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Nr. 2

Curricular Design and Development

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Index

InWEnt

InWEnt – Internationale Weiterbildung und Entwicklung gGmbH (Capacity Building International, Germany) - is an organisation for international human resource development, advanced training and dialogue. Established through the merger of the Carl-Duisberg-Gesellschaft (CDG) e.V. and the German Foundation for International Development (DSE), it can draw on decades of experience accumulated by the two organisations in the field of international co-operation. Its practice-oriented programmes are directed at specialist staff and managers, as well as decision-makers from business and industry, politics, public administration and civil society from all parts of the globe. Its Development Policy Forum arranges high-calibre international policy dialogues on subjects of current concerns in the field of development policy.

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Introduction

From 2003 onwards, InWEnt´s Division Technological Cooperation, System Development and Management in Vocational Training is to present a series on everyday practice in vocational training.

The intention of this series is described in the title itself ("Beiträge aus der Praxis der beruflichen Bildung" = series on everyday practice in vocational training). The division aims to support its programs of international personnel development in the above-mentioned areas with technical documentation in both printed and electronic form.

These reports

- originate in the partner countries, taking into account specific situational demand
- will be tested with and for experts in vocational training in the partner countries in conjunction with respective practice-oriented training programs on offer, and
- with a view to global learning, will be improved and adapted prior to publication according to the recommendations of the partners or the results of the pilot events.

Thus, the Division Technological Cooperation, System Development and Management in Vocational Training is applying the requirements of InWEnt´s training program to its own products in the above faculties: i.e. these can only be as good as their practical relevance for the experts of vocational training systems in the partner countries.

To this effect, we look forward to critical and constructive feedback from all readers and users of these special series.

This manual is one of an entire series of InWEnt publications that have been produced as a result of training seminars and courses carried out in cooperation with the vocational training institute SENATI in Peru.

Our special thanks go to Prof. Tippelt of Munich University and Mr. Amorós from the "International Cooperation Office", who both made invaluable contributions to these activities.

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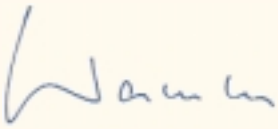

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Curricular Design and Development

1. Introduction to curricular design

link between work positions and qualification-skills structures

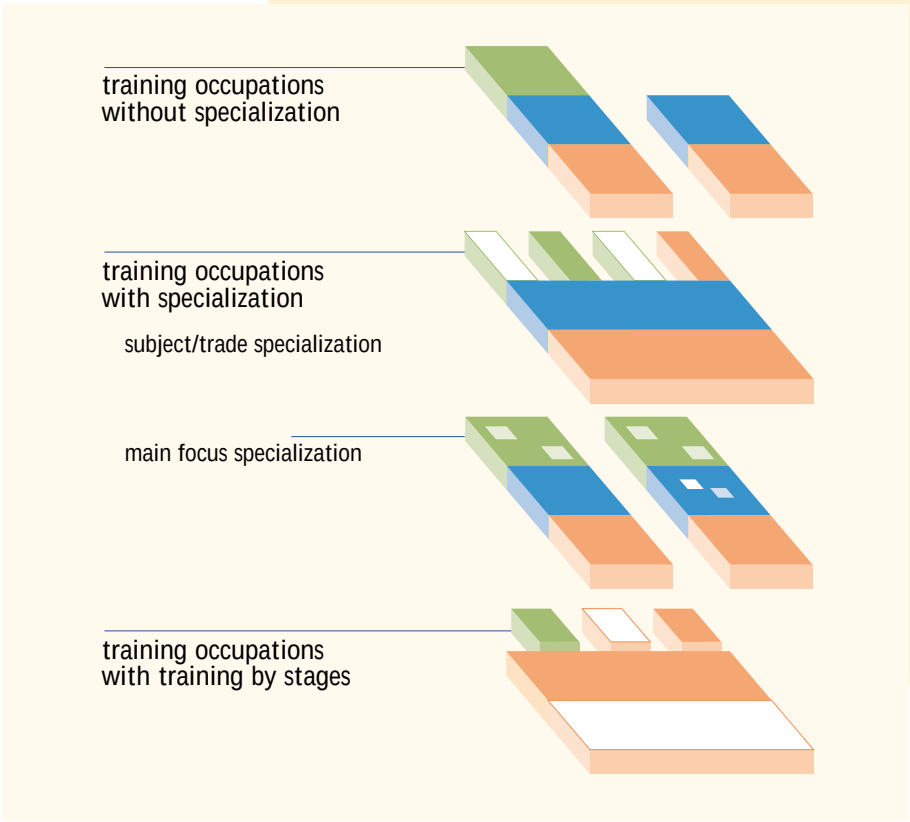
Vocational training curricula are intended to function as a link between work positions (occupational skills-qualification requirements) and the qualification-skills structures provided by those institutions or authorities offering vocational training (skills-qualifications of the actively working population). All vocational training curricula should offer sufficient direction to apprentices to enable them to:

- comply with the demands of specific work positions,
- adapt future skills-qualification requirements (implying a permanent disposition to take part in vocational training),
- help develop a humanitarian and efficient work position structure.

define the content of training programs

From a didactic-pedagogical viewpoint, the development of vocational training curricula is a tool used to help define the content and structure of training programs. Nonetheless, it is necessary, from the outset, to bear in mind that vocational training curricula development and its later implementation – in companies, vocational schools or training centers – is governed by a whole series of social factors, which – while not of a strictly pedagogical nature – do exert a decisive influence on vocational training. Before defining vocational training curricula design, the following points should be considered:

Figure 1: Different structures of training regulations



Source: Bundesinstitut für Berufsbildung / 3.4 - Gerl. / 1992

- Basic educational policy principles (length of compulsory schooling or student flows),
- Pedagogical factors (general level of school education, trainers' qualifications (both instructors and monitors), teachers...),
- Social factors (consensus among social partners, through collective agreements: business organizations and trade unions),
- Normative factors (labor norms, Protection of Minors legislation, Vocational Training Act, technological norms (ISO)...),
- Economic factors (structure, size and type of representative companies, development potential of small, medium and large companies, productive sub-sectors...),
- Technical factors (technological levels, technological innovations considerations: robotics, fiber optics, laser, CD Rom...),
- Environmental factors (prevention of contamination, waste treatment, water purification, workplace risks),
- Organizational factors (new organizational systems, quality control, company hierarchy),
- Historical factors: (traditional structure of institutions offering general education and vocational training).

It is therefore evident that of vocational training curricula design and development is directly influenced by economic, social and educational policy considerations.

individual national characteristics

Clearly, these economic, social, normative and historic factors differ greatly from one country to another, and vocational training curricula development will necessarily be equally diverse. There can therefore be no international standardization of content. There are, however, certain valid and universal strategies that can be applied to the determination of curricular content, and also a number of analytical procedures and forms of presentation, that take account of individual national characteristics which can help focus the curricular development process, helping to improve the quality of vocational training.

2. Different structures of training regulations

Before initiating the curricular process it is important to determine which of the following groups our training profile is aimed at:

- training occupations without specialization (mono-structured),
- training occupations with specialization – (occupational family),
- occupations with a main focus specialization,
- training occupations with training by stages

training occupations without specialization

This first model considers the development of an occupational profile (regulation) for a single occupation: This involves determining the group of competences, qualifications, skills and requirements that a worker should possess in order to perform correctly in a non-specialized occupation. A training occupation without specialization should establish a standardized occupational profile; likewise standardized general training plan for all apprentices – neither of which should contain any differences. The

same principal should be applied in the case of examinations. It should, however, be stressed that this model refers to a necessarily inflexible training configuration.

training occupations with specialization

The second model shows that more flexible training regulations (curricula) with a broader activities base can also be prepared in order to deal with the new demands caused by constant economic, technical and organizational changes. This model considers the formation of groups of related occupations or even the creation of combined occupational families – in the case of training regulations that envisage an integrated basic training approach as a means of dealing with common subject matter. This conceptual focus enables the grouping of occupations of essentially similar didactic content.

During the first year, a basic vocational training is provided, embracing a wide range of occupations (e.g. metalworking, electro-technical, etc). The aim is to center the specialized training of different occupations on a single common skills-knowledge base. Specialization is introduced gradually from the second year of training, with the final exam and corresponding professional specialization certificate obtained at the end of the third year (eg. metal-cutting mechanic, lathe operator specialist). With respect to technical specialization, both the occupational profile and the resultant training plan contain details of each specialization.

sectorial basic training

This sectorial basic training model has been the most used in Germany since 1987, when metalworking and electro-technical sector regulations were completely reorganized. It enables the integration of the basic training process in thirteen occupational families.

occupational family

The term occupational family can be defined as "a group of professions and occupations containing similar elements and requiring a basic analogical training. The similarity is to be found in either the productive aspect (eg. timber) or in functionability – when professionalism is developed transversely in dissimilar sectors and activities (eg. electricity, mechanics, etc.)".

Figure 2: Occupational families

the future worker's potential for mobility and flexibility

This trend towards wider reaching certification and a specific areas specialization is due not only to pedagogical-professional factors but also to the close links these have to professional training policies. Simply training-up specialists is not enough; the future worker's potential for mobility and flexibility needs to be consolidated. And this is precisely the strength of this model – it enables young people to be trained in such a way that, as qualified workers, they will possess the skills necessary to deal with the rapid changes affecting their professional environment. The acquirement of such a more diverse set of basic skills-qualifications allows young workers to adapt to new professional demands - in the case of job loss or the necessity of changing professions, for instance - taking a short course, a further or re-training measure.

main focus specialization

The third model, referred to here as "main focus specialization", groups various occupations together (from the small scale retailers' sector, for example) gradually introducing small specialization units. A training period of three years leads to a final exam-certification – (for example, in the clothing manufacturing retail or food production sectors, etc.) It should be stressed that this model should only be used in the case of highly specific professions.

training occupation with training by stages

The fourth model (vocational training in gradual stages) is based on a training occupation with training by stages, divided into thematically and temporarily superimposed phases.

According to the Vocational Training Act, Section 26, "(1) The training regulations may make provision for syllabuses and timetables to be followed in giving specially planned and mutually complementary stages of initial training. At the end of each stage it shall normally be possible for a trainee either to take a final examination qualifying him to engage in particular form of occupational activity corresponding to the level of training he has reached or to continue his training in successive stages." So, it can be seen that first stage training completion results are twofold; trainees can begin to exercise their recently acquired professional skills-qualification in the labor market or, should they wish, they can continue with their professional training - either immediately or at a later date.

modularization of vocational training

Unlike the previously mentioned models, this scaled training concept enables apprentices to obtain partial qualifications, which leads us to one of the most hotly debated areas of the vocational training field in Germany, namely: "Modularization" of vocational training.

variation in module combinations

By means of didactic units (modules), theoretical and practical skills-qualifications packages can be taught independently. In other words, it is possible to vary the teaching order without any loss of coherence to the complete package. One of the main advantages of this modular training model is that this variation in module combinations, makes it easier for apprentices to adapt to demands for different skills-qualifications. Another benefit is that the modular system enables rapid partial skills-qualifications acquirement – thus facilitating apprentices' access to the labor market. It should however be noted that, as this highly segmented skills- qualifications process results in apprentices possessing multiple occupational profiles, there are consequent economic effects felt by the companies – due to specific occupational profiles legislation (collective wage agreements).

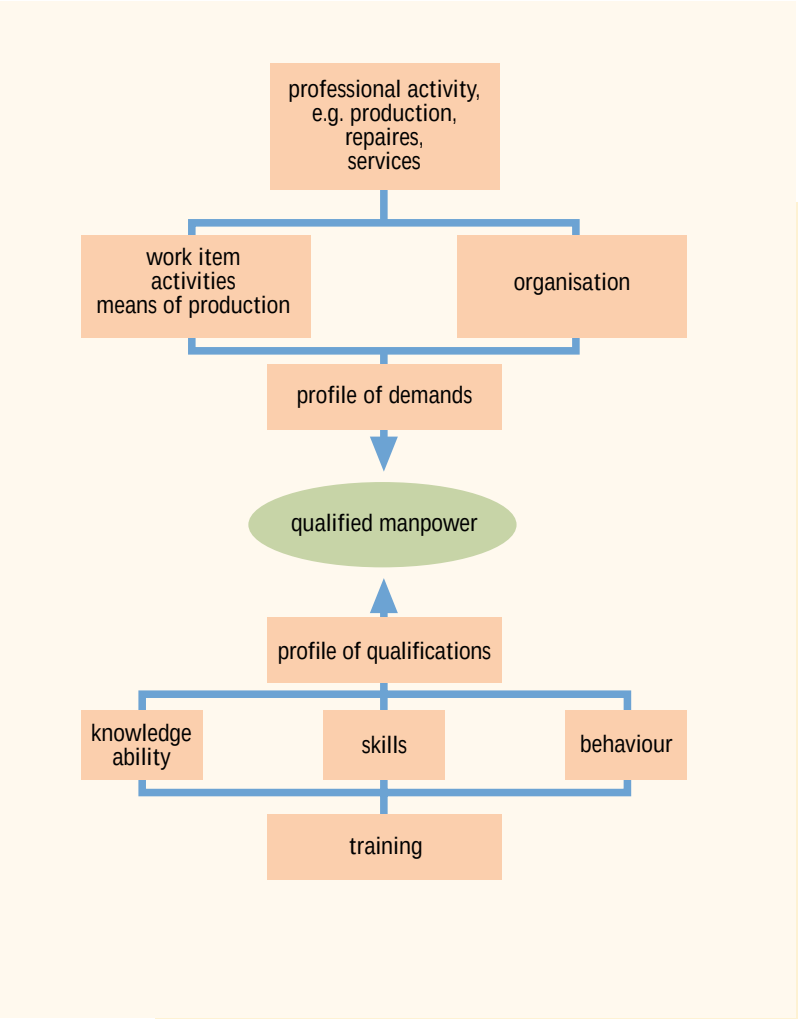
3. Required occupational profile and qualification of manpower

optimal degree of coherence

One of the main considerations of vocational training curricula preparation is attainment of an optimal degree of coherence between the qualifications of manpower and the required occupational profile.

Trainees need to be equipped with the knowledge, skills, aptitudes and social values that will make up their skills-qualifications profile. Within the framework of a labor market conditioned by changes and transformations, new vocational training demands are constantly presented. The productive economy is also undergoing permanent change, manifest in a wide variety of areas – for example; production processes and procedures, product ranges, technical changes affecting the tools of the trade, workplace organization (Taylorism versus team-work), etc. All curricular planning should implicitly take account of and analyze all of these "variables" when determining the required occupational profile for each work position. This means that specific training needs, as well as required profiles versus skills-qualifications profiles, need to be defined.

Figure 3: Profiles of demand and qualification of manpower



Source: G. Rösch

4. Basic curricular components

curriculum refers to the teaching-learning content, structure and processes

The term "curriculum" refers to the teaching-learning content, structure and processes provided by teaching institutions or training centers. The curriculum is therefore defined by the combination of an initial objectives-goals hypothesis and the strategies needed to achieve this.

From a theoretical viewpoint, three distinct phases of the curricular cycle can be identified. These are: Design (deciding what is to be taught and how), Development (putting into practice) and Assessment (evaluating the effects of the teaching process).

Within a framework of optimal analysis and reconstruction of the training process, all vocational training curricula should include the following dimensions or aspects:

- Learning objectives (learning goals, skills-qualifications),
- Learning content (used to achieve these goals),
- Learning organization (duration, sequencing),
- Learning methods,
- Place of learning,
- Teaching media and materials,
- Assessment (exams),
- Certification.

Figure 4: Curriculum (syllabus)

5. Preparing training regulations

legal dispositions at a national level

As outlined earlier (see the "Dual System" didactic unit), vocational training regulations are legal dispositions applied at a national level and used to standardize the in-company, or practical, part of the Dual System of vocational training (the training regulations contain the in-company vocational training curriculum).

The objective of curricular development is to provide vocational training regulations with a long term validity, which are applied on a national level and define the minimum skills-qualifications requirements or standards for each of the recognized occupations.

In general terms, it is likely that the initiative necessary to prepare new training regulations will come from the social actors – that is, the members of employers' associations or trade unions.

The following sub-sections outline the different phases of training regulations preparation:

5.1 Analysis of the situation / sources of information

compile and assess all available data

Before deciding whether or not to revise existing – or design new – curricula, existing conditions; plus current and/or possible future problems, need to be well defined. This calls for the staging of meetings or conferences, with the participation of recognized experts, in order to compile and assess all available technical, economic and social evolution data related to specific areas of vocational training. As a part of this process, the state of existing curricula and vocational training conditions should be weighed against rapidly changing labor market conditions.

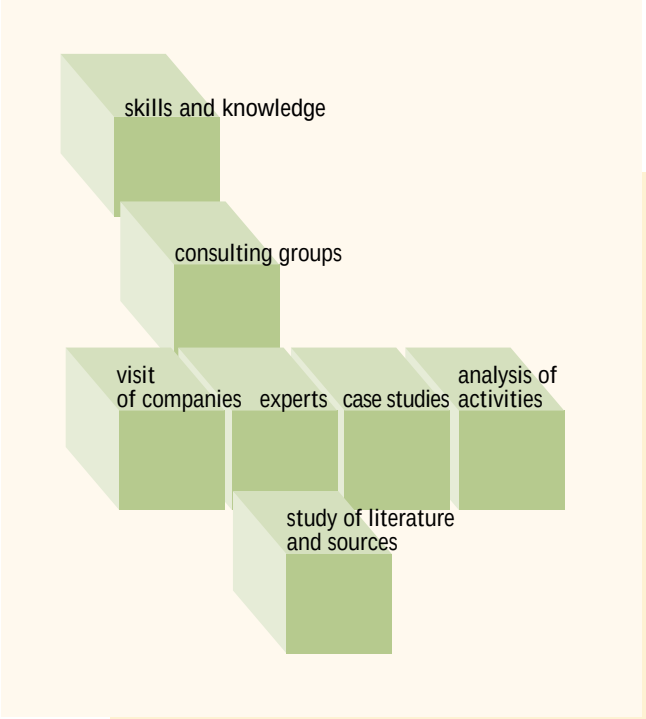
scope of investigation

The objective is to procure up-date information on how certain professional activities have caused, or might cause, significant changes. It is recommendable that the scope of investigation include careful consideration of the following areas (assuming availability of respective statistical data):

- General data regarding number, size and type development of the most representative companies,
- General data regarding the situation of the economically active population in the relevant sector(s),
- General data regarding investment, production level and economic index development in the relevant sector(s),
- General data regarding employment and training activity development within the relevant sector(s) – including both regulated and informal training.

Analysis of these results will enable definition of principle skills-qualifications requirements for each relevant occupational sector and also indicate the desired scope of the new regulations.

Figure 5: Methods of determination of skills and knowledge



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5.2 Visits to companies

obtain data on activities specific to an occupation

A specialist or a group of experts should visit previously selected companies in order to obtain data on activities specific to a given profession or, in certain cases, partial aspects of this. Companies should be selected by means of previously established criteria, to assure the "representativity" of the sample. Visits to companies will enable a greater understanding/ appreciation of concrete situations, work position requirements (functions, tasks, etc), and other similar areas – in other words, a definition of each company's specific requirements.

5.3 Consultation with experts

defining content

One of the most important instruments for defining vocational training regulations content is support received in the form of consultation – specifically from groups of recognized experts. In general, these are usually formed from representatives of business associations and trade unions (the consensus principle), often also including members of relevant professions (teachers, specialized occupational pedagogues, etc.). Their input is of extreme importance, as certain potential problems are not always best appreciated "in situ" - for example, the possible repercussions that the introduction of a new technological production process might have on vocational training.

DACUM model

The consultancy services provided by these groups of experts is very similar to those applied in the DACUM model, where groups are formed in order to determine the training needs of one or more occupations. The DACUM model is used in many countries and is evidently able to provide a satisfactory profile of skills-qualifications. Nonetheless, it is important that curricular content design be governed by more than simply the results provided by these experts – in order to limit the risk of over dependence on the selection criteria applied when conforming the group of experts. It is, therefore, advisable not to limit research and analysis to the findings of group of experts, but to revalidate, complement and extend the validity and reliability of their findings, applying additional instruments to the determination curricular content.

5.4 Case studies

diagnostic tool

One of the most commonly used diagnostic tools applied to vocational training is the case study. This enables analysis of "typical" work positions, providing initial data on the most representative innovations affecting the sectors of interest. The results of these studies can be used as a base for the formulation of a working hypothesis on the innovations or changes affecting any given occupational sector.

analyze work positions from the same sector

It is obvious that the most reliable and accurate way of applying a training needs diagnostic is to thoroughly analyze the work positions of a wide range of companies from the same sector of economic activity. However, though this method may indeed be reliable, in Germany, it is only considered to be a feasible option when a complete occupational family requires wide ranging reform. This is due to the fact that elevated time and cost considerations make its application prohibitive. In general, when a vocational training regulation requires either restructuring or replacement a more reduced group of companies from the relevant sector(s) are selected as the sample group. In these cases, "typical" companies from within the sector are preferred, as they can provide specific information on current work position demands. Some of the leading companies (those currently setting market standards within the sector) should also be included.

anticipative curricular development

Only through combining case studies of "normal" and "standard setting" (market leader) companies can "anticipative curricular development be fostered. Limiting studies to "normal" companies implies a serious risk of rapid curricula obsolescence. Conversely, analysis of only "standard setting" (state of the art technology) companies can result in the preparation of overly "futuristic" curricula, out of touch with real skills-qualifications needs, as dictated by existing labor market demands.

From this perspective, curricular design can be defined as a decision making process – as applied to the preparation of the curriculum before its implementation. The possibility of reformulating curricular design during this process should not be discounted.

- Those responsible for formulating learning objectives should participate directly in defining and implementing activities analysis.
- The central hypothesis governing this concept should be properly structured and formulated.
- Work position selection criteria should be subject to open debate.
- Work positions should not be selected by means of traditional classification (to avoid disregarding the effects of changes in real skills-qualifications demand, ie. the emergence of new competences and skills-qualifications.
- Activities analysis should be based on direct observation, questionnaires and personal or group interviews of all work process participants. All information so compiled should be complemented by contributions from the immediate superiors and experts in the corresponding field(s).

5.5 Activities analysis

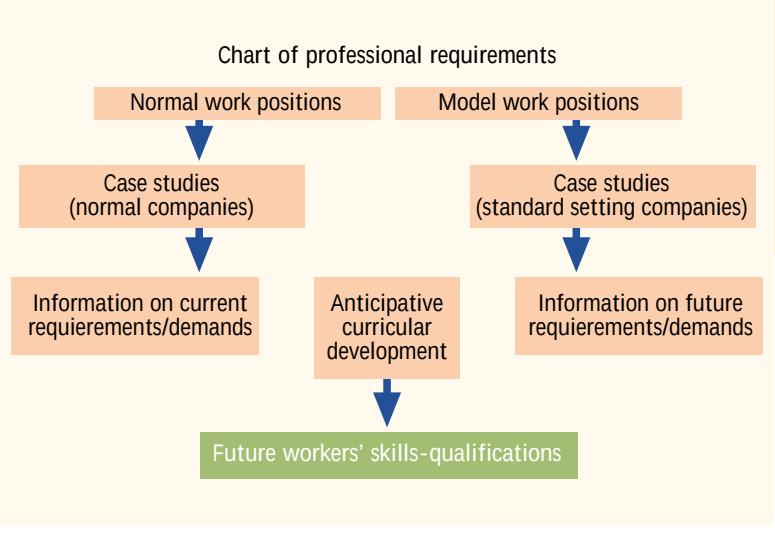
orientation tool and basic data facilitator

The objective of activities analysis is to establish a relationship between skills-qualifications and work positions requirements - as defined by companies within a given sector and the didactic objectives of both vocational training centers and companies. Activities analysis does not, however, imply a direct formulation of learning objectives, serving rather as an orientation tool and basic data facilitator (applied to objectives).

Activities Analysis – preliminary methodological and analytical considerations

- Work tasks, labor situations and conducts should be defined as curricular categories.

Figure 6: Anticipative curricular development



Source: TippeIt

5.6 Field Experts Conferences

assessment and deliberation tools

Field experts conferences can be useful assessment and deliberation tools when applied to the data, information and results obtained as described in the previous sub-section. Given the significance of vocational training regulations, it is advisable that experts from business associations, trades unions, the relevant chambers (eg. Commerce, Industry, etc.), vocational training schools and other similar institutions be represented throughout the decision making process. Organizational and logistical support should be offered by the Federal Institute for Vocational Training (BIBB). Changes affecting productive processes and the influence of variations in the skills-qualifications and competences required from workers are among the areas that should be subjected to careful analysis.

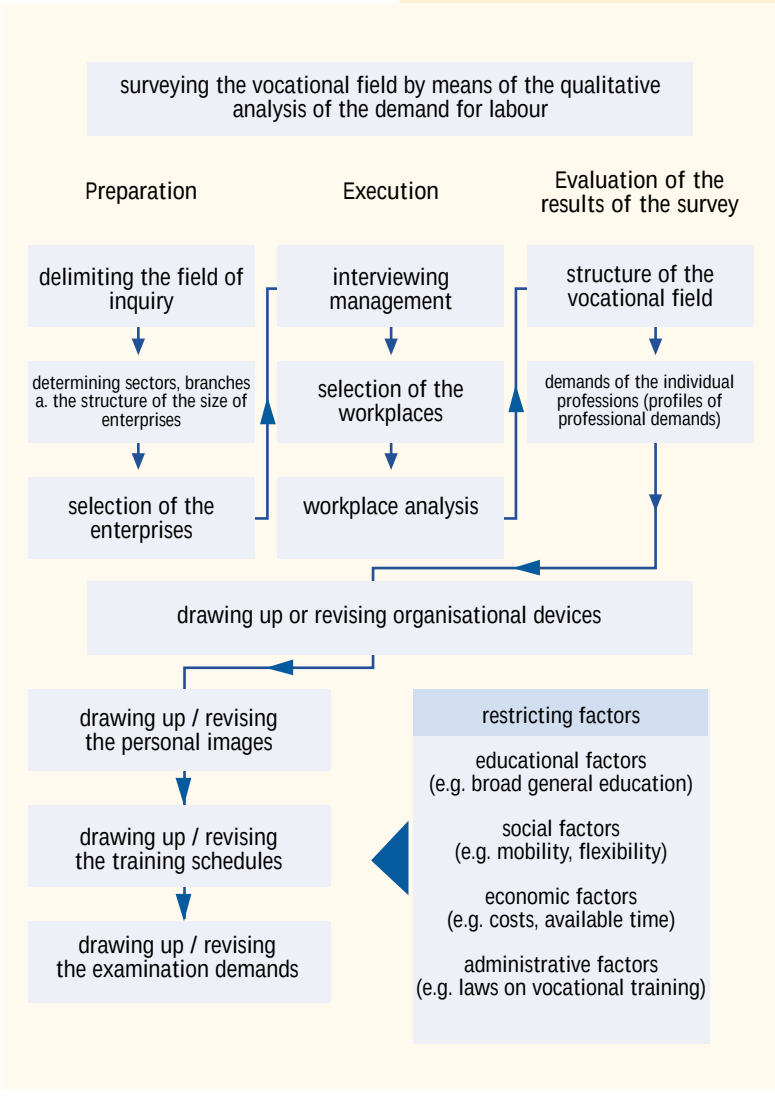
prediction of future changes

This group of experts should not limit itself to merely defining and clarifying changes that have already taken place – but, apply its collective expertise and experience to the prediction of future changes (the anticipative nature of the curriculum).

The field experts conference(s) debate should give special consideration to the following central points:

- Occupational denomination,
- Occupational profile,
- Training plan (objectives and length of training),
- Exam formulation requirements.

Figure 7: Steps in executing qualitative analyses of the demand for labour and in drawing up or revising organisational devises



5.7 Occupational content

general training plan

Occupational content can be defined as the sum of the skills-qualifications that make up or determine an occupation – basically, incorporating professional, technical, organizational, pedagogical aspects.

All vocational training regulations should include a general training plan, providing companies with a set of guidelines for training their workers. Using the general training plan as its base, a company can prepare its own training plan, that, if necessary can be further reaching than the minimum prescribed requirements.

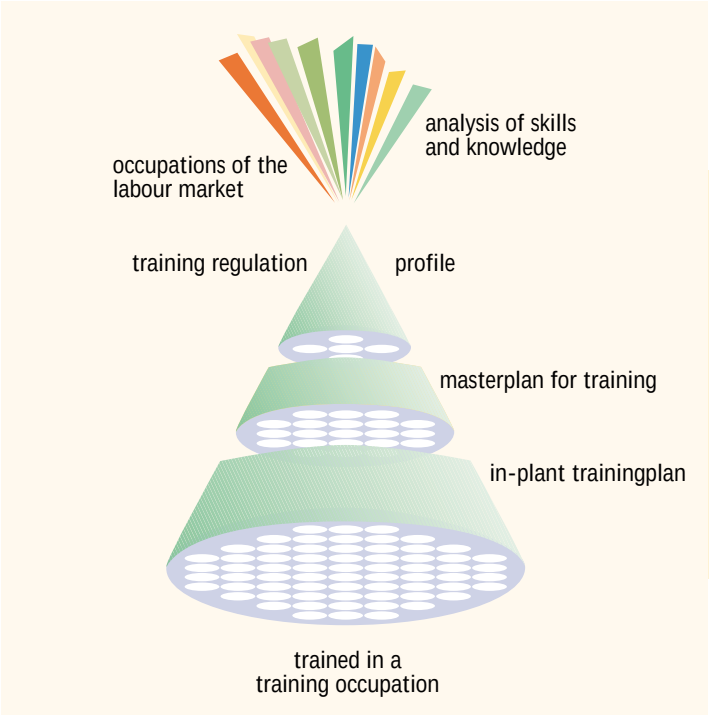
open curriculum

The general training plan (as a part of the regulations) classifies training content by areas of learning and contains a layout of objectives, divided into semesters or years. It should be stressed that the general training plan is not intended to define methodology, ie. how learning objectives are to be reached. This area is the direct responsibility of trainers (instructors or monitors), who should select the place of learning, deciding when and where the knowledge and skills defined in the regulations will be transmitted, and selecting the appropriate didactic material, etc. In this way, the general training plan can be classified as an open curriculum.

wide performance margins

For German companies involved in vocational training, the option of adapting a training plan to their specific needs is extremely important. The training company needs wide performance margins in order to enable the practical part of its training plan to be constantly updated – in line with the rapid technological advance and changing labor market conditions.

Figure 8: Occupations of the labour market and training occupations



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constant and systematic adaptation

(In Germany) some 356 occupations have now been included in these vocational training regulations and as such enjoy official recognition. One of the Dual System's greatest challenges concerns the constant and systematic adaptation affecting occupations, as a result of economic, sociological and technological changes to the labor market. A clear example of this constant adaptation is the recent reorganization of the metalworking professions. Although consensus was reached only after a long and arduous process – especially with respect to the duration and content of the occupations – finally the 42 original professions were reduced to 6, with 16 branches of specialization.

The Federal Institute for Vocational Training (BIBB) publishes a complete and up-to-date annual list, of all the officially recognized occupations forming part of the Dual System.

creation of new occupations

In Germany, the "Vocational Training Reform Project" has sought to increase the "power of attraction" of the vocational training system, by means of the creation of new occupations (regulations) of a more flexible and open design. One significant advance in this area, has been, for example, the creation of four new occupations, as a part of the Information and Telecommunications Technologies industry. These are as follows:

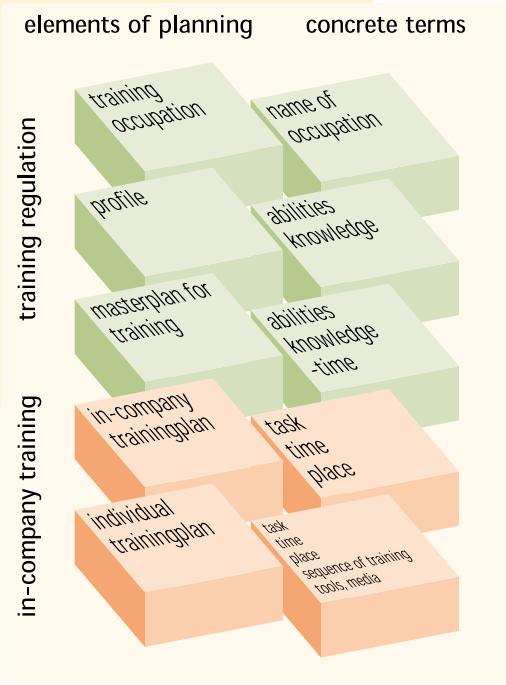
> Information Systems Electronics Technician,
> Information Technology Specialist,
> Information Systems Commercial Technician
> Information Technology Commercial Technician

The introduction of these four new occupations has been designed to provide a more efficient and flexible solution to the new demands derived from the Information Society (email, local networking, interactive systems, graphic designs, etc).

integration of technical skills-qualifications within a company economy framework

Training for these occupations is predominately process focused, enabling apprentices to master the complete range of in-company work procedures. A common objective is the integration of electronics field technical skills-qualifications within a company economy framework. The resulting new occupational profiles have been designed to be as flexible as possible, facilitating future adaptation to Information and Communication Technologies (ICTs) developments - (in areas such as producers, service providers and ICT users).

Figure 9: How to transfer a training regulation into a in-company training



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6. Coordination of in-company and vocational school training

coordination of the two learning venues

The temporary coexistence of in-company practical and theoretical vocational school training requires the implementation of a coordination process. As indicated earlier (see the Dual System didactic unit), the duality of the system becomes most evident when two areas of responsibility and authority coexist (in-company training is the responsibility of the Federal Government, while the vocational school training falls under the auspices of the Federal States).

The coordination of theoretical and practical training is also of great importance from a curricular point of view, as is the combining of psycho-motor and cognocitive objectives. This calls for a complete process of coordination of didactic principles and training activities – at both in-company and vocational school level.

framework curriculum

A complete coordination process was implemented with the input of the various experts commissions. The Framework Curriculum, approved and ratified by the Ministries of Education and Science of the Federal States (of Germany), was coordinated with its respective Vocational Training Regulations.

Over the last four years, the same procedure has been used to redefine 97 occupations, and to officially recognize 31 occupations. The case of the "Mechatronic" serves as an example – an occupation which finally received official recognition, after arduous negotiations involving businessmen (industrialists), trade unions and the Federal Institute for Vocational Training (BIBB).

consensus principles

It should once again be stressed that one of the fundamental pillars of the "Dual System" is the "consensus principle" between business associations and trade unions. When agreement between social partners is not forthcoming, the approval of new training regulations becomes practically unviable.

new training regulations

New training regulations are usually prepared with the support of the relevant guidance and didactic support material prepared by the BIBB. Their subsequent implementation is usually the role of companies involved in training apprentices. The BIBB does, however, take an active participation in the process, in order to facilitate the often difficult putting into practice of new in-company content or occupational profiles - as indicated in the following schematic (overleaf): (Figure 12)

Figure 10: The coordination of in-company training and school training

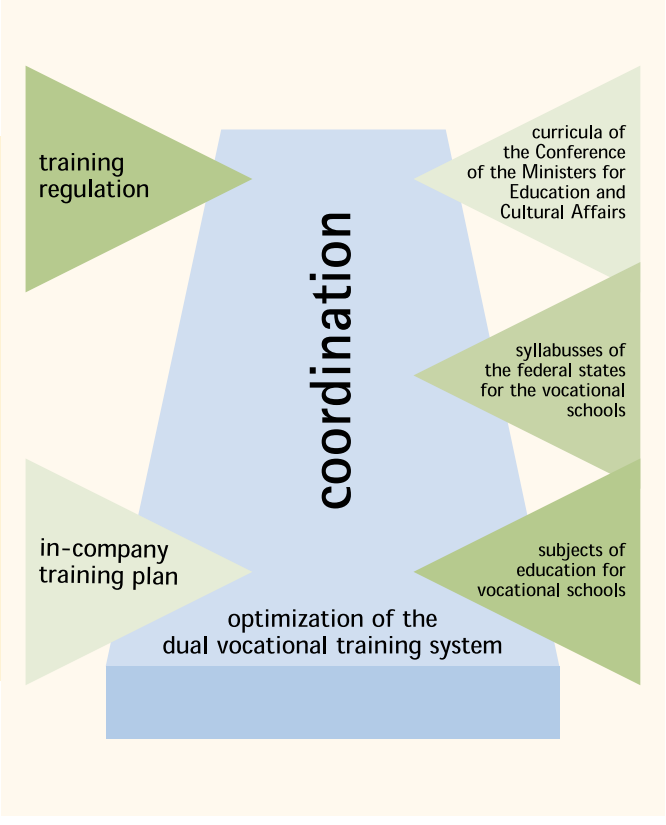

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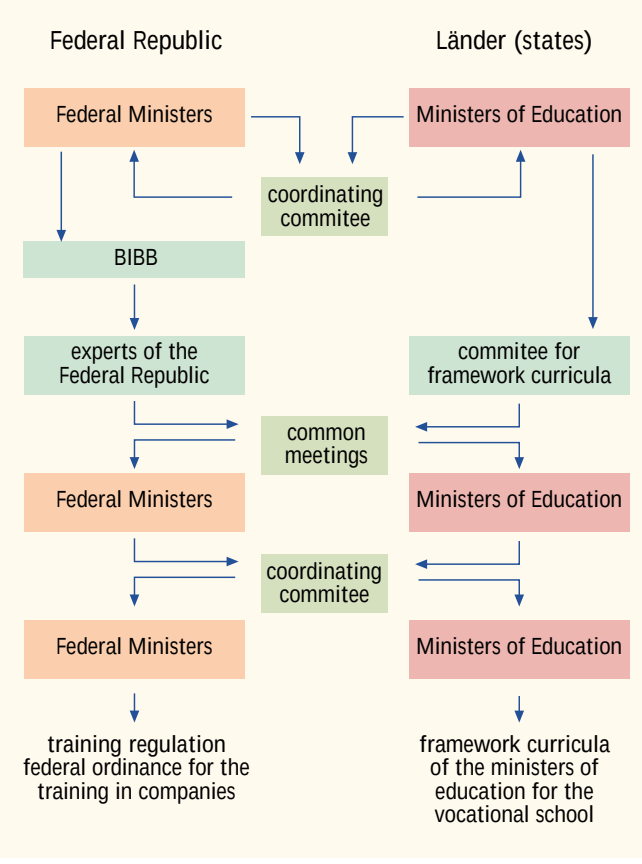
Figure 11: Coordination between training regulation and school curricula



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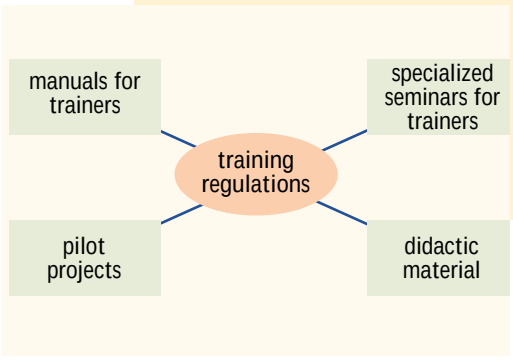
reduction in time needed to implement the re-adaptation process

One of the main goals – as proposed by the Federal Government, through the BIBB – is a considerable reduction in the time needed to implement the re-adaptation process – plus the creation of new occupational profiles (one year for the re-adaptation and creation of new profiles and a maximum of two years for the creation and elaboration of regulations for new occupations).

Figure 12:



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InWEnt Mannheim in figures:
former: Industrial Occupations Promotion Centre (ZGB) of the German Foundation for International Development (DSE) Employees: 24 Annual financial budget for international human resource development programmes: approx. 6 million euro; a further approx. 4 million euro per year are made available by federal states cooperating in joint projects Annual number of participants: approx. 950