF initiative "Chains of educational progression through to initial vocational qualification"

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- VET policy issues, concepts and committees
- Annual Report on Vocational Education and Training
- VET innovation and structural support programmes
- Vocational education and training research
- European/International VET cooperation



► The vocational education and training system has undergone considerable change during the past 20 years. Large numbers of vocational preparation schemes or programmes leading to partial vocational qualification have grown up alongside the dual system of vocational education and training, but these only provide some of the young people concerned with successful transitions into vocational training leading to a recognised qualification. Over the course of recent years, numerous programmes and initiatives have been introduced at an individual, regional and structural level in an attempt to increase the efficiency of the transition system. September 2010 brought the launch of the BMBF Initiative "Chains of educational progression through to initial vocational qualification."

BWP_ Mr. Thiele, what is the aim of the BMBF Educational Chains Initiative?

Thiele_ The "Chains of educational progression through to initial vocational qualification" initiative is not merely a support programme. Its aim is to bring about a systemic optimisation of the transitions between school, the transition system and dual-system initial vocational education and training. Although an initial budget of € 362 million has been planned for the "programme part" of the initiative until the year 2014, our orientation is towards a longer-term approach. Our goal is to reach young people in a targeted way, focusing on those at lower secondary schools and special schools, who require particular support and who have especial difficulty in making the transition into training later on. The objective of the initiative is to develop a system of collective responsibility between the stakeholders in the three areas mentioned above and to establish this at an early stage during the time young people spend at school. The focus is on avoiding school dropouts, preventing waiting loops and achieving efficient transitions into dual training and successful vocational qualification. This includes strengthening company responsibility for training preparation. Last but not least, a further aim is to counter the impending shortage of skilled workers occasioned by demographic change.

I admit that this is a challenging project which requires us to look beyond our own individual areas of responsibility. Nevertheless, I am optimistic that we can make discernible progress in this area.

BWP_ The Educational Chains Initiative brings together both new and old support instruments. Which tried-and-tested programmes does the initiative link up with, and how will the interlinking of the three instruments of potential analysis, vocational orientation and career-entry support actually work?

Thiele_ We have worked in conjunction with the federal states and used a standardised catalogue of criteria to select over 1,000 lower secondary schools and special schools as intervention establishments. Depending on the type of school, an analysis of potential will be conducted with all pupils from Year 7 onwards. The aim will be to identify

areas of strengths and to reveal support requirements. A school-based and out-of-school support plan will be agreed for young people ascertained to need support. This will happen in consultation with everyone involved, including pupils and their parents. We expect to fund around 60,000 such analyses of potential at the schools each year. These young people will receive extra-school support from full-time, experienced educational guides on an individual and continuous basis. This provision will extend until the completion of initial vocational qualification in problem cases. We have planned to fund 1,000 such educational guides. The first guides, numbering just under 500, have already been in post since November 2010. Their tasks are to take on a mentoring role to support and monitor the young people personally and develop individual solutions for problems arising in the educational development whilst cooperating closely with regional educational and support institutions.

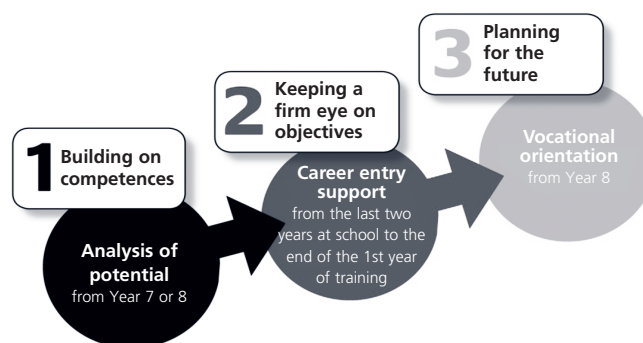
The plan is to deploy the third instrument of the initiative from Year 8 onwards. This involves practice-based vocational orientation in inter-company institutions and similar establishments with close links to trade and industry where the aim is that young people – and not just those identified as requiring support, by the way – will test out their inclinations and gather specific experiences in three occupational fields whilst – quite literally – grasping along the way that the subjects they have learned at school, such as mathematics, are of considerable practical use. Results will be recorded in a “career choice passport” or similar document. The funding available to the BMBF vocational orientation programme, which has already financed over 150,000 practical placements of this nature, has been specifically increased for this purpose.

Not all the individual instruments I have outlined are new. They have already been used and continue to be used on an individual basis in some federal states. What is new, however, is the strategic interlinking of such instruments within a systemic support philosophy geared up for broad-based, coherent, nationwide implementation. Another new aspect is that these measures are backed up with individual support agreements, the aim of which is to strengthen the coordination and collective responsibility of a range of stakeholders within sub-sectors of the educational system.

BWP_ Can you use the example of the educational guides to explain this?

Thiele_ The educational guides are the backbone of the Educational Chains Initiative. They will use the individual support plans as a basis for ensuring that young people in need of support receive continuous personal mentoring over several years, whilst also teaming up with the stakeholders in other areas of the educational system to realise the gradual transition of the young people into training. During the early design stage of the Educational Chains Initiative, we cooperated closely with the Federal Ministry

Figure Educational Chains from school to career entry



Source: JOBSTARTER Programme Office, Bonn

of Labour and Social Affairs (BMAS) and the Federal Employment Agency (BA). We have also incorporated the findings gleaned from the first generation of career-entry support staff and commissioned the BA to implement the deployment of “BMBF” educational guides in order to achieve the greatest possible degree of coherence. There are, however, specific characteristics which we believe are important for the BMBF educational guides, such as a commitment to carry out analyses of potential as the basis for selecting the young people and drawing up their individual support agreements; and that the BMBF mentors continue in their roles in the longer term. We continue to collaborate closely on the basis of an administrative agreement reached with the BA which also encompasses qualitative aspects of implementation, and to coordinate the tendering and selection procedures which have taken place as well as the implementation of career-entry support within the scope of the Educational Chains Initiative.

The full-time specialist educational staff are joined by around 1,000 volunteer educational guides from the Senior Expert Service. These unpaid Senior Experts, most of whom have many years of experience in the workplace and in initial vocational training, work in close conjunction with the locally based full-time post holders with a particular focus on supporting and stabilising young people during the vocational training process. The experiences we had with the Senior Experts during our JOBSTARTER VerA Initiative aimed at preventing training dropouts was very positive, and we are now extending our cooperation nationwide. Together with around 1,200 existing career-entry support staff from the BA, this means that a total of more than 3,000 mentors will soon be in post and pursuing the Educational Chains approach. Our aim is to use the “new” generation of educational guides to provide many years of support for up to 30,000 additional young people and assist them along their educational pathway.

We have also established a service agency at the JOBSTARTER programme office at BIBB, partly to assist us with the regular exchanges that take place with schools and mentors involved in the Educational Chains Initiative.

BWP_ You have already mentioned that one aim of the Educational Chains Initiative is to bring about further structural development of the transition system. This is in line with the idea of inclusion: i. e. setting up the entire VET system to be accessible to all young people and their heterogeneous requirements, rather than instigating special programmes for specific target groups. What impulses can we expect from the initiative in this regard?

Thiele_ The “programme part” of the BMBF Educational Chains Initiative is already pursuing precisely this objective. We put our faith in successful instruments which we interlink within an educational chain, and where additional provision is necessary, we take it from our existing toolbox instead of adding to the many layers of support already in place by instigating new instruments. The one key idea is that these instruments should keep forming connective links in the chain until it results in a qualification. One example is the combination of in-training support and introductory qualifications that reinforce company-based training preparation for lower ability trainees and deliver a retention effect into training. The transition system as a whole, however, also needs to be subjected to scrutiny. BMBF studies revealed that the transition system included in excess of 190 Federal Government and federal state support programmes as long ago as 2008. Our aims are to monitor the efficiency of these programmes, accord priority to the most effective instruments and achieve optimisation. Such an objective will not be achievable within twelve months. We have, however, already made a start and have set up an inter-ministerial group under the lead management of the BMAS to deal precisely with this topic and to present proposals before the end of 2011.

BWP_ One major plus of the Educational Chains Initiative – the broadly based and cross-departmental involvement and participation of stakeholders at the various levels – is possibly also a major challenge to your success. How will it be possible to reconcile these varying interests and concentrate the large number of ideas towards the objective?

Thiele_ We have established a considerable consensus in favour of the Educational Chains Initiative from all stakeholders. The degree of commitment shown by the federal states in particular is also pleasingly high. The bilateral discussions we held with every single federal state focused on the matching and coherence of Federal Government and federal state funding, the identification of transferable “good practice” and the ongoing future harmonisation of our support measures. The degree of consensus amongst the social partners is also high. The trade unions are seeking to become involved via such vehicles as supplementary voluntary projects of their own, and the Educational Chains are a central pillar within the new National Training Pact. This focuses on a rapid transition into training; for example, by extending school-industry cooperation and company-based training preparation.

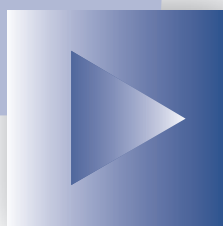
BWP_ What else can be done over the coming years in order to ensure that the instruments being put in place become standard provision across the board for all pupils at lower secondary schools and special schools, and do not depend solely on Federal Government funding for their existence?

Thiele_ Sustainability and system optimisation are, of course, objectives of the initiative already. Whether we will succeed in achieving them in overall and permanent terms without funding seems to me to be questionable, however. The fact is that we have problems in the educational system, and solving them will cost money – money well invested for sustainable returns, I might add! Every time such funding prevents a dropout from giving up on school or training, subsequent societal costs are saved many times over. And I only need to look at the budget for the transition system, which amounts to around € 4 billion a year, to see that enough money is there. The focus therefore needs to be on improving the efficiency and connectivity of the instruments rather than on additional funding. For this reason, we at the BMBF see the support provided for Educational Chains as an initial injection of finance for a process that will be funded from various sources.

And we have, of course, already entered into discussions with the federal states on how we can establish the Educational Chains approach in each state’s system on a permanent basis. During the bilateral negotiations conducted with the federal states, we were pleasantly surprised by the degree of commitment shown and by the measures already instigated to pursue a diverse range of activities in support of the Educational Chains. We are now backing up these measures with our own funding. We also met with considerable openness with regard to cooperation projects extending beyond actual support for the Educational Chains Initiative. We have already succeeded in reaching additional BMBF-federal state agreements with some states covering such areas as the nationwide introduction of potential-analyses at lower secondary schools and special schools via self-sustaining teacher training systems, in order to enable such analyses to be carried out all over the country on a permanent basis. We have also set up a Federal Government-federal state support group at the BMBF with the aim of providing a platform for the transfer of good practice and achieving better coordination of future Federal Government and federal state measures.

Finally, we will also use our Educational Chains service agency at BIBB to pursue dissemination of the approach outside Federal Government and federal state funding schemes by instigating an Educational Chains campaign to link the diverse range of voluntary projects going on in this sector into our network, and actively promote additional initiatives of this nature. ■

(Interview: Christiane Jäger)



Parity between advanced training qualifications and university degrees: ultimately the labour market decides

REINHOLD WEIB

► Recent years have seen a marked increase in the numbers completing the transition into higher education. The target of 40 per cent of an age cohort embarking on a degree programme has not only been achieved but surpassed. It is only a matter of time before this trend pays off in the form of higher numbers of graduates in the German labour market, exposing skilled workers who have qualified via the vocational pathway to heightened competition. As yet, it remains to be seen what impact this will have on different occupations and sectors. Meanwhile it is all the more important to make progress in the direction of permeability and parity between educational pathways, so that people with vocational qualifications can take advantage of the opportunities.

ADVANCED TRAINING QUALIFICATIONS FACE MORE INTENSE COMPETITION

The structural reform of degree courses introduced as part of the Bologna Process, particularly the introduction of Bachelor's degrees, is bound up with the aspiration to deliver qualifications that are relevant and desirable in the job market. Whether this aspiration can actually be fulfilled

led now appears somewhat doubtful, for many of the more than 6,000 Bachelor's degree courses are geared towards narrow labour market niches. There is a lack of transparency, permeability, and the necessary element of practice. Work placements are no substitute for the acquisition of experiential knowledge, of the kind that is indispensable to meet the practical demands of the workplace.

Nevertheless, the labour market is sending out positive signals. Enterprises are classifying Bachelor's and Master's graduates as applicants with an academic qualification profile (cf. BRIEDIS et al. 2011). Therefore they are generally being hired in place of graduates with the Staatsexamen (state examination for entry to professional practice) or traditional Diplom or Magister degrees. Hence the vast majority of the new qualifications are not in direct competition with qualifications from the vocational system. This is all the more true, given that a proportion of them cover subject disciplines without close equivalents in the vocational education system. Also the majority of Bachelor's degree holders pursue a higher academic qualification by studying for a Master's.

The most likely outcome is that increasing competition with Bachelor's graduates can be expected at the level served by advanced training qualifications, because advanced training and higher education programmes impart different but, in terms of labour-market relevance, entirely comparable qualifications. This is shown not only by curriculum comparisons but above all by analyses of the activities and requirements of specific occupations (cf. WHKT et al. 2011). Viewed through the eyes of the labour market, there is a broad array of jobs which can be done both by university graduates and by skilled workers with advanced vocational qualifications. This is especially true for management functions in small and medium-sized enterprises and a range of specialised skilled functions.

The projection model constructed jointly by BIBB and IAB to assess the developments in occupational fields and qualifications until 2025 comes to the conclusion that the share of employed people with a recognised advanced training qualification will decline slightly in relation to the share of graduates (cf. HELMRICH/ZIKA 2010; BOTT/HELMRICH/ZIKA in this issue). The key reason for this is that at least some university graduates, particularly those with Bachelor's degrees, will infiltrate areas that have previously only been staffed by people with vocational qualifications. Another significant factor is that the number of advanced training examinations has stagnated for years, so that advanced training qualifications have quantitatively lost ground to university degrees and will continue to do so.

Thus it is all the more important to maintain and even boost the attractiveness of advanced training qualifications

where possible. Areas for action on this front include better dovetailing of initial and advanced vocational training, greater systematisation of advanced training qualifications, modularisation of advanced training regulations, competence-oriented examinations, a convincing system of quality assurance and, crucially, more permeable pathways into higher education.

ENSURING THE PERMEABILITY OF ROUTES INTO HIGHER EDUCATION

In its Resolution of March 6, 2009, the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) liberalised access to higher education for holders of qualifications from initial and advanced vocational training, thereby giving a first important signal of the parity of qualifications from higher education and the vocational system. It enables holders of advanced training qualifications to obtain a general university entrance entitlement in all subject disciplines (as conferred by the Abitur). Since then, this resolution has largely been implemented by the federal states (Länder) into their higher education laws. On its own, the removal of formal hurdles may not make a long-term difference to the rates of entrance to higher education in this group, which accounts for just 1 per cent of students. Over and above the matter of university admission, numerous other deterrents are inhibiting take-up of this option. The Board of BIBB has issued a recommendation containing proposals for better permeability between vocational education and university studies (Hauptausschuss 2010).

Improving credit transfer options: Transparency about admission requirements, the demands made by a degree course and the possibilities of applying for credit transfer, i. e. to have qualifications attained during vocational education or occupational practice credited towards a degree programme, would need to be improved distinctly. Now as ever, case-by-case assessment is the dominant approach: degree-course applicants must first enrol at a higher education establishment, and only then discover what credit will be awarded for their vocational qualifications. It is also known from experience that very little use is made of credit transfer mechanisms. In this light, a degree course looks like a barely calculable educational pathway, paved with stumbling blocks. A necessary remedy would be the creation of standardised credit transfer procedures, combined with skilled advice and a system of bridging courses.

Degree programmes tailored to target-group interests: Another issue is the organisation of study, which is geared towards a notional full-time student. Study programmes that can be attended in tandem with employment, which are crucial in enabling working people to participate, are

barely offered as yet. But there is a healthy level of interest among holders of advanced training qualifications. Equally, the growth of individual course offers, particularly from private providers, signals the great potential to be found here.

The development of accessible study programmes tailored to the interests of target groups requires the collaboration of all actors. It is therefore essential to further expand and foster cooperation between the vocational education providers, higher education establishments and enterprises. For instance, providers of adult education can offer pre-degree preparatory courses. Companies are called upon to encourage their staff to study in tandem with employment by granting leave and/or awarding grants.

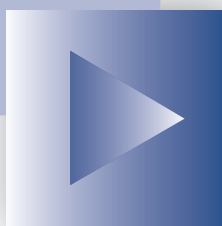
Access to Master's programmes: A strategic objective should be not only to rank advanced training qualifications at the same level as Bachelor's degrees, but also to make it possible to use them as the foundation for a subsequent Master's degree at a university of applied sciences. The "Common structural guidelines of the federal states for the accreditation of Bachelor's and Master's study courses" passed by the KMK at the beginning of 2010 opens up this possibility. Some German federal states such as Rhineland-Palatinate are already making use of this option. Others should follow their lead.

PROVIDING DEVELOPMENT AND PROMOTION OPPORTUNITIES

Ultimately the value of certain qualifications is decided by the labour market. But particularly against the background of the skills shortage that is expected in certain sectors, employers in both the private and the public sectors must offer attractive development opportunities to qualified individuals from the vocational pathway. This applies to work tasks, staff development, earning opportunities and career prospects. ■

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Dual courses of study – the supply and demand situation

FRANZISKA KUPFER, ANDREA STERTZ

► For years now, Germany has witnessed steadily growing interest in dual courses of study, i. e. degree programmes that combine academic with vocational learning. A prime reason for their growing significance is that by integrating both dimensions they make it possible to equip skilled workers with fully-rounded qualifications for demanding roles in the workplace. This article describes current developments, drawing upon data from the AusbildungPlus (TrainingPlus) database.

CHARACTERISTICS AND OPPORTUNITIES OF DUAL STUDY COURSES

Dual study courses combine a degree programme at a university or a university of cooperative education (Berufsakademie) with vocational training and/or relevant practical employment. This greater emphasis on practical relevance is the key difference between dual and standard degree courses. One special feature is the close integration of academic and vocational content in the curriculum. This is achieved through contractual ties between the cooperation partners, namely the company and the higher education provider.

Dual courses of study can be categorised into four different types (cf. MUCKE 2003), using typological criteria based on the groups targeted by the courses, the content and organisation of the work-experience phases, and the nature and intensity of the cooperation between the vocational and academic sectors. Dual courses of study that *integrate vocational training* and *integrate workplace practice* into uni-

versity studies are intended as initial vocational training for school leavers with a higher education or university of applied sciences entrance qualification. In contrast, dual courses of study that *integrate full-time employment* and are conducted *in tandem with employment* are for the purpose of continuing vocational education and training and are targeted at experienced employees.

Within six to eight semesters, participants in the *integrated-training* study courses can obtain two qualifications: one vocational and one higher education certificate, which enhances their career opportunities in the labour market. Companies see dual courses of study as an important instrument for recruiting and developing qualified junior employees. But greater weight is also being attached to them from the perspective of education policy, which is supporting the expansion of this form of provision. Dual study courses open up transition routes between vocational education and the higher education system and thereby support the concept of lifelong learning. As a further benefit, they may also help to increase the proportion of graduates in Germany.

DUAL COURSES OF STUDY – SUPPLY AND DEMAND

The main providers of dual study courses are the universities of applied sciences (Fachhochschulen), the universities of cooperative education (Berufsakademien) and, since its foundation in March 2009, the Baden-Wuerttemberg Cooperative State University (Duale Hochschule Baden-Württemberg, DHBW). But a number of universities have begun to recognise the advantages and attractiveness of this form of study and now offer their own dual study courses.

The AusbildungPlus portal – dual study courses at a glance

The AusbildungPlus portal provides a nationwide overview of dual study courses. It has been operated by the Federal Institute for Vocational Education and Training since 2007 with support from the Federal Ministry for Education and Research. The aim is to increase transparency regarding high-quality training provision including supplementary qualifications and dual study courses. The centrepiece of AusbildungPlus is a database containing over 44,000 listings of company-based training opportunities incorporating supplementary qualifications or dual study courses (as of May 2011). Until now the database has only listed the *integrated-training* and *integrated-practice* types of dual study courses. In future, it will also include dual courses of study for continuing vocational education and training.

Online information: www.ausbildungplus.de (in German)

At the last reporting date (April 2010), the AusbildungPlus database listed 776 dual courses of study (cf. Table 1, p. 30), in which 50,764 students are enrolled. A total of 27,900 cooperation links exist between companies and institutions of higher or cooperative education. Some companies may have been counted more than once in the statistics if they provide a variety of study-course qualifications.

Although the universities of cooperative education and the DHBW offer considerably fewer dual study courses than the

Table 1 **Providers of dual study courses** (retrieved April 2010)

Providers	Dual study courses	Participating companies	Students
Universities of applied sciences	394	7,732	17,503
Baden-Wuerttemberg Cooperative State University	189	11,810	21,481
Universities of cooperative education	164	8,045	11,213
Universities	29	313	567
Total	776	27,900	50,764

Source: AusbildungPlus in Zahlen 2010

Table 2 **Subject disciplines for dual study courses** (retrieved April 2010)

Subject specialisations	Dual study courses	Participating companies	Students
Economics and Business Studies	319	15,014	27,912
Computing	113	3,403	5,687
Mechanical / Process Engineering	120	3,909	6,987
Electrical Engineering	77	1,944	3,485
Engineering	42	705	1,640
Civil Engineering	29	908	972
Industrial Engineering	28	842	1,546
Social Studies	23	845	1,772
Economics and Social Ethics	12	267	196
Transportation / Nautical Engineering	11	58	355
Mathematics	1	3	210
Architecture	1	2	2
Total	776	27,900	50,764

Source: AusbildungPlus in Zahlen 2010

universities of applied sciences, they register more partner companies and more students per course. Aside from the historical fact that universities of cooperative education have been running dual study courses for considerably longer than universities of applied sciences, this discrepancy is explained by a peculiarity of certain dual study programmes at universities of applied sciences. Whereas the strongly business-led dual study courses at universities of cooperative education and the DHBW are taught in classes of 20-30 students, dual students at universities of applied sciences and universities are not always catered to with specific dual courses. In that case, dual students attend the normal Bachelor's degree classes and seminars, and complete their vocational training or practice phases during a year's work experience before commencing their studies, or otherwise during vacations and a work placement semester.

The majority of dual study courses are offered in business and economic disciplines (cf. Table 2). The predominant combination is a Business Administration degree coupled with training and/or employment in a recognised clerical occupation. Students can choose between different subject specialisations such as Banking, Media Management, Logistics or Business Law. They make this choice in consultation with their companies, taking account of the emphasis of their work-experience role.

Around a third of these study courses are based in the engineering field (e. g. Mechatronics, Electrical Engineering, Vehicle Engineering and Civil Engineering). The study programme can be linked with training in a recognised industrial-technical or clerical occupation, or with training or employment in the IT sector. Special study programmes are also offered for apprentices in the skilled crafts (e. g. the cooperative degree programme in Wood Technology for apprentice carpenters).

Analysis of the data from AusbildungPlus also permits a review of the quantitative development of dual courses of study in recent years. From 2004 to 2010, the number of such courses on offer continually rose (from 512 to 776), but it is striking that the number of students has not grown proportionately (from 40,982 students in 2004 to 50,764 in 2010). While the numbers of dual study courses and companies grew by a good 50 per cent from 2004 to 2010, growth in student numbers was just 23 per cent. This suggests a growing differentiation and specialisation in the subject-related content of dual study courses, coupled with only very modest expansion in the number of places offered.

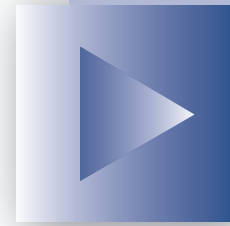
OUTLOOK

The range of dual study courses has been expanded constantly in recent years, particularly at universities of applied sciences (Fachhochschulen), universities of cooperative education (Berufsakademien) and the Baden-Wuerttemberg Cooperative State University (DHBW). Despite the great interest of education policy and companies in this special form of study, the number of dual study courses has not proliferated unduly because they are highly demanding of time and effort and companies only have limited capacities. It remains to be seen whether universities of cooperative education and the DHBW will continue to record the largest numbers of partner companies and students in future, or whether any shift towards the universities of applied sciences will occur. The majority of dual study courses are offered in business and economics and engineering disciplines. The expansion into previously unrepresented disciplines such as social ethics and social sciences would be one possibility for expanding the overall provision of dual study courses. Further growth potential can be identified, particularly against the backdrop of skill shortages and life-long learning, in continuing-education dual study courses for applicants who are already fully qualified in their occupation. ■

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Systematising career progression

Advanced and continuing training in the electrical sector

► To tailor the development of skilled workers to the industry's needs, as of August 2009 a process-oriented system of continuing vocational education and training (CVET) has been instituted in the German electrical and electronics sector: having completed initial vocational education and training (IVET) in an electrical and electronics training occupation, skilled workers can pursue further CVET to qualify as Specialists and then gain a second-stage recognised qualification as a Certified Process Manager in Electrics/Electronics (Operative Professional). The realisation of a third-stage advanced training qualification (Strategic Professional) is planned for 2012. This article outlines the innovative structure and the standards governing the content of this new advanced training model. It focuses on the potential of this form of CVET, which is work-process-oriented, undertaken in tandem with work to keep pace with constant advances in technology and organisation.



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Professional process management

The objectives of modern vocational education derive from the structural conditions of the economy. Flexible specialisation – a strategy that relies on the rapid implementation of innovations in the form of high-quality, marketable products – is the unavoidable response of companies wishing to safeguard their international competitiveness and access new markets. This approach goes hand in hand with process-oriented organisational structures: the functional hierarchy is no longer the determining structure; business processes and operations come first. If these are designed effectively and efficiently, the requisite flexibility and customer-orientation, quality improvement and cost reduction can be achieved.

These modern process-based structures impose a changing set of tasks and requirements upon skilled workers: job-elements are integrated and intermeshed; tasks become broader and more demanding; isolated processes are combined and integrated. More responsible decisions are delegated to skilled-worker level. Integrated system development, intelligently organised production and customer-oriented service call for competent members of staff at all levels of employment who share a common, comprehensive understanding of the processes involved.

The development of skilled workers in the course of business processes is a key issue for companies, not just with a view to safeguarding their competitiveness but most of all in the light of demographic change. Amid rising demand for skilled workers and high qualifications, the workforce is ageing and the supply of junior staff is diminishing. What were once abstract demographic scenarios are thus turning into acute business challenges.

At the heart of these changes, the electro-technical and electronics industry has to contend with complex products and systems, branch-specific solutions and diverse product variants, global value chains and worldwide operations and services. New advanced training occupations and the respective CVET provision must do justice to these changes: at the earliest opportunity in the modernisation of the training regulations for the industrial electrical occupations, the social partners agreed upon a connecting thread linking

them to CVET (cf. ZVEI/IG Metall 2000). In this conception, business processes were used in the development of the new advanced training regulation as the common basis for the prospective qualifications and the examination requirements. This has ensured that skilled workers at every level attain competence in sub-processes along with an understanding of the overall process.

Training and career progression in electro-technical (ET) occupations

Employees express very high interest in an external upgrading training programme but are reluctant to participate in full-time courses (cf. BORCH 2007). The time-consuming nature of advanced training for Master Craftsman or Technical Engineer qualifications is mentioned as one of the inhibiting factors. Criticism is also levelled at the high proportion of training content that is not required in business practice, and the fact that advanced training courses only superficially help candidates with professional process management or even aim to do so.

Conversations with human resources managers, apprentice instructors, CVET coordinators and skilled workers during site visits to ten companies with up to 500 members of staff revealed that typical company-based career patterns in the electrical and electronics industry consist of “growing into” higher-grade activities. The skilled workers concerned, mainly vocationally qualified Electronics Technicians, work alongside engineers on projects, develop specialisations within their subject field and undertake their own continuing education within the company. Specialists like these are highly regarded as company employees because they work at the interface between the development of systems, production, installation and customer service, and have a crucial influence on the quality and functionality of products and services.

The conversations also showed that there is a growing demand for skilled workers who can work independently and make decisions in technically demanding and complex task areas. Against this background, a training programme that does not require a career break is welcomed. A job-compatible, work-process-oriented advanced training course is seen as an appropriate solution.

Some companies are already working within structures that support incremental company-based CVET programmes. These training models allow staff to remain in the workplace. The company provides the enabling conditions for the training process and ensures that staff can perform well while gaining certification.

This work-process-oriented CVET is seen as an efficient form of professional training and a superb instrument for the targeted development of skilled workers. It takes place within real projects and thus imparts a high degree of occupational competence (cf. BORCH/GERDES 2009).

Skills for transformation processes

As the business environment changes and industries constantly reinvent themselves, IVET and CVET – and human resources development in companies – need new strategies to ensure that they remain competitive in future.

In a technologically demanding environment, the work process itself becomes the greatest source of learning. In this context, companies can utilise the potential and experience of their skilled workers by deliberately developing their skills within the framework of in-company CVET. Learning within the work process does not happen spontaneously: lessons learned in the work process need to be reflected upon in order to draw the right conclusions.

The permanent impulses for change and improvement that are stimulated not only develop the skills of individual staff members, but have similar benefits for teams and – on the principle of “learning organisations” – the company itself (cf. OLESCH/PAULUS 2000). For not all organisations are alike; some are better equipped than others to accomplish all the requirements of their tasks. In this sense, competence development can ease the path of structural adaptations and develop the ability to shape technical and organisational transformation processes, working closely with the skilled workers concerned.

Systematised advanced and continuing education and training

The new Professional qualifications give those who successfully complete an apprenticeship access to levels of specialisation that have normally been the sole preserve of Technical Engineers (cf. Figure 1). As a consequence of the shortage of Electrical Engineers, companies will have to consider much more precisely in future which engineering tasks they can appropriately assign to skilled workers who have acquired their occupational competence via the IVET and CVET route. In this context, particular importance is restored to the apprenticeship route into a career.

Four Specialist profiles

The Specialist profiles contained in the Ordinance on the Examination for the Recognised Advanced Vocational Qualification (Bundesgesetzblatt 2009, p. 2841) describe an innovative approach of work-process-oriented training. These are located on the first level of CVET, and could be assigned to Level 5 of the German Qualifications Framework (Deutscher Qualifikationsrahmen, DQR). The Annex to the Ordinance sets out the content-related standards of the individual profiles. These standards are also a prerequisite for admission to the qualifying examination as a Certified Process Manager (Electrics/Electronics). Hence

they form the link between IVET in a recognised occupation and the Operative Professional qualification governed by advanced vocational training regulations. The foundation for the Specialist qualification is laid by training in the fields of work and the work processes described for the individual profiles:

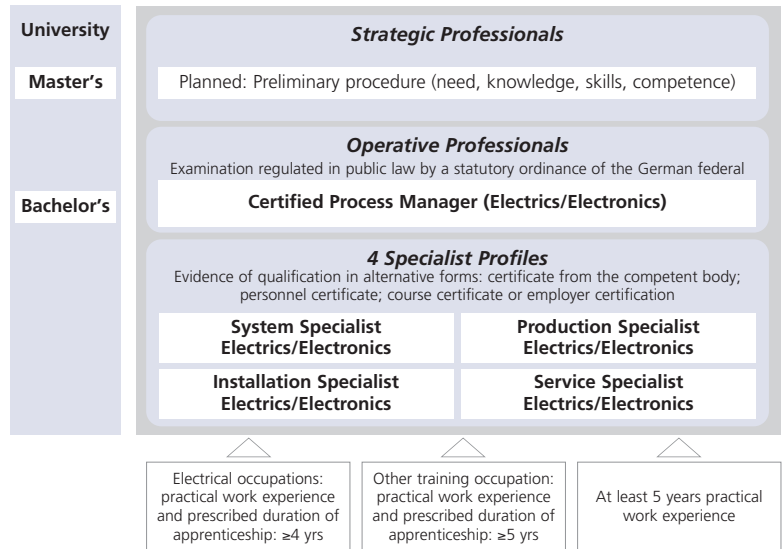
- ET System Specialists plan and design electrical components, devices, plants or systems, and devise technical solutions for products or systems.
- ET Production Specialists devise solutions for technical production and procedural challenges in the manufacturing of electrical and electronic products.
- ET Installation Specialists coordinate and oversee procedures in the construction of installations and systems on the customer's premises.
- ET Service Specialists analyse customer enquiries, devise and implement solutions to problems, and support customers in this process.

All the Specialist profiles were conceived in such a way that training can take place within real, company-based operations and projects. In the course of training, the listed work processes have to be carried out independently in the process of fulfilling company orders and projects. In-process documentation must be completed, and a coherent account of the activities and the competence attained must be delivered in the form of a presentation, on which the candidate must subsequently answer questions in an expert dialogue. Professional mentoring on the learning process is, of course, essential to facilitate and support reflection on learning. This gives companies the opportunity, for the first time, not only to design the training of their Specialists themselves but also to document it independently in the form of an employer's certificate.

Unlike the CVET system in the IT sector, in which the Specialist qualification can only be taken as part of a personnel certification scheme conforming to an international norm, the new CVET system in the ET sector is consciously pluralistic: it formally stipulates that evidence of the qualification is to be provided through a certificate from a competent body, a personnel certificate, a course certificate or certification – in particular one awarded by employers –, which sets out the breadth, depth and method of the Specialist qualification.

The breadth and depth of the qualifications to be certified are described in detail for each of the four Specialist profiles and are understood as a reference standard for the precise company-specific design and personalisation of the training. In contrast to the IT sector, these descriptions of the typical work processes fitting the profile are an integrated component of the advanced training regulation. The method of Specialist training itself is determined by the concrete process in the given case, the organisation of the training process, e. g. in the form of learning-process mentoring and expert counselling, or cooperation with in-com-

Figure 1 CVET system in the electro-technical (ET) sector



pany and/or external training establishments. This means that implementation in the company context can also be tailored, participant-focused and situationally appropriate.

The Operative Professional (Process Manager Electrics/Electronics)

Certified Process Managers (Electrics/Electronics) provide technically innovative and marketable electrical and electronic products, customer-oriented solutions and associated services. In addition, they perform human resources management functions and are deployed in the fields of development, production and customer service. Qualitatively, this qualification could be assigned to the same level as the Bachelor's degree, i. e. DQR Level 6.

The aim of the new Chamber of Industry and Commerce (IHK) CVET examination is to certify that process managers are proficient in the management of processes and projects, either in development, in production or in customer service, taking account of technical, organisational and commercial issues and complying with rules and standards.

For admission to the examination, over and above the usual provisions, the advanced vocational training regulations stipulate that a Specialist qualification must be held in one of the four electro-technical specialisations, or evidence provided of a qualification meeting equivalent standards of subject knowledge (cf. REINECKE 2009).

The examination structure consists of three components (cf. Figure 2, p. 34): In the "Process and Project Management" component of the examination, candidates have to carry out and document a company-based project, and report on this. For this element, they choose one of three possible fields of activity: systems engineering, production engi-

neering or services engineering. In this exam component the candidate must demonstrate proficiency in analysing processes and carrying out projects to modify processes.

In the “Comprehensive Specialist Tasks” component, the candidate must demonstrate proficiency in carrying out engineering tasks with due regard to technical, organisational, economic and human resources aspects. This capability has to be demonstrated in two situational tasks: for the first, they must draw up technical specifications in the form of a requirements specification, while for the second, they have to produce technical solutions in the form of a functional specification.

In the “Personnel Management” component of the examination, evidence must be shown of the capability to deal with tasks and interventions in the areas of staffing needs, staff deployment and staff leadership. This capability is examined in a further written situational assignment.

Planned qualification: Strategic Professional (ET Technical Engineer)

During the modernisation process, the expert representatives of employers and employees appointed by the federal government reached agreement on a proposal for a new project to draft a third-stage CVET qualification (Strategic Professionals), building on the Operative Professionals level. From the viewpoint of BIBB, initially it proved effective to organise the planned advanced training qualification (prospectively assigned to DQR Level 7) in such a way as to retain the work-process-oriented approach, supplemented with academic study content from the discipline of electrical engineering.

This integration is intended to make it clear that vocational competencies and excellent CVET achievements by skilled occupational practitioners can also include scientific investigation of topics from basic and applied fields of electrical engineering. It is conceivable that content teaching could take place within a short degree-level course in tandem with work or by attending modules of study, and that credit points could be applied to one of the three planned sections of the examination. The selection of study modules is to be limited exclusively to scientific and technical teaching content.

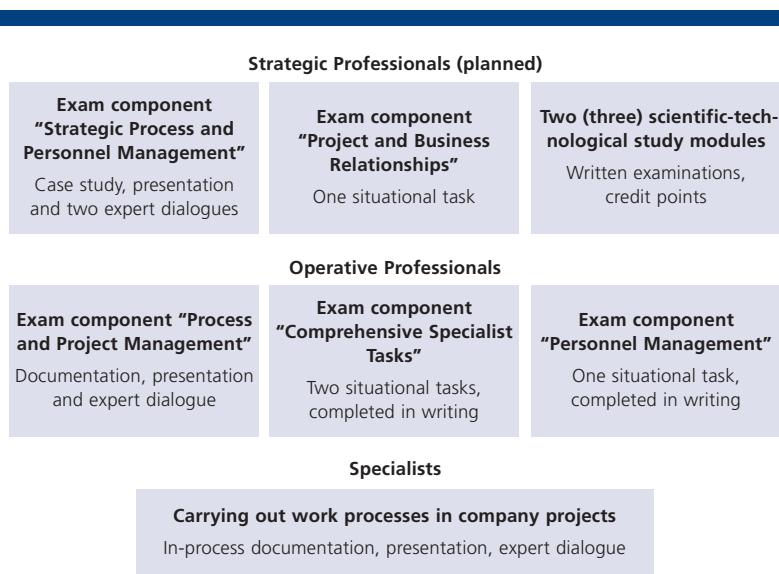
As in the CVET system for IT, the other two examination elements could comprise “Strategic Process and Personnel Management” and “Project and Business Relationships” in the ET sector. A preliminary procedure will initially be launched to study the feasibility of adding a third stage to the CVET system for the electrical and electronics sector and to clarify conceptual aspects of the model.

Summary

The new advanced and continuing education structure in the electrical and electronics sector offers opportunities both for employees and for companies:

- The work-process-oriented CVET system enables companies to adopt an efficient form of staff training and is a superb instrument for sustainable human resources development in the context of demographic change.
- It enables skilled workers to systematically develop their own competencies within the work process, and thus opens up a wide range of employment opportunities in electrical engineering and electronics.
- The training leading to both Specialist and Professional qualifications takes place in parallel with work and within real business tasks. It is highly transfer-oriented and promotes comprehensive vocational competence. ■

Figure 2 Examination structure of the CVET system in the ET sector



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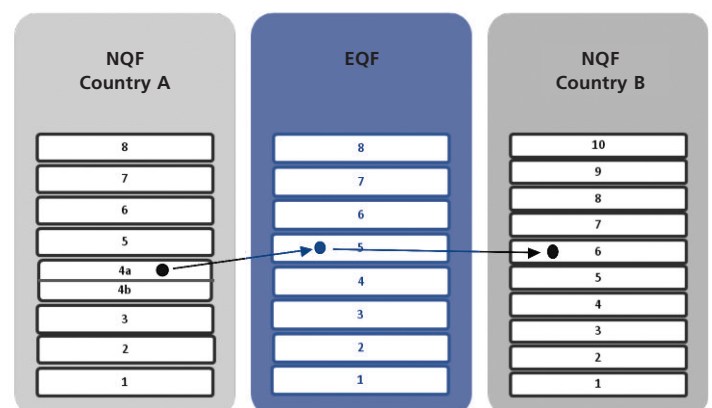
Can the German Qualifications Framework contribute to the recognition of non-formal and informal learning?

► As a consequence of introducing the European Qualifications Framework (EQF), according to the Recommendation of the European Parliament and Council of April 23, 2008, “access to and participation in lifelong learning ... and the use of qualifications [should] be promoted and improved at national and Community level.” Furthermore, the EQF should build bridges between formal, non-formal and informal learning and contribute to the validation of learning outcomes. This article considers whether, and if so, how the EQF – and particularly the German Qualifications Framework for Lifelong Learning – can promote and strengthen the recognition of non-formal and informal learning. In addressing this line of inquiry, the authors make reference to two recent expertises on this subject.

The European Qualifications Framework – translating qualification levels

In April 2008, the European Parliament and the Council passed a Recommendation on the establishment of the European Qualifications Framework for Lifelong Learning (EQF). The EQF is to function as a translation instrument, to make national qualifications comprehensible throughout Europe and thus to enhance the cross-border mobility of employees and learners and foster their lifelong learning. This is to be done by coordinating the different national qualification systems with one common European reference framework, the EQF. The EQF applies across all types of general and vocational education and qualifications, from school-based and vocational education to higher education. It sets out the description of learning outcomes in eight levels. From 2012 onwards, it should be possible to ascertain the corresponding EQF level for any new qualification. Each Member State's national qualification framework (NQF) or other mechanisms then enable the alignment of the national qualification system with the levels of the EQF. So a qualification from Country A can be made decipherable in Country B by comparing its level on the EQF (cf. Figure).

Figure The EQF as a translation instrument



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The German Qualifications Framework for Lifelong Learning

Germany is currently developing the German Qualifications Framework for Lifelong Learning (Deutscher Qualifikationsrahmen für lebenslanges Lernen, DQR) which is based on learning outcomes and designed to be compatible with the EQF, with a view to promoting transparency and permeability between sub-sectors of the education system. In February 2009, the German Qualifications Framework Working Group (Arbeitskreis DQR) submitted a first draft of a qualifications framework, the current version dates from March 2011.

Work is currently in progress to arrive at a consensus on the levels of selected formal qualifications from general, higher and vocational education (cf. in more detail www.deutscherqualifikationsrahmen.de; in German). As a matter of principle, every qualification level of the DQR should be attainable by means of different educational pathways. If this principle can be realised successfully, it will represent a major contribution towards parity between academic (general and higher) education and vocational education in Germany.

In the Annex to the EQF Recommendation and in the glossary of the DQR Working Group's discussion proposal, a "qualification" is described as the "formal outcome of an assessment and validation process in which a competent body has determined that an individual's learning outcomes meet specified standards" (Arbeitskreis DQR 2009, p. 15). The EQF Recommendation thus confirms the normal use of the term qualification in Germany, according to which a qualification – understood as "learning outcomes aggregated into competences" – is subject to validation and assessment, but says nothing about the scope of qualifications (i.e. the extent of the learning outcomes and competences aggregated therein). Given the backdrop of Europe's varied education systems, it goes without saying that a wide range of ideas exist concerning the intensity of learning processes and the spectrum of learning outco-

mes that make up a qualification. This means that in Germany, qualifying in a recognised occupation counts as one qualification, whereas in another country the same body of knowledge and competence amounts to several qualifications – possibly even at different levels. This is a good argument for addressing the issue of specifying which aggregated skills might be defined as a qualification within the terms of the DQR.

The main objective in drawing up the DQR is to "achieve an appropriate assignment of levels to qualifications acquired in Germany within the EU" (Arbeitskreis DQR 2009, p. 2). First and foremost, this will increase the transparency and better national and international decipherability of qualifications. Further-reaching modernisation objectives, as mentioned in the EQF Recommendation, particularly with regard to participation and access to lifelong learning and the validation of learning outcomes, have not been taken up so far.

The DQR Working Group's discussion proposal does state that consideration will additionally be given to outcomes of informal learning. Because the recognition of non-formal or informal learning has not become widespread in the German education landscape, this statement remains vague, however. In order to support the process of integrating non-formal and informal learning into the DQR, two expertises were therefore prepared (cf. DEHNBOSTEL/SEIDEL/STAMM-RIEMER 2010 and Gutschow et al. 2010), which form the basis for the following discussion.

Taking account of non-formal and informal learning in the DQR

To lay the foundations for the following line of argument, a brief definition of terms is necessary. Numerous aspects are drawn upon to distinguish formal from non-formal and informal learning. The most important are the intentionality of the learning and the extent of organisation and structure involved in the learning processes (cf. Table). Participation in formal learning is concentrated in the phase of childhood, youth and early adulthood. Increments in competence in subsequent phases of life are largely based on non-formal and informal learning. A qualifications framework that claims to promote lifelong learning should take this into account. A related question, namely what specifications a set of aggregated skills must fulfil in order to be classified as a "qualification" as defined by the DQR, arises for certificates from continuing education as well as for methods of recognising informal learning.

EXISTING APPROACHES TO RECOGNITION

The starting point for approaches that establish links between formal, non-formal and informal learning with the help of a qualifications framework is their particular ori-

Table Characteristics of formal, non-formal and informal learning

Formal learning	Non-formal learning	Informal learning
<ol style="list-style-type: none"> 1. Learning in an organised and structured context, 2. structured as regards learning objectives, learning time or learning support, 3. intentional and goal-directed from the learners' point of view 4. generally leads to certification. 	<ul style="list-style-type: none"> • Learning embedded in planned activities, • deliberate, from the learners' point of view. 	<ul style="list-style-type: none"> • Learning in daily life, in the workplace, in the family, in leisure time, also called (learning from) experience, • not organised or structured in relation to learning objectives, learning time or learning support, • not explicitly intended as learning.

Source: based on CEDEFOP (2009), WERQUIN (2010)

entation towards learning outcomes. Neither institutions nor course-lengths nor curricula form the basis of qualification frameworks, but rather descriptors expressing different levels of knowledge, skills and competence.

Existing approaches for the recognition of non-formal and informal learning in Germany, although not in widespread use, follow the same fundamental principle. The main form of recognition for non-formal and informal learning as well as outcomes of formal learning processes from other segments of the education system in Germany has consisted of admission to courses or examinations: the vocational sector has the “external candidate provision” pursuant to the Vocational Training Act and the Crafts Code (BBiG § 45 (2)/HwO § 37 (2)), while general education has “non-enrolled examinations” for general qualifications and for access to higher education without a university entrance qualification. The prerequisites for admission to these special procedures are generally vocational qualifications and relevant occupational practice, or continuing education leading to formal certification. Interviews, placement or assessment tests, evidence of (normally) several years of occupational experience, or trial courses build the bridges that link non-formal or informal learning with formal education courses. Since the qualifications acquired are state-awarded or state-recognised, these qualifications are included in the DQR.

Approaches exist in Germany for the granting of credit for prior learning towards other courses. These take account of skills acquired in a variety of ways. The accreditation of prior learning presupposes that transferable equivalences can be identified or determined on the basis of the curricula of different courses (cf. HÜNTELMANN/EVERS 2009) or integrated competence descriptors for the prospective course (cf. STANGE et al. 2009). In this case, the qualification pursued can be located within the DQR.

TAKING ACCOUNT OF CONTINUING EDUCATION

The present draft DQR suggests that out of the entire domain of continuing education, certificates from upgrading training are the only formal qualifications that can be assigned to the DQR. Nevertheless, in the continuing education sector there are other forms of provision which certainly meet the listed criteria for formal learning but have never previously been treated as formal learning in Germany. These include, in particular, certificates such as the European Computer Driving Licence, language certificates and other expert certificates from adult education centres. Similarly, the periodically renewable certificates for welders, forklift drivers or hazardous load hauliers, or manufacturers’ certificates in the IT sector, also fit the above criteria for formal learning. There is much to be said for incorporating certificates acquired in such contexts into the DQR, despite the fact that they are not a part of initial vocational training or upgrading training.

In addition, there are many courses in continuing education which cannot originally be ascribed to formal learning and which do not lead to certification as such but, at the most, a certificate of attendance. The response paper to the German Qualifications Framework submitted by the associations, providers and institutions of the continuing education sector (Stellungnahme zum Deutschen Qualifikationsrahmen 21.12.2009) suggests a “pluralistic recognition landscape in which new recognition bodies are integrated into existing structures” (p. 4). The aim is to develop criteria which enable the most diverse courses to be assigned to a level. This approach would broaden the spectrum of qualifications listed in the DQR. The necessary quality assurance could be guaranteed with a system of certification and accreditation. An approach of this kind is currently being pursued in Austria (cf. GUTSCHOW 2010; DEHN-BOSTEL/SEIDEL/STAMM-RIEMER 2010) in the implementation of its national qualifications framework.

TAKING ACCOUNT OF INFORMAL LEARNING

Informal learning, in the sense of managing situations and solving problems to meet the demands of work in practice, is characteristically highly individual and context-dependent. However, the DQR is geared towards reflecting “qualifications and not individual learning and career biographies” (Arbeitskreis DQR 2009, p. 3). As an instrument of transparency for use as a means of establishing the compatibility of learning outcomes, it cannot adequately communicate individual, personalised learning outcomes. The prerequisite for the inclusion of non-formal and informal learning in the DQR is therefore that the learning outcomes are identified, assessed, aggregated, and correlated with qualifications.

Often learners are not consciously aware of the outcomes of non-formal and informal learning, particularly in the form of experiential learning, and these need to be made visible before they can be recognised. Validation procedures, as used in some European countries for the certification of competence but mainly confined to advisory settings in Germany, therefore need to be multi-stepped in design. The essential prerequisites for validation are standards for the bodies of knowledge, skills and competences to be assessed, and for the assessment itself. If validation standards refer to existing qualifications, validation can lead directly to an educational qualification and hence to a recognised certificate assigned to a qualifications framework level. But it can also be applied to parts of a course or to obtaining credit for prior learning. Accordingly, it facilitates transition routes or access to courses, and can contribute to permeability between courses or, equally, to the shortening of learning periods. Hence it can build the desired bridge to formal learning.

Options and perspectives for validating non-formal and informal learning

Validation procedures can be integrated into the education system in different ways: the inclusion of non-formal and informal learning in the DQR can be treated as system-immanent, allowing for selective use. Every sector of education retains its established procedures or continues to develop them separately from the others. The bridges between formal, non-formal and informal learning are then effectively one-way streets, and their heterogeneity frequently renders them opaque to applicants. Non-formal and informal learning can be taken into account where it corresponds to the contents of existing formal qualifications without broadening the scope of qualifications taken into account by the DQR.

A second alternative is the establishment of a validation system that develops in parallel with the formal education system. This validation system would be more uniform and systematic in its methods than the system-immanent alternative, and would relate partly to the same content-based standards and partly to certificates that have not hitherto been admissible within the DQR. This development would lead to a separate assessment procedure and raise questions concerning the parity of the qualifications thereby awarded.

The third option is to aim for a uniform, competence-based system, which would capture and assess all the qualifications and skills acquired according to uniform standards (cf. DEHNBOSTEL/SEIDEL/STAMM-RIEMER 2010). This would mean the competence-oriented reformulation of existing standards, taking account of non-formal and informal learning. In this connection, the inclusion of non-formal and informal learning calls for an extension of the concept of competence, since the descriptors of the draft DQR could only capture the special dimensions of informal learning in a limited way or with undue emphasis on cognitive aspects (cf. *ibid.*; Stellungnahme der Weiterbildung zum DQR 21.12.2009).

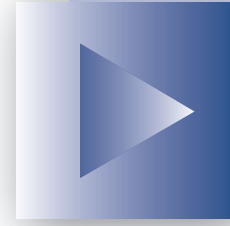
With its aims of establishing the comparability of qualifications in order to foster cross-border mobility and lifelong learning, and with its emphasis on competences or learning outcomes, the DQR can pave the way for the recognition of non-formal and informal learning. In a similar vein, the DQR Working Group combines with its implementation the opportunity to move closer to the principle that, in Germany, "what is important is what you are capable of and not where you learnt it" (Arbeitskreis DQR 2009, p. 5). Even if this is only realised to a limited extent in the present draft DQR, a learning-outcome-based DQR can be expected to have long-term repercussions for the edu-

cation system. In vocational education, it can be assumed that the drafting of training regulations will begin to take account of the DQR classification system. And even if little is known as yet about the implementation of the DQR, it is likely that in future not only reports and certificates will contain references to DQR levels, but in the long term, procedures for determining competence will become established which refer to its competence categories and levels. These changes can only develop step by step over a longer period of time, however. One important step would be to implement options within the DQR process which permit ongoing evaluations of the DQR, to ensure that it continues to evolve in parallel with the changes in the education system and accommodates both experiential and knowledge-based learning. ■

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Measuring the world of (vocational) education – the Report on Vocational Education and Training and the BIBB Data Report



► Germany's National Education Report, first published in 2006, is the first comprehensive report covering all areas of education. However, ongoing reporting in the field of vocational education and training (VET) has been in place for more than 30 years in the form of the Report on Vocational Education and Training published by the Federal Ministry of Education and Research (BMBF). The Federal Institute for Vocational Education and Training (BIBB) has thus far been involved with the preparation of this report within the scope of its statutory functions. Following a realignment of the Report on Vocational Education and Training in 2009, BIBB now issues the Data Report, a new standard work on VET. The Data Report is based on selected indicators and depicts the main developments within initial and continuing vocational education and training within an international context. In addition, different focal topics are dealt with each year.

Increasing interest in indicators-based reporting

The aims of ongoing educational reporting are to improve the data basis for educational policy decision-making processes and increase "knowledge of the effectiveness of the educational system" (cf. TIPPELT 2009, p. 7). The OECD publication "Education at a Glance" (OECD 2010) has been providing annual information on participation in education, educational qualifications and investments in education for more than ten years and is a significant cornerstone for benchmarking processes at an international level (cf. KRÜGER-HEMMER/SCHMIDT 2010, p. 11). During recent years, further activities for the improvement of educational reporting at a national level have followed. In 2009, Austria presented its first National Education Report (cf. SPECHT 2009). In 2006, Switzerland published a prototype for national educational reporting (SKBF 2006). 2006 also saw the first "Education in Germany" Report, laying the foundations for ongoing educational reporting with the aim of encompassing all areas of education from early childhood education to continuing training for adults (Konsortium Bildungsberichterstattung 2006; Autorengruppe Bildungsberichterstattung 2008). Other reports on education are also published for individual federal states (cf. e. g. Institut für Bildungsmonitoring 2009; LANDER 2009), for cities and towns and for local government authorities (cf. e. g. Schul- und Kultusreferat der Landeshauptstadt München, Stadt Dortmund 2008).¹

The German Report on Vocational Education and Training

Although this form of reporting is seen as an innovation within the educational system as a whole, it has a long tradition in the field of vocational education and training.



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¹ There are also various reports covering individual sectors (e. g. higher education institutions) or aspects of the education system (e. g. educational spending). For a summary, cf. e. g. DÖBERT/ AVENARIUS, pp. 300 ff.

Data Report accompanying the Report on Vocational Education and Training



Structure

- Indicators for initial vocational education and training (Chapter A)
- Indicators for continuing vocational training (Chapter B)
- Focus topic: "Transition from training to employment" (Chapter C)
- Programmes and pilot initiatives (Chapter D)
- International indicators and benchmarks (Chapter E)

Frequency of publication: annual

Publication dates

- Draft version (PDF) published online in April when the Report on Vocational Education and Training has been adopted by the Federal Cabinet and published
- Printed version published in June (print run currently 5,000)
- Online version (HTML) with additional information and search function published in August

Internet

<http://datenreport.bibb.de/> (German language resource; selected results provided in English)

Since 1977, the ministry responsible (at the time the Ministry of Education and Science) has been fulfilling its statutory task in this regard and presented the first Report on Vocational Education and Training in that year.² At the time, the report was still produced on the basis of § 5 of the Act for the Promotion of the Provision of Training Places in Vocational Education and Training (APIFG) of 7 September 1976. The Report on Vocational Education and Training has been providing annual information ever since, the current foundation being § 86 of the Vocational Training Act³ (cf. box). This information includes the number of newly concluded training contracts, associated developments on the training places market and the further development of vocational education and training at large.

§ 86 Paragraph 1 BBiG

The Federal Ministry of Education and Research shall monitor developments in vocational training on a continuous basis and shall for this purpose present a report to the Federal Government (the Report on Vocational Education and Training) by 1 April each year. Said report shall portray the status and anticipated further developments of vocational education and training.

Whereas the National Education Report features a chapter entitled "Vocational Training," which concentrates on a

² Many of the recent Reports on Vocational Education and Training are available in English by searching for "Report on Vocational Education and Training" at <http://www.bmbf.de>.

³ Vocational Training Act (BBiG) of 23 March 2005 last amended on 7 September 2007 by Article 9b of the Act.

number of central indicators, the Report on Vocational Education and Training has "now established itself as a kind of 'main ledger' of vocational education and training (...) and is currently the central data compendium" (BAETHGE/WIECK 2006, p. 171). Reports relating to vocational training remain rare at a federal state, district or local government level (cf. e. g. Thüringer Ministerium für Wirtschaft, Arbeit und Technologie 2009, Koordinierungsstelle Schule – Beruf 2009).

The Data Report accompanying the Report on Vocational Education and Training

BIBB published its first Data Report (BIBB 2009) to accompany the Report on Vocational Education and Training in conjunction with the 2009 Report on Vocational Education and Training (BMBF 2009). The preparation of the Data Report is based on a recommendation made by the BIBB Board to restructure the Report on Vocational Education and Training and separate it into a policy section, which forms the object of consultation and resolution by the Federal Government, and a non-policy section, for which BIBB is responsible (cf. BIBB Hauptausschuss 2008, p. 2). The task of BIBB within this process is to "be involved in the preparation of the Report on Vocational Education and Training" (§ 90 BBiG). In the past, BIBB had already provided essential "information and data on vocational education and training" in Part II of the Report on Vocational Education and Training.

Indicators-based reporting

From the very outset, the design concept and alignment of the Data Report accompanying the Report on Vocational Education and Training ensured that reporting was based on suitable indicators (cf. box). A pragmatic understanding of the indicators forming the foundation of the report has been adopted (cf. DÖBERT/AVENARIUS 2009, p. 310; WITTMANN 2010).

Indicators

Indicators are quantifiable parameters (absolute values or ratios) with which particular facts and realities (actual values) in the domain of vocational education and training can be rendered measurable (operationalised), and trends can be charted over time (cf. SCHNELL/HILL/ESSER 1995, pp. 121 ff.). They constitute an important foundation for regular reporting in vocational education and training. The contrasting of measured values and stock variables with normative, social ideals or stipulated policy targets (target values) draws attention to issues requiring (policy) action and may be used as a basis to inform the design of vocational education and training (policy guidance).

The selection of indicators tends to take place implicitly and is strongly aligned to the availability of suitable data

and to central educational policy issues. Alongside official and process data (e. g. VET statistics produced by the statistical offices of the Federal Government and the federal states, employment statistics from the Federal Employment Agency, BA), indicators are also drawn from the institute's own surveys (e. g. BIBB survey on newly concluded training contracts as of 30 September (cf. box). In addition, BIBB conducts its own studies on specific topics either on a one-off basis or on a particular cycle (including the BA/BIBB Applicant Survey, the BIBB School Leaver Survey and the BIBB Transition Study).

Some of the indicators used were already covered in the BMBF Report on Vocational Education and Training. Others were given sharper definition for the Data Report, whilst new indicators have also been developed. One aim of naming it the "Data Report" was to make it clear that it is mainly based on empirically determined parameters.

The indicators used in the Data Report are usually continued year-on-year in order to be able to map developments in vocational training over longer periods of time. The Board of BIBB also took the view that such long-term monitoring was required, and to this end recommended the development of "long series" to form an object of reporting each year (BIBB Hauptausschuss 2007, p. 2). Notwithstanding this, the inclusion of further indicators can make sense for certain facts and issues and for finite periods of time. Depending on future development, it is in turn conceivable that some facts and circumstances may cease to be relevant for vocational training, resulting in the exclusion of indicators previously used.

Alongside the work conducted by BIBB staff, contributions from external institutions are also used to inform the Data Report accompanying the Report on Vocational Education and Training. The 2011 edition, for example, contains indicators from the Institute for Employment Research (IAB) and the German Institute for Adult Education (DIE). These indicators were developed in conjunction with BIBB. Expert reports provide access to further interesting data sources and information for the Data Report.

Selected indicators for vocational training

How many young people were able to conclude a training contract, and how many were unable to obtain the apprenticeship they desired? How high is the rate of company participation in training? The following section will introduce two indicators which are closely connected with the debate surrounding training place market issues: the supply and demand relation and the rate of training provision by companies.

SUPPLY AND DEMAND RELATION

Since the first Report on Vocational Education and Training in 1977, reporting has taken place on an annual basis on the number of newly concluded training contracts and on the supply of and demand for training places. The main data foundations in this regard are the BIBB survey as of 30 September each year (cf. box) and the training market statistics produced by the Federal Employment Agency (BA).

BIBB survey as of 30 September

The BIBB survey as of 30 September is conducted on the basis of the Vocational Training Act (BBiG) each year and takes place in conjunction with the competent bodies for vocational education and training. The survey takes account of all training contracts newly concluded between 1 October of the previous year and 30 September of the present year and not prematurely dissolved.

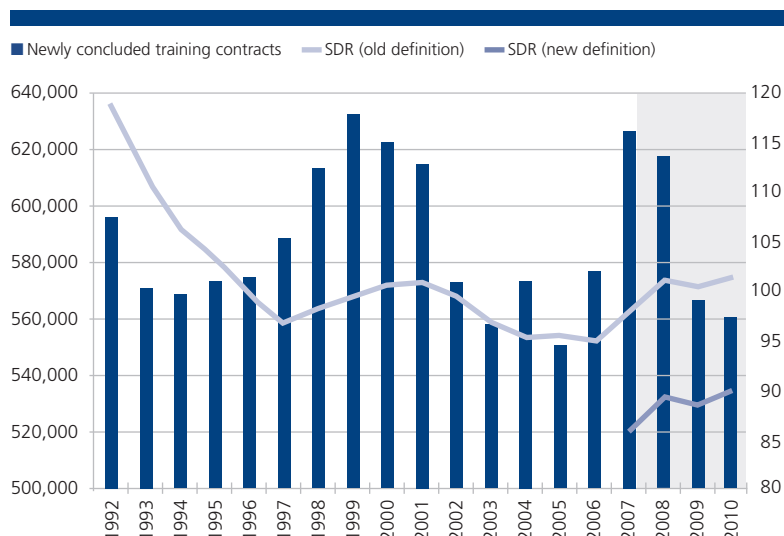
Results available at <http://www.bibb.de/de/14492.htm> (German language resource)

This information forms the basis for the calculation of the supply and demand relation, as an indicator for the situation on the training places market. This involves expressing the number of training places available as a ratio per 100 persons seeking a training place.

- **Training place supply** is made up of the number of newly concluded training contracts (560,073 in 2010) plus the training places made available for placement through the BA but still vacant as of 30 September (19,605 in 2010).
- **Training place demand** is defined as the sum of newly concluded training contracts plus those still seeking a training place at the BA on 30 September.

Figure 1 shows that around 595,000 training contracts were concluded in 1992 and that the second highest result

Figure 1 **Newly concluded training contracts and the supply and demand relation (SDR)**



Source: BIBB survey of newly concluded training contracts as of 30 September; Federal Employment Agency training market results as of 30 September

following German reunification was achieved in 2007. If the usual (traditional) method of calculating the supply and demand relation is applied to the overall figures since the beginning of VET reporting, a significant surplus supply of training places is shown still to have existed at the beginning of the 1990s. Despite higher levels of contracts concluded around the year 2000, this surplus was very much reduced around that time. As of 2007 the (traditionally calculated) supply and demand relation is on the rise once more.

Notwithstanding this, a significant factor for the results and their interpretation is who is deemed to be counted among the persons still seeking a training place on 30 September (cf. KREKEL/ULRICH 2006). The supply and demand relation as hitherto calculated included only “unplaced” training-place applicants (12,255 in 2010). The extended definition of the supply and demand relation, however, also encompasses applicants who were in alternative provision as of 30 September (e. g. continued attendance at school, work experience, introductory training) but were still seeking a training place for the current year (72,342 in 2010).⁴

Whereas the supply and demand relation as traditionally calculated tends to indicate a balanced training market provision, the extended definition highlights the quantitative imbalance between training supply and demand (cf.

BMBF 2011 and BIBB 2011). Notwithstanding this, both curves indicate a rising tendency from 2007 onwards.

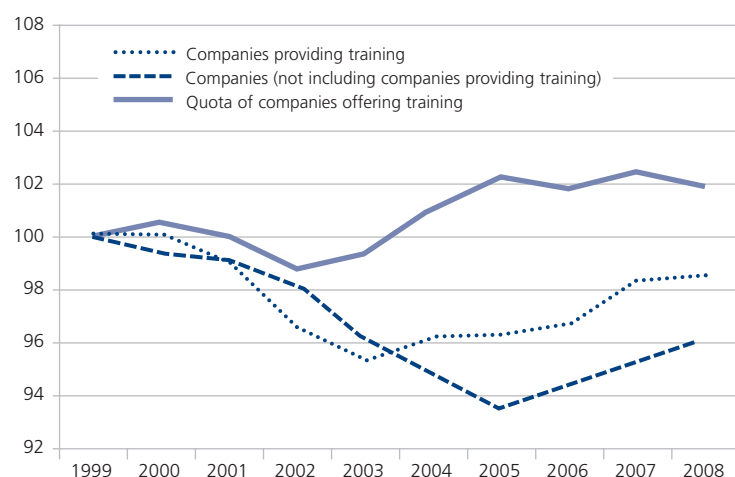
RATE OF TRAINING PROVISION BY COMPANIES

The rate of training provision by companies also acts as a central annual reporting indicator in providing information on the situation on the training places market. The rate of companies offering training is based on the company statistics of the Federal Employment Agency (BA) and states companies with trainees as a percentage of all companies (including companies providing training). Data relates in each case to the previous training year.

In 2008, around 490,000 or 24 per cent of all companies participated in the initial vocational education and training of young people. This represents a slight fall in the rate of companies offering training as compared with 2007. Nevertheless, the rate of companies offering training has improved by two per cent since 1999 and only failed to reach the 1999 level in the years 2002 and 2003 (cf. Figure 2). Although the rate of companies offering training has risen, the total numbers of both companies (not including companies providing training) and companies offering training have fallen since 1999, although the latter have not decreased in quite such high numbers as the former.

Although the rate of companies offering training is a central indicator of company participation in training, it neglects the fact that not all companies are entitled to provide training (cf. STEGMAIER 2010) and does not take account of the circumstance that not all companies participate in training on a continuous basis (cf. TROLTSCH 2010).

Figure 2 **Development of company participation in training in Germany between 1999 and 2008** (stated in %, 1999 = 100)



Source: company statistics provided by the Federal Employment Agency, BIBB calculations

⁴ As of 2009, the statistic additionally includes applicants to authorised government providers. Accordingly, comparison with the previous year is possible only to a limited extent. Information on vacant training places at authorised local government providers is not presently available.

Outlook

The “clear separation” of the previous Report on Vocational Education and Training into a policy section forming the object of consultation and resolution by the Federal Government (cf. BIBB Hauptausschuss 2008, p. 2) and a Data Report published by BIBB to accompany the Report on Vocational Education and Training has met with a positive response from the social partners, the academic research community and VET practitioners.

The Data Report’s clear indicators-based structure has already established it as a standard vocational education and training work in Germany. The aim now is to continue to develop the basis which has been created and to pursue ongoing enhancement of the indicators system, the (measurement) instruments and the analytical methods employed. Account must also be taken of externally dictated contextual factors such as the National Education Report and developments within the international context and at a European level in particular. Alongside central indicators

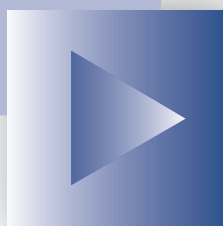
relating to initial and continuing training, the reporting system will continue to include special topics of focus which will change each year and will be addressed both in the Report on Vocational Education and Training and in the Data Report in equal measure. As a result of the current debate centring on the modernisation of the educational system and transitions between various educational sectors, the topic chosen for the year 2011 is “permeability”.

As the Data Report continues to develop, however, it is important not to lose sight of the overall size of the work. It currently comprises some 400 pages, and this is a level which should not be exceeded. In order to address further topics, the individual articles will need to concentrate on the most important indicators in future. Furthermore, greater use will be made of the existing practice of transferring information onto the BIBB Internet portal. Such an approach ensures that all the essential information on the development of vocational education and training is made available via the Data Report accompanying the Report on Vocational Education and Training. ■

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Chances of fully fledged employment after a dual-system apprenticeship

TOBIAS MAIER, RALF DORAU

► A smooth transition from initial vocational training into employment is a fundamental prerequisite for establishing successful career trajectories. However, not all young people who complete a dual-system apprenticeship negotiate this “second threshold” transition with uniformly positive results. An analysis of Microcensus data shows that outcomes vary depending on the level of school-leaving qualifications and the chosen field of initial vocational training.

JOBLESSNESS LINKED TO TYPE OF SCHOOL-LEAVING CERTIFICATE

In the first six years after completion of a dual-system apprenticeship, the percentage in fully fledged employment is 60.8 per cent on average (cf. Table 1). Even so, 26.2 per cent are in precarious employment and some 13 per

Data basis and operationalisation

To study the process of integration into employment after completion of initial vocational training, employment status is studied for a period of up to six years after qualification. The data basis consists of Microcensus data for the survey years 2005 to 2007. The population studied are working people whose highest vocational qualification is a dual-system apprenticeship. The analysis of integration into employment differentiates not only between employment and joblessness but also between fully fledged and precarious employment status.

- Employment is deemed to be *precarious* when it cannot guarantee a secure long-term livelihood. For the purposes of this study, work is defined as precarious employment if it takes the form of a fixed-term contract or if earnings are below two-thirds of the average income for the cohort of dual-system qualification holders.
- If the above criteria are not met, it is deemed to be a typical, standard employment contract, i. e. *fully fledged employment*.

cent are jobless. A particularly significant factor for progression into fully fledged employment is the level of school-leaving certificate previously attained in the general school system.

In the group with better school-leaving certificates, there is a marked decline in joblessness (18.5 % for those with a lower secondary school-leaving certificate (Hauptschulabschluss) and 12.3 % with a general secondary school-leaving certificate (Mittlere Reife), but only 7.5 % for those with the Abitur or higher education entrance qualification). Holders of the Abitur are also less affected by precarious employment, although here the differences are far less clear (varying between 2.5 and 0.4 percentage points depending on the type of school-leaving certificate). The percentage in fully fledged employment rises significantly with the level of their school-leaving qualification (lower secondary school-leaving certificate: 55.1 %; general secondary school-leaving certificate: 60.9 %; higher education entrance qualification: 68.2 %).

EMPLOYMENT STATUS FOUND TO DIFFER BY INITIAL VOCATIONAL TRAINING FIELD

However, the level of the school-leaving qualification is not the only factor that improves the chances of fully fledged employment after completing a dual-system initial vocational qualification. On the basis of the data analysed for this study, certain initial vocational training fields could be identified in which fully fledged employment seems a more likely outcome than in others (cf. Table 2).

If the total percentage of those in fully fledged employment (60.8 %) is considered as a threshold value, then there are indeed certain initial vocational training fields in which the proportion in fully fledged employment exceeds the threshold value regardless of the type of school-leaving certificate held. The initial vocational training fields in question (cf. Table 2, shaded in blue) are “Electrical occupations,” “Industrial and tools mechanics,” “Banking and insurance specialists” and “Non-licensed health occupations.” In all of these initial vocational training fields, the percenta-

Table 1 Employment status of dual-system qualification holders, by school-leaving certificate

	Fully fledged employment	Precarious employment	Jobless
Total	60.8 %	26.2 %	13.0 %
Breakdown of total by school-leaving certificate:			
Lower secondary/Elementary	55.1 %	26.4 %	18.5 %
General secondary, or equivalent	60.9 %	26.8 %	12.3 %
Higher education entrance	68.2 %	24.3 %	7.5 %

Source: Figures projected from Microcensus 2005-2007 data; own calculations.

ges in fully fledged and precarious employment bear almost no correlation with the level of school-leaving qualification achieved. However, the percentage of jobless is always highest among those with lower secondary or elementary school-leaving certificates and always lowest among Abitur holders.

Equally, fields of training can be identified in which the percentage of jobless is always higher than the total percentage of jobless (13 %), regardless of the level of school-leaving qualification achieved, and the percentage in fully fledged employment is always lower than the total percentage in fully fledged employment (60.8 %). In this case, the fields of initial vocational training concerned (shaded in light grey) are the “Construction occupations, wood and plastic working and processing,” “Agriculture, livestock management, forestry and horticulture,” “Hygiene occupations” and also, with certain provisos, “Cooks and chefs.” In this last initial vocational training field and in “Sales occupations (retail)” and “Hygiene occupations,” levels of precarious employment are found to exceed 30 per cent. In all other initial vocational training fields, occupational status differs significantly according to the type of school-leaving qualification achieved. With the exception of one initial vocational training field – “Vehicle and aircraft construction, servicing occupations” – it can be concluded that, within a given initial vocational training field, the higher the school-leaving qualification from general education, the higher the proportion of dual-system qualification holders in fully fledged employment and the lower the proportion without jobs. Among those in precarious employment, the degree of correlation varies from one initial vocational training field to another. The level of precarious employment in most initial vocational training fields varies between 20 and 30 per cent. Thus, it appears that the type of school-leaving qualification achieved has the greater influence on the distribution of fully fledged employment and unemployment.

CONCLUSION

On the basis of the data analysed here, it can be stated that in almost all initial vocational training fields, joblessness after completion of a dual-system apprenticeship correlates with school-leaving qualifications. Nevertheless, there are certain initial vocational training fields in which equal opportunities for fully fledged employment exist, regardless of the school-leaving qualification achieved. ■

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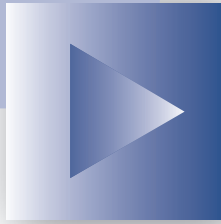
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Table 2 **Employment status by initial vocational training field and school-leaving certificate, six years after completion of a dual-system apprenticeship**

Occupational sector	Initial vocational training field	Highest school-leaving certificate from general education	In fully fledged employment	In precarious employment	Jobless
Production-related occupations	Construction occupations, wood and plastic working and processing	Lower secondary / elementary	49.4 %	25.3 %	25.3 %
		General secondary, or equivalent	49.9 %	28.3 %	21.8 %
		Higher education entrance	53.1 %	31.0 %	15.9 %
		Total	49.8 %	26.7 %	23.5 %
	Electrical occupations	Lower secondary / elementary	66.6 %	20.8 %	12.6 %
		General secondary, or equivalent	65.7 %	25.0 %	9.3 %
		Higher education entrance	68.5 %	24.6 %	6.9 %
		Total	66.3 %	24.0 %	9.7 %
	Vehicle and aircraft construction, servicing occupations	Lower secondary / elementary	63.4 %	24.9 %	11.8 %
		General secondary, or equivalent	60.2 %	29.0 %	10.9 %
		Higher education entrance	59.9 %	27.3 %	12.8 %
		Total	61.7 %	27.0 %	11.4 %
	Industrial and tools mechanics	Lower secondary / elementary	67.3 %	20.3 %	12.4 %
		General secondary, or equivalent	68.2 %	25.1 %	6.7 %
		Higher education entrance	64.7 %	29.2 %	6.1 %
		Total	67.6 %	23.7 %	8.7 %
	Agriculture, livestock management, forestry, horticulture	Lower secondary / elementary	46.5 %	28.8 %	24.7 %
		General secondary, or equivalent	49.0 %	31.9 %	19.1 %
		Higher education entrance	43.6 %	41.7 %	14.8 %
		Total	47.4 %	31.3 %	21.3 %
	Metalworking, plant construction, sheet metal construction, installation, assembly workers	Lower secondary / elementary	61.8 %	23.0 %	15.2 %
		General secondary, or equivalent	59.5 %	26.8 %	13.6 %
		Higher education entrance	70.4 %	24.3 %	5.3 %
		Total	61.0 %	24.8 %	14.1 %
	Bakery, pastry goods and confectionery production	Lower secondary / elementary	53.5 %	31.0 %	15.5 %
		General secondary, or equivalent	54.8 %	31.5 %	13.7 %
		Higher education entrance*	74.4 %	21.9 %	3.7 %
		Total	54.8 %	30.9 %	14.4 %
Primary service occupations	Banking and insurance specialists	Lower secondary / elementary*	73.6 %	11.0 %	15.5 %
		General secondary, or equivalent	79.6 %	15.3 %	5.1 %
		Higher education entrance	81.8 %	15.2 %	3.1 %
		Total	80.7 %	15.1 %	4.1 %
	Wholesale and retail clerks	Lower secondary / elementary	53.7 %	28.6 %	17.7 %
		General secondary, or equivalent	60.0 %	28.2 %	11.7 %
		Higher education entrance	70.8 %	21.8 %	7.4 %
		Total	60.9 %	26.9 %	12.1 %
	Hotel and catering occupations, housekeeping	Lower secondary / elementary	36.4 %	37.1 %	26.6 %
		General secondary, or equivalent	46.0 %	35.6 %	18.4 %
		Higher education entrance	62.8 %	29.5 %	7.8 %
		Total	46.4 %	34.9 %	18.7 %
	Cooks and chefs	Lower secondary / elementary	41.0 %	32.0 %	27.1 %
		General secondary, or equivalent	45.1 %	35.4 %	19.5 %
		Higher education entrance	57.3 %	28.8 %	13.9 %
		Total	44.4 %	33.7 %	21.9 %
	Clerical office occupations	Lower secondary / elementary	52.2 %	25.4 %	22.3 %
		General secondary, or equivalent	62.9 %	23.5 %	13.6 %
		Higher education entrance	69.8 %	21.9 %	8.3 %
		Total	64.1 %	23.2 %	12.8 %
	Other clerical occupations (except wholesale, retailing, banking)	Lower secondary / elementary	56.2 %	24.5 %	19.3 %
		General secondary, or equivalent	68.3 %	21.5 %	10.2 %
		Higher education entrance	76.4 %	17.7 %	5.9 %
		Total	71.6 %	19.8 %	8.6 %
Sales occupations (retail)	Lower secondary / elementary	43.0 %	32.9 %	24.1 %	
	General secondary, or equivalent	45.3 %	35.4 %	19.3 %	
	Higher education entrance	50.0 %	39.0 %	11.0 %	
	Total	44.4 %	34.4 %	21.3 %	
Secondary service occupations	Hygiene occupations	Lower secondary / elementary	45.5 %	38.3 %	16.2 %
		General secondary, or equivalent	37.4 %	47.0 %	15.6 %
		Higher education entrance	38.8 %	42.0 %	19.1 %
		Total	41.0 %	43.0 %	16.1 %
	Non-licensed health occupations	Lower secondary / elementary	61.5 %	26.6 %	12.0 %
		General secondary, or equivalent	68.6 %	24.6 %	6.8 %
		Higher education entrance	65.2 %	29.3 %	5.5 %
		Total	66.7 %	26.0 %	7.3 %
	Dual-system qualification holders in other initial vocational training fields	Lower secondary / elementary	58.4 %	24.6 %	17.0 %
		General secondary, or equivalent	62.8 %	25.6 %	11.6 %
		Higher education entrance	65.7 %	26.0 %	8.3 %
		Total	62.7 %	25.5 %	11.8 %

* Number of people surveyed <50 within this school-certificate type.

Source: Figures projected from Microcensus 2005–2007 data; own calculations; all figures stated as row percentages.



Recruitment of skilled workers in companies that do not provide initial vocational training and measures to encourage more of them to do so

FELIX WENZELMANN, GUDRUN SCHÖNFELD

► **Most companies in Germany do not provide in-company vocational training for young people. What are their reasons for this, how do these companies meet their skilled labour needs, and what can be done to increase the share of companies that provide in-company vocational training? These questions are the focus of BIBB's Company Survey on the Recruitment of Skilled Workers.**

WHY DO COMPANIES CHOOSE NOT TO PROVIDE IN-COMPANY VOCATIONAL TRAINING?

"Only" 24 per cent of all companies in Germany provided initial vocational training in 2008 (see TROLTSCH 2010a). As shown by the BIBB survey on the costs and benefits of in-company vocational training, such training is worthwhile for the company providing it because its benefits usually exceed its costs (see SCHÖNFELD et al. 2010). Then why do the majority of companies opt not to provide in-company vocational training and how do such companies meet their skilled labour needs? To answer these questions, BIBB conducted the Company Survey on the Recruitment of Skilled Workers in 2008.

A total of 725 companies that did not provide in-company vocational training in 2007 took part in the survey. The findings were supplemented by the evaluations from a parallel survey of nearly 3,000 "training companies" (companies that provide in-company vocational training) on the

costs and benefits of initial vocational training (regarding the design of these studies, see SCHÖNFELD et al. 2010). The reasons for companies not to provide vocational training are diverse (see SCHÖNFELD/WENZELMANN 2010). 36 per cent of the "non-training companies" surveyed lack the physical resources or the necessary personnel to provide an apprenticeship, and another 29 per cent meet only one of these prerequisites. Of these companies, 78 per cent have not provided in-company vocational training in the last ten years and have no plans to do so in the future. The vast majority of these companies (92 %) are very small (less than ten employees) and therefore never or only seldom look for new employees. As a result, initial vocational training does not play a role in their personnel development plans. Those companies which meet the prerequisites for providing in-company vocational training cite, first and foremost, the lack of qualified applicants (56 %), the high cost of providing training (55 %) and the fact that apprentices spend too much time away from the workplace (49 %) as their primary reasons for not providing such training.

The **personnel requirements** for conducting in-company vocational training are met when at least one person at the company is authorised to provide training (e. g. has passed the Trainer Aptitude examination).

The **physical requirements** for conducting in-company vocational training are met when the company has the space and technical equipment and facilities necessary for providing in-company vocational training in accordance with the provisions of the Vocational Training Act or the Crafts Code. These requirements can vary greatly from occupation to occupation.

PERSONNEL RECRUITMENT STRATEGIES

In most cases, training companies seeking to fill vacancies for skilled workers first draw on the apprentices they have trained themselves (cf. Table 1). Non-training companies do not have this option. Consequently, hiring experienced skilled workers from the external labour market is the most important channel for this latter group. This recruitment channel is often used by training companies as well, particularly those with increased skilled labour requirements. In addition, non-training companies often rely on internally training up employees who have never attained an initial vocational qualification. This is particularly the case with companies which have hired skilled workers in the last three years or which expect to have an increased need for skilled workers in the future. Hiring new entrants to the workforce who have gained a school-based vocational qualification or completed an apprenticeship in another company is of secondary importance for most training companies and non-training companies. Individuals who have completed apprenticeships in other companies have better chances of landing a first job in larger non-training companies. Individuals with a school-based vocational qualification have better chances in non-training companies in the public sector and in the liberal professions.

MEASURES TO INCREASE THE NUMBER OF TRAINING PLACES ON OFFER

Non-training companies are particularly dependent on recruiting skilled workers via the labour market. Given the current demographic trend and the predicted decline in the labour supply, they will probably have less success with this method in the future. Providing their own initial vocational training offers a possible alternative. Some 16 per cent of the non-training companies surveyed want to start or resume providing initial vocational training in the near future. What kind of changes would have to be made in the underlying conditions in order for more companies to provide in-company vocational training? Training companies were also asked which measures would make it easier for them to increase the number of training places they offer. More than three-quarters of the non-training companies surveyed believe that reducing the amount of bureaucracy (cf. Table 2) involved, for example in applicant selection would facilitate the provision of in-company vocational training. At 51 per cent, agreement with this item was considerably lower among training companies. This could mean that non-training companies estimate the bureaucratic load to be greater than it really is. The picture is similar for financial assistance from the state: again, more than three-quarters of the non-training companies surveyed consider such measures well suited to facilitating their provision of in-company vocational training, in contrast to slightly more than half of the training companies surveyed. Non-training companies assess the cost-benefit ratio of providing in-company training less favourably. Consequently, government subsidies or tax incentives would exert a greater influence on their inclination to provide training. High percentages of both training companies and non-training companies say that "greater coordination between vocational schools, chambers and companies" would be conducive. This could include a variety of different factors such as better coordination of training content between the different venues. Approximately two-thirds of the training and non-training companies surveyed said that improving the schooling that comes prior to the initial vocational training stage could lead to more training places being offered. By contrast, only a few companies felt that changes in the general structure of vocational training would facilitate in-company vocational training provision.

CONCLUSION

For many non-training companies, providing initial vocational training is not possible or not worth their while because the necessary prerequisites are not fully met: this applies both to the means of implementing training (e. g. the company lacks the necessary personnel or physical resources) and to the subsequent use of trainees (e. g. the company has no need for skilled workers). Nonetheless, a proportion of the companies that are not yet doing so could get involved in initial vocational training. ■

Table 1 **Personnel recruitment strategies of training companies and non-training companies, by different company attributes** (% of companies that say the particular attribute is important or very important)

		Provides own vocational training*	Hires experience skilled workers on the labour market	Provides internal training/ continuing training for employees w/o formal vocational training	Hires new entrants to the labour market who have been trained by other companies	Hires new entrants to the labour market who received school-based training
Total	Training companies	84	37	28	18	15
	Non-training companies	-	37	34	17	14
Companies w. increasing skilled labour needs	Training companies	89	46	36	23	20
	Non-training companies	-	44	45	27	18
Companies that have hired skilled workers in the last three years	Training companies	83	51	27	21	15
	Non-training companies	-	52	41	29	22

Source: BIBB company surveys on the recruitment of skilled workers and on the costs and benefits of in-company vocational training (2008)

* Not a response category for non-training companies.

Table 2 **Measures which companies say are suited or very suited to enabling them to provide in-company vocational training or increase the number of training places they offer** (in %)

	Non-training companies				Training companies
	Total	Enterprises w. experience providing in-company voc. training	Fulfills prerequisites for providing in-company vocational training	Enterprises w. growing skilled labour needs	
Less bureaucracy	77	76	84	89	51
Financial or tax incentives/ government assistance	76	87	89	85	53
Greater coordination between vocational schools, chambers and companies	67	74	76	78	76
Improve schooling provided before voc. training stage	66	75	77	84	63
Retain current duration of vocational training/selective skills development	48	47	61	56	66
Shorten duration of voc. training/additional qualification via continuing vocational training provided on an individual basis	26	27	27	35	16
Lower the allowance paid trainees	25	41	36	26	15
Extend duration of voc. training to four years	9	8	9	12	9

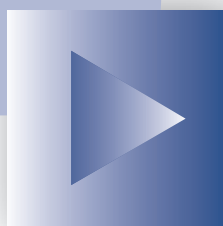
Source: BIBB company surveys on the recruitment of skilled workers and on the costs and benefits of in-company vocational training (2008)

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Improved access to research data in the field of vocational education and training BIBB's Research Data Centre

HOLGER ALDA

► **BIBB launched a Research Data Centre (BIBB-FDZ) in 2008. The FDZ processes the microdata from BIBB research projects and makes the respective data sets available to external researchers and scholars for their own analysis. As a constitutive part of the German Data Infrastructure coordinated by the German Data Forum (RatSWD), BIBB-FDZ helps to reduce the workload and costs involved in conducting data surveys in the field of vocational education and training (VET) by assisting external researchers in the use of existing data.**

IMPLEMENTING THE BIBB-FDZ INFRASTRUCTURE: PRIORITIES DURING THE SET-UP PHASE

Setting up a research service such as BIBB-FDZ requires a special infrastructure, including data documentation standards and regulations for data access for external researchers in line with the German data protection laws. Working within a joint development project, the Federal Ministry of Education and Research (BMBF) and BIBB supported the establishment of the BIBB-FDZ between 2008 and 2009. Some of the main areas of work during the set-up phase were:

- establishing an FDZ data archive and a secure IT-environment for FDZ studies and FDZ data sets;

- clarifying data protection rules for transmitting project information and (weakly or formally anonymised) data sets (e. g. Scientific Use Files, SUF) to external researchers, scholars, and institutions;
- laying down standards for data documentation;
- setting up a web site;
- allocating unique identifiers for data sets (digital object identifiers) and standardising the citation of BIBB-FDZ data sets, and
- informing and advising interested parties and users on the possible uses of BIBB-FDZ data sets for their own research.

These individual work segments were coordinated in such a way that transparent, standardised access procedures, sets of data documentation and other working tools (e. g. the questionnaire for each data set) are now in place for BIBB's microdata. The respective procedures and standards apply to all data sets in the FDZ.

The recent work of the BIBB-FDZ has focused on filling the established structures (cf. Figure) with more data sets, such as the BIBB Transition Survey 2006 on the level of individuals or the BIBB-Cost-Benefit-Survey 2007 on the level of firms.

AVAILABLE DATA SETS

An initial examination during the implementation of BIBB-FDZ showed that BIBB has generated more than 200 data sets since 2000; in addition, new sets are continuously generated by current BIBB research projects. Of course, not all of these data sets are of equal interest for secondary analyses. For this reason, the first data sets that BIBB-FDZ prepared for external usage were those with a proven demand from external researchers. Furthermore, emphasis is placed on the preparation of data covering the entire range of BIBB's research topics as comprehensively as possible. To this end, the FDZ developed documentation systems that take account of the heterogeneousness of BIBB's microdata without becoming arbitrary or too idiosyncratic.

This was achieved by dividing data sets in the field of VET into five classes based on the stations a (German) individual typically passes through in the process of acquiring education, skills and qualifications: general schooling, the first threshold, initial vocational training, the second threshold, and working life. The introduction of a further differentiation – between data on the level of firms and individuals (persons) – produces a ten cell-matrix filled with appropriate data sets from BIBB's research activities (cf. Figure).

By now BIBB-FDZ offers at least one data set in each cell. All data sets include a full set of documentation consisting of a data/methods manual, questionnaire, test data and other working tools. In total, 21 single data sets are currently accessible to external researchers.

HOW BIBB-FDZ'S DATA SETS ARE USED

Since 2008, BIBB-FDZ has analysed enquiry statistics in order to obtain information about the use of its data sets. In the following, results of these analyses will be summarised and commented upon, covering the time period from April 2008 to the end of 2010.

In this period, BIBB-FDZ answered 468 enquiries referring to BIBB microdata. Of these, 392 (approx. 84 %) were external requests, while 76 came from inside BIBB. The requests cover the entire range of BIBB-FDZ's services and products. As expected, most of the data-related enquiries pertained to accessing data, the terms of use and the like. However, BIBB-FDZ also answered methodology-related enquiries (regarding certain regression techniques, for example) and requests concerning specific topical VET-related content (e. g. the effect of continuing vocational training activities on unemployment risks). The range of research topics extends from studies on the potential for creativity in the workplace all the way to potential earnings and opportunities for wage increases against the background of technical and organisational change in the workplace environment.

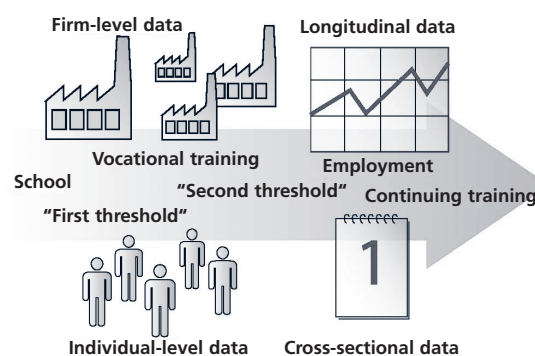
Looking at individual BIBB data sets, the BIBB/BAuA Employment Survey 2006 and the preceding surveys (BIBB/IAB surveys in 1998, 1991, 1985, 1979) currently account for the greatest number of enquiries by far. Approximately 42 per cent of all external requests pertain to the use of this data set or lead to its use. Another six per cent revolve around the BIBB/IAB surveys. About 18 per cent of all requests do not concern a specific data set and can thus be classified as pertaining entirely to content-related or methodological consultation services.

The number of enquiries received is not identical with the number of formal contracts with data users. The BIBB-FDZ signed a total of 107 use contracts with 234 persons for the different types of data access (SUF, remote data access, use of on-site work stations for guest researchers at BIBB-FDZ). The vast majority of these contracts relate to the BIBB/BAuA Employment Survey 2006.

Based on this information, the question of whether there is an actual need for an FDZ at BIBB can be answered with an unconditional "yes." This is also made clear by a glance at the institutions using BIBB data: they range from numerous national and international universities to well-known social and economic research institutes. The table illustrates how productive this use is, showing which kinds of papers external researchers produce with the BIBB-FDZ's data sets.

The table shows that the output of external researchers using BIBB data covers the entire spectrum of academic publications. Given that BIBB-FDZ has only established its infrastructure and prepared a significant number of BIBB data sets for external usage since the beginning of 2009, and seeing that it takes some time until scholarly articles are published – in reviewed journals, in particular, – the current output is highly encouraging and promises to increase significantly in the near future.

Figure The structure of BIBB-FDZ data sets



Source: www.bibb.de/de/50124.htm

Table External academic output generated by use of BIBB-FDZ data in 2009/2010

Kind of publication	Number	Percentage
SSCI journal	2	5.6
Other reviewed journal	5	13.8
Other journal	3	8.3
Monograph	2	5.6
Contribution to edited collection	2	5.6
Working paper	6	16.7
Research note	3	8.3
Manuscript	2	5.6
Research report	4	11.1
Work/manufacturing report	5	13.8
Other academic paper (e.g. master's thesis)	2	5.6
Total	36	100

OUTLOOK

The establishment of regular FDZ operations always requires a certain amount of work and investment in (IT) infrastructure. The analysis of the BIBB-FDZ enquiry statistics shows that within the first two and a half years since the FDZ's foundation, these efforts and costs have been offset by the substantial benefit yielded for VET research. The German Science Council and the German Data Forum have recommended the establishment and operation of a research data centre in all institutions generating data of potential interest to external researchers. By setting up its FDZ, BIBB has put these recommendations into practice and reached a good interim level in providing data-related services to the VET research community. A visible expression of this assessment is the accreditation of BIBB-FDZ as a part of the German data infrastructure coordinated by RatSWD. It is therefore BIBB's firm aim to continue to operate the FDZ at the current level. Interested parties can check the Research Data Centre's website at any time (<http://www.bibb.de/en/50113.htm>),¹ where they will find detailed and up-to-date information about the services and support offered by BIBB-FDZ. ■

¹ Note that, currently, information on our website is mainly in German. However, further English content will be added throughout 2011/2012.

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