Using the VQTS model for mobility and permeability Results of the Lifelong Learning project VQTS II

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Karin Luomi-Messerer (Ed)

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Preface

This publication is the final result of the Lifelong Learning project 'Vocational Qualification Transfer System II – VQTS II'. As the project coordinator, it is always a pleasure to be able to publish the project outcomes and to share the ideas and concepts of the project partnership. It is, indeed, a very rewarding feeling after two years of diligent and intensive work!

Of course, this publication was only made possible by the contributions and support of numerous people and I would therefore like to express my gratitude to all of them:

I would like to thank the European Commission for the substantial co-funding of the VQTS II project within the Lifelong Learning Programme (Leonardo da Vinci) and the institutions forming the partnership for securing the necessary institutional co-funding as well as the Austrian Federal Ministry for Education, Arts and Culture for supporting the Austrian project partners.

All project team members are supported by colleagues and administrative staff within their institutions. It is not possible to list all their names here but – also on behalf of all other project colleagues – I would like to express my gratitude for their valuable support.

Furthermore, I would like to thank the colleagues outside the VQTS II partnership who discussed with us and helped us to improve the preliminary results of our project.

My special thanks go to the work-package leaders and all project team members (see list on the previous pages) for their contributions and commitment to the VQTS II project, for their endurance and collegiality as well as for the amicable atmosphere at our project meetings.

Finally, I would like to thank my 3s-colleagues Genoveva Brandstetter and Jörg Markowitsch for their highly appreciated support during the lifetime of the project, Jouko Luomi for his patience and very constructive and valuable feedback at the final stage of this publication, Karl Giesriegl for his uncomplicated cooperation when providing the layout for this volume and Harold Otto for his flexibleness and thoroughness as the language and copy editor.

This publication, as well as further information, is available at the project website: www.VocationalQualification.net. Feedback and suggestions for the further development of the VQTS model as well as any comments or ideas regarding further possibilities for its application are very welcome!

Vienna, October 2009

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Introduction

1. Background

VQTS project and ECVET

VQTS II (Vocational Qualification Transfer System II, LLP-LdV-TOI-2007-AT-0017) is the follow-up project of the successful Leonardo da Vinci project VQTS (2003-2006). The VQTS project was closely aligned with the aims of the 'Copenhagen Process' wherein the EU countries declared their willingness to foster employability and lifelong learning in Europe by strengthening cooperation and increasing mobility in vocational education and training (VET). According to the 'Copenhagen Process', it should be possible to utilize competences acquired through formal, non-formal and informal learning throughout Europe. Furthermore, studying or training abroad should not necessarily lengthen vocational training. Therefore, common tools and initiatives for VET are needed to enhance transparency and comparability of qualifications and mutual trust among stakeholders. One of these initiatives is the development of the European Credit System for Vocational Education and Training (ECVET). The system, which should be implemented by Member States by 2012, is a voluntary framework to describe qualifications in terms of units of learning outcomes. Each of these units will be associated with a certain number of ECVET points developed on the basis of common European standards. It will give people greater control over their individual learning experiences and make it easier to move between different countries and different learning environments. The European

Commission together with the Member States are working on the development and implementation of the system and several working groups and pilot projects (on national and European levels) have been initiated.

The VQTS project contributed to these activities by developing a model that facilitates transnational comparison of competences and qualifications by offering a solution for a structured description of work-related competences and their acquisition (including credit points): the VQTS model. The VQTS project has received the Helsinki Award 2006 (in the category 'Recognition of competences and qualifications, ECVET') and the Lifelong Learning Award 2007 in Gold for its contributions to the aims of the 'Copenhagen Process' (for more information see: www.vocationalqualification.net).

Helsinki Award 2006

Lifelong Learning Award 2007 in Gold

VQTS II project

The Lifelong Learning project VQTS II focuses on transferring and further elaborating of methods and procedures for developing the VQTS model by using the ideas and principles described in the VQTS project. Additionally, the VQTS II project elaborates the possibilities for using the VQTS model for enhancing the permeability and progression between VET and practice-oriented, higher education (HE) programmes.

VQTS model

Comparing training programmes and understanding qualifications from other countries` systems is one of the main challenges of ECVET implementation. This is because of the various approaches, concepts and traditions for designing and describing qualifications. The VQTS approach seeks to transcend the incomparability of qualifications and training contents by focussing on work

processes. Of course, differences exist between national ways of offering and organising training but one can identify many similarities in the tasks of modern work processes. Different countries tend to apply similar material, technologies and processes. Therefore, the occupational requirements or the core work tasks – and the necessary vocational or professional competences – in an occupational field can be better compared than the training programmes in different countries for these competences.

The VQTS model provides a 'common language' to describe competences and their acquisition and also offers a way to relate these competence descriptions to the competences acquired in training programmes. On the one hand, the VQTS model focuses on competences related to the work process and identifies the core work tasks within the context of the particular occupational field. On the other hand, the VQTS model follows a 'development logical' differentiation of a competence profile (known as a competence development or acquisition model) and thus can also describe the acquisition of competences. The description of competences in relation to core work tasks can be seen as an attempt to bridge the terminological and ideological gap between the world of education and the world of work.

The core elements of the VQTS model are the Competence Matrix, Competence Profiles and Competence Profile Certificates (including credit points). This publication, which is the final product of the VQTS II project, seeks to provide information about developing these core elements and the ways of applying the VQTS model; in particular, how to use it in the context of transnational mobility and to enhance permeability between VET and HE programmes. The following section provides a more detailed overview over the different parts of the publication.

2. Overview and further information

Overview

The different parts of this publication are partly addressed to different target groups. However, in order to understand the development of Competence Profiles (Part II) as well as the use of the VQTS model for transnational mobility (Part III) or for enhancing permeability between VET and HE (Part IV), one

must be informed about the general ideas behind the Competence Matrix (Part I). Furthermore, using the VQTS model for transnational mobility or for enhancing permeability between VET and HE also requires understanding of the procedure for developing Competence Profiles. Therefore, the sections need not be read in sequence but according to one's particular interest and understanding of the VQTS model.

Part I: Competence Matrix – includes information about:

- the procedure for developing a Competence Matrix (including also the principles for developing a Competence Matrix as defined by the first VQTS project);
- the methods and resources that can be used for developing a Competence Matrix;
- the possibilities and purposes for using a Competence Matrix;
- examples to illustrate this approach (in the VQTS I project, a Competence Matrix for 'mechatronics' was developed and in VQTS II one for 'electronics/electrical engineering');
- a checklist.

Target group:
This part is especially addressed to responsible authorities or competent bodies from different countries who are planning to create a Competence Matrix for a specific occupational field.

Part II: Competence Profiles and Competence Profile Certificates (including credit points) – includes information about:

- the development of Competence Profiles of training programmes or of a person in training by using a Competence Matrix;
- the interpretation of a Competence Matrix for this purpose;
- the allocation of credit points;
- the procedure for issuing a Competence Profile Certificate;
- a checklist.

Examples are available at the website.

Target group:
This part is especially addressed to responsible authorities or competent bodies planning to develop Competence Profiles of a training programme or a person in training based on a specific Competence Matrix.

Part III: Mobility Procedure, Memorandum of Understanding, Learning Agreement – includes information about:

- the planning and the organisational steps necessary when using the VQTS model for VET placements abroad and to facilitate the transfer of vocational competences acquired abroad;
- the procedure for the development as well as the structure and content of a memorandum of understanding;
- the procedure for the development as well as the structure and content of a learning agreement;
- a checklist.

A proposal for the format of a Memorandum of Understanding and of a Learning Agreement is available at the website.

Target group:
This part is especially addressed to competent bodies and training providers and persons in training who want to establish partnerships for organising and implementing VET placements abroad.

Part IV: Using the VQTS model for enhancing permeability between VET and HE – includes information about:

- European-wide political processes towards enhanced recognition of prior learning from VET in HE programmes as well as terms and concepts used in this context;
- important aspects to be considered when adjusting VET and HE for enhancing permeability between VET and HE;
- the use of the VQTS model as a methodological approach or instrument to recognise prior learning, for facilitating permeability and for adjusting VET and HE programmes;
- a checklist.

Target group:
This part is especially addressed to competent bodies and training providers from VET and HE who want to promote sustainable advancement from VET to HE by establishing new partnerships between VET and HE providers for developing learning paths for students progressing from VET to HE.

Glossary – includes information about key terms.

Further information:

- In some cases, additional information to the core information presented in the text is included in grey-coloured boxes.
- Illustrative examples that are included in the different parts of this text or made available at the website (www.VocationalQualification.net) arise from the previously mentioned particular fields (‘mechatronics’ and ‘electronics/electrical engineering’). However, the VQTS model can also be used for describing and comparing competences in other fields.
- To some of the elements described (Competence Matrix, Competence Profiles, memorandum of understanding, learning agreement, facilitating permeability and adjusting VET and HE programmes) checklists are available. These lists should help those developing the respective element to check whether all necessary steps have been taken or whether all necessary information has been included.

Part I: Competence Matrix

1. Introduction[1]

A Competence Matrix displays work-related competence descriptions and the progress of competence development ('steps of competence development') in a table:

- the left column of the table contains *competence areas*, based on the various core work tasks;
- the acquisition of competences by a person in training with reference to core work tasks is described for each competence area as *steps of competence development* (horizontal axis).

This section includes information about:

- the procedure for developing a Competence Matrix (including also the principles for developing a Competence Matrix as defined by the VQTS I project – see Luomi-Messerer & Markowitsch 2006);
- the methods and resources that can be used for developing a Competence Matrix;
- the possibilities and purposes for using a Competence Matrix;
- examples to illustrate this approach: The VQTS I project developed a Competence Matrix for 'mechatronics' and the VQTS II developed one for 'electronics/electrical engineering'.

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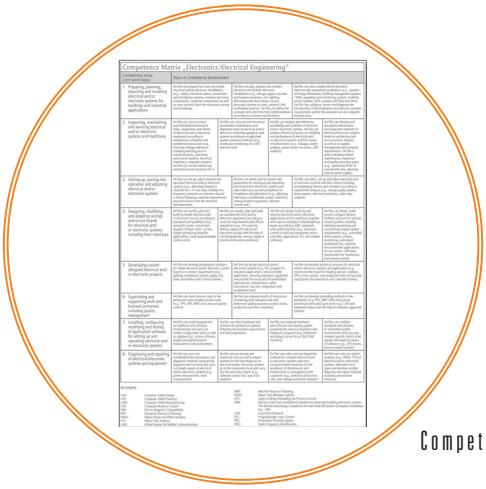
1 This part is mainly based on the principles defined in the VQTS I project and the further discussions in the VQTS II project (cf. Becker 2009).

2. Development of a Competence Matrix



Competence Matrix

2.1 Scope of the Competence Matrix

Sector or occupational field

The first step is obviously identifying a sector or occupational field for which the Competence Matrix will be developed. The available examples are from the fields of 'mechatronics' and 'electronics/electrical engineering'.

Professional profiles or segment(s) of qualifications systems

Furthermore, one must decide on the scope of the Competence Matrix in terms of professional profiles to be included: In the first VQTS project (Competence Matrix 'mechatronics'), the focus was on the skilled worker level and on VET programmes from secondary level education. The VQTS II project intended to develop a Competence Matrix useful for identifying overlapping areas between VET and HE programmes and therefore the scope of the Competence Matrix 'electronics/electrical engineering' had to be broadened to include at least some steps of competence development relevant for HE (for more information see Part IV).

2.2 Competence areas

Based on empirically derived complex core work tasks

In the next step, competence areas that form the left column of a Competence Matrix must be identified based on core work tasks. Core work tasks are com-

Competence areas

prehensive tasks within the work context of a person with the respective occupational profile. Instead of using subjects from traditional subject-based curricula to structure the Competence Matrix, the core work tasks of the target group in the selected occupational field must be derived empirically from the working world (work practice/work place). Only holistic competences that actually exist in the world of work are to be described and differentiated. Just as core work tasks have a complex relationship to the work process, competence areas also represent a certain complexity.

Varying number

Based on these core work tasks, a varying number of competence areas are defined, depending on the complexity, range of activities or job opportunities within a certain occupational field. Experience so far has shown that about ten competence areas can be differentiated for one Competence Matrix.

Possibility for responding to changes

We consider that a Competence Matrix describes a 'dynamic' list of competence areas. This should allow those responsible for developing a respective Competence Matrix to respond to major changes in occupational fields by adding or removing competence areas, or by restructuring the Competence Matrix.

Balance between general and detailed formulations

The competence areas should not be specified in an overly general way (for example, 'building machines'), nor should they be too detailed (for example, 'soldering cables'). They must be formulated so that they promote mutual understanding between experts in the respective occupational field.

Example
The competence areas included in the Competence Matrix for 'electronics/electrical engineering' are:

1. Preparing, planning, mounting and installing electrical and/or electronic systems for buildings and industrial applications;
2. Inspecting, maintaining and servicing electrical and/or electronic systems and machinery;
3. Setting up, putting into operation and adjusting electrical and/or electronic systems;
4. Designing, modifying and adapting wirings and circuit boards for electrical and/or electronic systems including their interfaces;
5. Developing custom-designed electrical and/or electronic projects;
6. Supervising and supporting work and business processes including quality management;
7. Installing, configuring, modifying and testing of application software for setting up and operating electrical and/or electronic systems;
8. Diagnosing and repairing electrical/electronic systems and equipment.

Concept of competence and domain
The competence concept used does not only refer to the disposition for a competent behaviour but also includes the visibility/apparentness of the professional competence itself. Competence is meant as expertise, which also becomes apparent – as performance – in a person's actions (cf. Spöttl/Becker 2005). The description of professional competences should therefore also refer to the professional action itself.

The descriptions of occupational competences must refer to the sector, the domain, the context and the occupational tasks: In its original sense a *domain* is understood as an area in which somebody is able to act competently. In a first approach, a domain could be understood as an 'action area' in the sense of descriptors such as using and operating (of facilities, plants, systems...), mounting/dismantling, maintenance/servicing/inspecting, installing, configuring/adjusting, measuring. In the most general sense, the domain is determined by the behaviour in the respective sector and has the character of a subject-related process: Skilled workers are dealing with a domain by running through and shaping the working process based on a certain task. They analyse the specific assignment, task or problem, identify the starting point

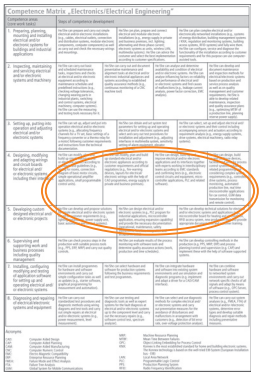
as well as the aims to be reached and start the working process. They handle the work task, use tools and methods applicable in the framework of the organisation of their work and consider manifold requirements (set by customers, society, legislation, enterprise, work group) in order to achieve the envisaged result for the object of work (product, system, technique, customer).

Therefore, the descriptions of occupational competences also must refer to the *context*: The context must be described in order to clarify the cohesion of sense ("Sinnzusammenhang") formed by the worker engaging in the work process (area of action or application) as well as the cohesion of facts ("Sachzusammenhang") that is shaped by the objects of skilled work.

Only a holistic view preserves a meaningful use of the terms of competence and domain. The concretisation of a domain in the broadest sense would then be achieved by an area of actions with a clear-cut relation to the object. The object and the area of application then define the area of actions.

Source: Becker 2009a; Spöttl et al. 2008.

2.3 Description of competences in relation to the work context on various stages of the competence development process



Steps of competence development for one competence area

2.3.1 Steps of competence development

Illustrating the process of progression

On the horizontal axis – i.e. for each competence area – between two and six successive steps of the competence development process within certain core

work tasks are described. These descriptions should clearly illustrate the process of progression from the lower to the higher steps. The competences on each step are to be described in a holistic way as explained in section 2.2.

Number of steps depends on the nature of the competence area
The nature of the competence area determines whether it makes sense to differentiate between more or fewer steps of competence development (for example, in one competence area three steps may be sensible, whereas in another, five steps may be better). Therefore, no concrete or consistent number of steps can be pre-determined. Consequently, the consideration of the level of steps only make sense within one single competence area (horizontally) and a step of competence development for one competence area does not necessarily correspond to the meaning of a step of any other area. (For example, 'Step 3' in a competence area with three steps does not necessarily express the same level of achievement as 'Step 3' in a competence area with five steps.)
Furthermore, each step expresses the level of competence relating to a certain competence area. However, a competence or step of competence development of another competence area can be a prerequisite for the development of a competence described in this competence area (for example, 'Step 1' in 'Competence area 1' can be a prerequisite for the development of 'Step 3' in 'Competence area 2').

Granularity of the descriptions
The differentiation of steps of the competence development is a crucial issue in designing a Competence Matrix: The difference between one step and the next must be clearly described. An important question is the 'granularity', i.e. the degree of detail and precision of the steps of the competence development. The descriptions must provide a clear and comprehensible picture of the competence development process, but they should not be too detailed. Excessively detailed descriptions would endanger the broader usefulness of the instrument. The scope of the single steps of the competence development should not be too broad or extensive and one single step should also not be too 'high'.

Dimensions for characterising the different steps of competence development
No specific determinants for differentiating the steps are given in advance. However, whenever it is reasonable, certain dimensions are included as reference points to describe the competence development in addition to the context characteristics (tools, etc). These dimensions are used to express the differences between steps and the progress of competence development and are thought of

as a continuum. The extent or the degree to which learners achieve them characterises the various steps or enables the differentiation between steps.

Several dimensions are provided as examples below. This enumeration is not complete; additional dimensions suitable for the differentiation of steps in competence development should supplement this partial list.

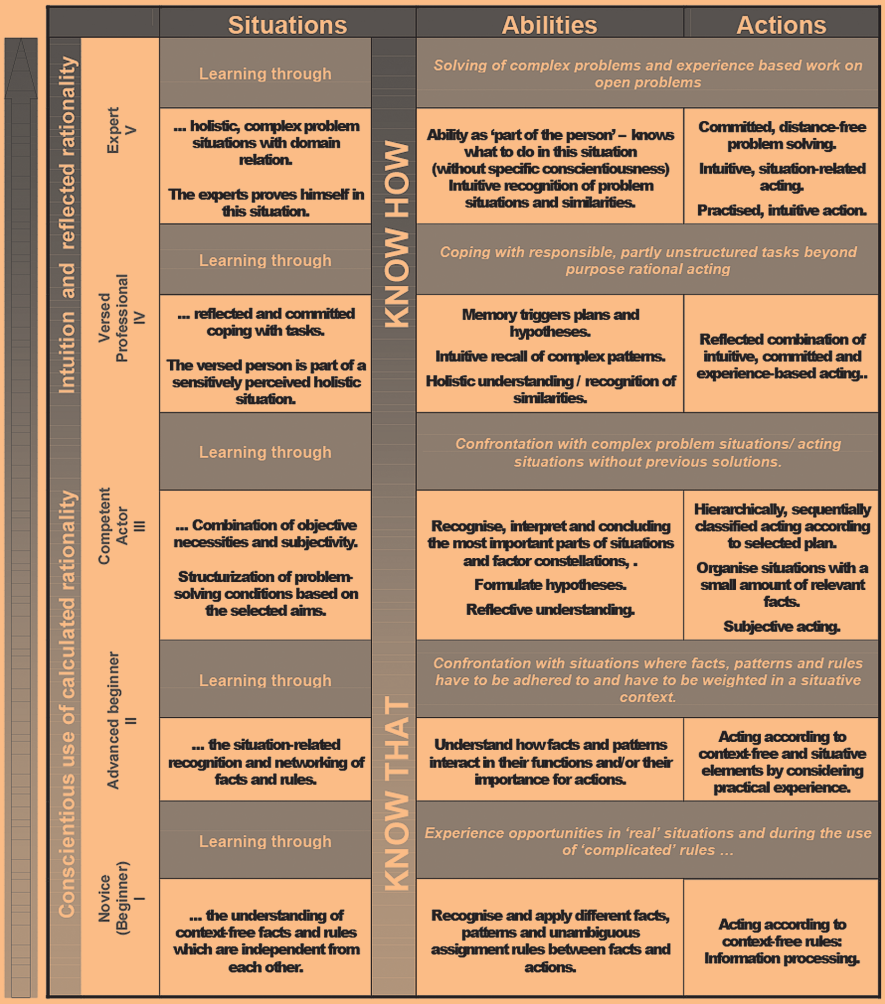
- Ability to perform independent work tasks: marks the degree of necessary support or instruction;
- Ability to deal with a certain complexity;
- Ability to deal with quality standard demands: marks the degree to which demands and standards can be considered in fulfilling work tasks;
- Ability to deal with dynamic situations: marks the degree to which changing parameters of a problem or system can be taken into account;
- Ability to deal with intransparency and ambiguity: measures the ability to deal with messy situations or with situations with variables not visible from the outset.

Competence development model by Dreyfus & Dreyfus

The Competence Matrix is based on a holistic view of competence development. The competence development model by Dreyfus & Dreyfus (1986) and its further development (cf. Markowitsch et al. 2008) is used as theoretical background for describing the competences on different stages of development with reference to the core work tasks.

The model designed by Dreyfus & Dreyfus (1986) describes the competence development in five levels from the novice to the expert. Each of these five development levels is marked by certain characteristics (kind of perception, dealing with rules, etc.) and all lower four levels must be run through in order to reach the expert level (for example, as a pilot, nurse or teacher). The use of the Dreyfus/Dreyfus model to characterise competency development is described in the following graph (cf. Spöttl & Becker 2005, p. 34).

The VQTS model can be considered as a further development of the Dreyfus & Dreyfus model: It uses this approach in such a way that the levels of competence development are not applied to overall professional actions (as shown for pilots, nurses, teachers and others), but to smaller entities of professional



profiles. While strongly taking into account work-related tasks and contexts (objects, tools, work organisation), competence areas are defined and Dreyfus' ladder is applied to these new entities. Thus, Dreyfus' model is adopted in two ways: (1) applying the model to competence areas (corresponding to specific core work tasks) instead of using it for overall competence profiles (corresponding to professionals/experts); (2) making the model flexible and dynamic by not restricting it to a certain number of levels, but only defining the differences between levels.

Source: Becker et al. 2007; Markowitsch et al. 2007; 2008

2.3.2 Description of competences in relation to the work context

Relation to the work process

The competences on the various steps of competence development are described in a context-related manner. The competences are consistently formulated in relation to the work process and always align with the core work tasks within the context of the occupational field.

'He/she is able to...'

The descriptions of the competences are designed to form a clear picture of how they can be applied in the work context and are related to actions that can be carried out or problems that can be solved. This is why the term 'is able to' is used in the descriptions.

Work-related categories

The descriptions include – wherever reasonable for the respective competence area or the step of competence development – work-related categories as context characteristics to clarify the work activities in a specific field.

Work-related categories are:

- Objects of skilled work: meaning the contents or processes of skilled work (composed of technology, functions, phenomena etc; customers may be objects in this sense as well);
- Tools, methods and organisation of skilled work;
- Requirements for skilled work and technology (in form of rules, norms and laws, service concepts etc.; requirements set by the internal and external customer towards the expert work, also social demands).[2]

Holistic descriptions

Contrary to existing taxonomy systems, holistic descriptions are used. In order to avoid isolated descriptions, the previously mentioned dimensions must be expressed in relation to core work tasks. The following principles must be considered:

- The description of a step of competence development includes not only the degree or specification of one or more dimensions, but must always be related to the work context.
- The description should not be restricted to competences that can be formulated analytically, yet cannot be identified in the work context.

2 Cf. also Spöttl 2007, 11.

- The steps of competence development should be described so capaciously that holistic professional competences are depicted and not only 'descriptions of isolated job tasks'.

2.3.3 Supplementing competence descriptions with examples

Experience tells us that examples can convey well the understanding between experts from the same skilled work area. Thus, 'good' examples are an efficient way to ensure the necessary practical relevance to the work context. Descriptions are therefore supplemented – wherever possible – by specific examples. These examples relate to the relevant categories. For this reason, examples are not simply illustrative elements of the description, they serve an essential purpose. Examples provide the necessary information for characterising the different competence levels and various ways of assessing when an individual has achieved a certain level of competence.

It lies in the nature of examples that they are just that: they serve as an indication or illustration of the nature, complexity, etc. of the work tasks and the competence to fulfil them. They must be carefully selected but, of course, they can not reflect or express the whole range of work tasks and competences relevant for a certain step of competence development. A range of examples could be included in the Competence Matrix but 'story telling' (extensive descriptions) should be avoided in order not to overload it.

2.3.4 Further principles for describing competences in the Competence Matrix

Soft skills and key competencies

Soft skills and key competencies are inherent in the respective descriptions. They are not described as specific competence areas on their own, but they are integrated in the context-related descriptions because of their relevance in this context. All core work tasks require soft skills (like stress resistance or self-reflection) or key competencies, such as social and communicative competences. Also the acceptance of responsibility and quality awareness are integrated in the occupational competences. Without these competences, the work tasks cannot be executed in a manner indicating professional ability.

Bridging the gap between the world of education and the world of work

The description of competences in relation to core work tasks can be seen as an attempt to bridge the terminological and ideological gap between the world of education and the world of work:

A Competence Matrix does not in any way replace a national curriculum. The focus of the descriptions is on empirically derived work-related competences and not on the content of curricula ('in-put'). For this reason, it must be ensured that only those competences are described and differentiated that actually exist in practice. No subjects from the curriculum should be used in the Competence Matrix. Merely analytical descriptions of steps should also be avoided.
Descriptions of vocational competences gain significance only through their relation to the work context. However, the Competence Matrix should be used not only to make visible the competence profile of the acquirable competences within a training programme/qualification but the competence profile of a person in training as well (i.e. the competences acquired so far by a person in training). Therefore, the compilation of competence profiles solely oriented on occupational profiles (i.e. profiles of work tasks or competence profiles of skilled employees in a certain field of work) is not sufficient by itself because the steps of competence development also must be made transparent.

Style of language
To describe the competences of the various steps of competence development, complete sentences should be used (for example, 'He/She can develop and propose solutions for simple electrical/electronic systems based on customer requirements [for example, lighting installations, power supply unit, basic automation and control systems].) and not merely catch phrases (for example, 'solutions for simple electrical/electronic systems').

Extent of the descriptions – 'volume or size' of the Competence Matrix
In order to be readable, easy to understand and useful for training providers, an important aspect is the amount of information provided. A Competence Matrix should fit on one (or maximum two) page(s). This offers the possibility to grasp the scope of the field in one glance and to get a quite swift overview over the competence areas and steps of competence development in a certain occupational field. This, of course, also means that the Competence Profiles (see Part II) that can be developed based on a Competence Matrix, can provide information also only up to a certain extent. However, any further details can be specified in a Memorandum of Understanding or particularly in a Learning Agreement (see Part III).

3. Methods and resources for developing a Competence Matrix

3.1 General approach

Level of application
A Competence Matrix can be developed for the national level, or in cooperation between two or more partner countries, or by an international sectoral association.

Based on empirically derived core work tasks
It is important to note that core work tasks must be identified in the professional context and should not be primarily from the educational system, which is marked by country-specific characteristics. In order to facilitate transparency, qualifications need to be described in a learning outcomes approach that is not solely linked to a certain national context or educational system.

Empirical methods
Therefore, the core work tasks – the basis for 'competence areas' – must be derived empirically by using methods that include work process analyses, company surveys, expert interviews, work-related comparison of existing qualification or occupational profiles and moderated workshops with experts from the occupational field (cf. Becker & Spöttl 2008).

Analyses of secondary sources
Identifying competence areas based on work process analysis is an important requirement but quite often – and in particular in the context of EU projects like ours – an extensive empirical research is not possible. Therefore, it might be necessary to prepare the Competence Matrix based on analyses of secondary sources such as competence descriptions that have been gathered empirically in other research projects. The outline of a Competence Matrix should then be evaluated and developed further based on expert feedback and through moderated workshops (for example, 'expert skilled worker workshops', cf. EVABCOM 2005; Spöttl 2009). Developing a Competence Matrix in this respect is based on empirical research and is carried out in the form of an intensive communication process between different experts.

Involvement of experts from the occupational field
Experts from the respective occupational field must be included: from the field of work as well as from the field of education (VET and also HE in case the scope of the Competence Matrix should also include some competences relevant for HE programmes). In order to facilitate mutual trust, different perspectives and expertise should be integrated and experts from different countries should be involved.

Further support
VET researchers or 'Competence Matrix experts' should be involved in the development process to ensure that the principles for developing a Competence Matrix are taken into account sufficiently.

3.2 Classification systems

ISCO and ISCED
As a starting point for determining the scope of the Competence Matrix, the professional classifications from ISCO-88 (International Standard Classification of Skills and Competences) and the corresponding ISCED levels (International Standard Classification of Education) in the selected field could be analysed.

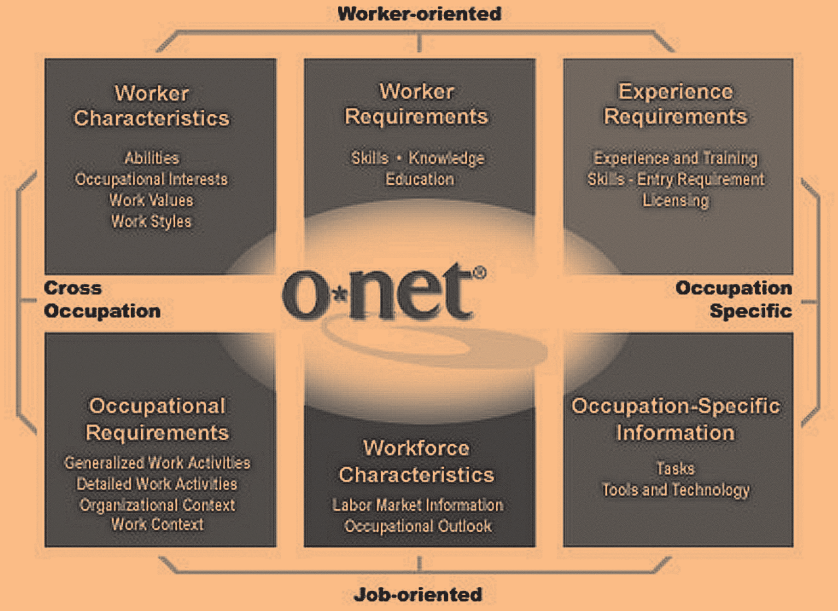
Skills and competence ontologies
For defining the relevant occupational field, one could also use skills and competence ontologies such as O*NET, the Occupational Information Network (http://online.onetcenter.org) used in the USA, or national skills compilations such as the 'AMS-Qualifikationsklassifikation' used in Austria (http://bis.ams.or.at/qualibarometer) or Taxonomy_DB used in Sweden as well as by EURES (http://ec.europa.eu/eures), the European Job Mobility Portal. In order to support translations between different languages, DISCO – the Dictionary of Skills and Competences (www.disco-tools.eu), a comprehensive multilingual thesaurus could be used.

These systems have their origins mainly in the attempt of public, labour-market authorities to support occupational classification and information systems with information and data on skills and competences and thus improve various applications that vary from matching systems to career guidance tools.

*O*NET*

In the O*NET Content Model, key features of an occupation are described by a standardised, measurable set of variables called 'descriptors'. The hierarchical model starts with six categories (worker characteristics, worker requirements, experience requirements, occupational requirements, workforce characteristics and occupation-specific information), describing the day-to-day aspects of the job and the qualifications and interests of the typical worker (see figure below). O*NET also offers levels of requirements for the individual abilities and skills. It provides a scale that offers seven levels for most of its generic descriptors.

The O*NET Content Model
Source: National Center for O*NET development (www.onetcenter.org)



Taxonomy_DB

Taxonomy_DB, a repository of taxonomies for occupations and skills, is available in 20 of 23 official EU languages. It is based on ISCO-88 and other international standards (ISO, ISCED). Only occupational skills are included in the database; skills describe either formal requirements such as authorisations, or informal requirements such as experience necessary to work in the particular occupation.

Occupations and competences are sorted into occupation groups that correspond to the ISCO categorisation at the four-digit level. Furthermore, all skills are grouped under skill-headings such as 'computing/ICT, general competences', 'specialist training for nurses' or 'other specializations'. Currently, approximately 6,000 terms for occupational skills per language are grouped under some 60 skill headings.

DISCO

DISCO is a comprehensive collection of terms (totalling some 7,000) for competences and skills, as used in CVs, job advertisements, job profiles and the like, which is available in structured form in seven European languages (Czech, English, French, German, Hungarian, Lithuanian, Swedish). DISCO has a comprehensive understanding of skills and competences: although the focus is on (occupation-specific) skills and competences in particular, it therefore also includes terms that cannot be precisely attributed to specific areas, such as values and attitudes, behavioural patterns or physical characteristics – independent of whether they have been acquired formally or informally.

The thesaurus is subdivided into 'domain specific skills and competencies' and 'non-domain specific skills and competences', the former distinguishes 25 subject fields, the latter eight subject fields.

DISCO includes 7,348 terms for occupational as well as transversal skills per language and their synonyms (2,300 per language on average) are grouped under 33 subject fields.

cf. Markowitsch & Luomi-Messerer 2008; Markowitsch & Plaimauer 2008; Müller-Riedlhuber & Markowitsch 2008.

4. Reasons to use a Competence Matrix

The main aim of a Competence Matrix is to enhance transparency of competences and qualifications and thus mutual understanding between different countries and different contexts (for example, between the world of education and the world of work or between VET and HE) and to compare qualifications with one another.

A Competence Matrix can be used for those purposes where the transparency of competence profiles is very important, such as:

- transferring vocational competences acquired abroad (mobility in VET);
- transferring and recognising competences acquired within the official VET system as well as competences achieved through non-formal or informal learning;
- developing qualifications;
- composing job profiles as well as personnel (human resources) planning;
- referencing qualifications to qualifications frameworks;
- enhancing permeability between VET and HE.

Transferring vocational competences acquired abroad (mobility in VET) (see Part III)
The Competence Matrix and in particular Competence Profiles developed on it can help training providers from different countries to communicate the competence profile of their own training offers, to understand the training offers in the partner country and to identify commonalities in qualifications. Thus, a Competence Matrix can support the recognition of competences a person in training has acquired during a training period abroad.

Transferring and recognising competences acquired within the official VET system as well as competences achieved through non-formal or informal learning
A Competence Matrix can also support the recognition of competences acquired in other learning contexts within a country.

Developing of qualifications or training programmes
A Competence Matrix can serve as the starting point for developing qualifications or training programmes and facilitates a demand-based and competence-oriented process for designing curricula. A Competence Matrix not only offers the possibility for describing competences acquired at the end of a training pro-

gramme (competence profile of a graduate) but also provides the description of the progress of the competence development for each competence area. A Competence Profile based on a Competence Matrix is therefore characterised by a 'logic of development' oriented design. Thus, it could be used as a basis for identifying modules and/or building blocks that could support the structuring of the curriculum or training plan.

Composing job profiles as well as personnel (human resources) planning
Since the descriptions of competences in a Competence Matrix are strongly work-task related, companies in the respective occupational field can quite easily understand these descriptions. They can use the matrix to identify existing job profiles in their companies or to map the Competence Profiles of their staff. Thus, they could monitor the matching of the job profiles with the Competence Profiles of their employees and this could help them, if needed, to identify required Competence Profiles for new employees.

Referencing qualifications to qualifications frameworks
Since a Competence Matrix facilitates the visibility of differences and similarities of qualifications (in terms of steps of competence development included or not included) it can be used to support the referencing or allocation of qualifications to levels of a qualifications framework. The descriptions in the Competence Matrix reflect professional competences in a comprehensive manner and in close relation to the working context. It is important to show how such competences can actually be applied in a working context. The allocation to levels, such as the EQF levels (European Qualifications Framework), therefore results from the holistic descriptions; an assignment of Competence Profiles to single dimensions of the EQF (knowledge, skills, competence) is not possible due to the holistic nature of the descriptions.

Enhancing permeability between VET and HE (see part IV)
The VQTS II project assumed that the VQTS approach can also be used for making visible the overlapping areas of the competence profiles of VET and HE qualifications and thus as an instrument for recognising prior learning in HE. However, the Competence Matrix' usefulness as an instrument for identifying equivalence between (parts) of VET and HE training programmes and for recognising learning outcomes from VET in HE, depends on the HE curricula. The Competence Matrix is easier to use and more likely to be used when HE programmes have a strong practice-oriented focus, follow a work-task orientation and are described in terms of learning outcomes or competences.

5. Examples

Competence Matrix 'mechatronics'

The Competence Matrix 'mechatronics' was developed in the Leonardo da Vinci project VQTS (cf. Luomi-Messerer & Markowitsch 2006). The project VQTS sought to develop a systematic procedure for comparing competences and qualifications and the transnational transfer of competences acquired abroad. The development of the Competence Matrix 'mechatronics' focused on the skilled-worker level and on initial VET (IVET).

The basic structure of this Competence Matrix was drafted in a workshop with experts from Germany and Austria (Arno Schmitt – Bosch Rexroth AG, DE; Johann Wiedlack – HTL St. Pölten, AT; Stefan Praschl – ibw, AT; Sabine Archan – ibw, AT; Mattias Becker – biat, DE; Karin Luomi-Messerer – 3s, AT). The Competence Matrix was further developed and finalised after the workshop by Matthias Becker and Johann Wiedlack.

Further information is available at the website: www.VocationalQualification.net.

Competence Matrix 'electronics/electrical engineering'

The Competence Matrix 'electronics/electrical engineering' was developed in the project VQTS II. The procedures and principles followed for preparing this Competence Matrix are described in sections 3 and 4. The focus for developing the Competence Matrix 'mechatronics' was on the skilled-worker level and on initial VET (IVET). Because one aim of the VQTS II project was to explore the use of the VQTS approach for making visible overlapping areas between VET and HE programmes, the scope of the Competence Matrix was extended so that Competence Profiles of VET programmes and also some parts of HE programmes could be identified. Some further explanations, reflections and considerations are described in the following paragraphs (cf. Becker 2009).

Development of the Competence Matrix 'electronics/electrical engineering'
The Competence Matrix was developed by evaluating work process studies and competence analyses in the occupational field electronics/electrical engineering. The available competence descriptions from the partner countries were also taken into account. These competence descriptions were mostly taken from different national curricula and job descriptions. Special care was taken that no country-specific curricular singularities became part of the Competence Matrix. This was done to avoid giving higher priority to a certain competence development determined by institutional and legal framework conditions in a spe-

cific qualifications system. Such descriptions would endanger the mutual acceptance of the Competence Matrix. The avoidance of country-specific singularities allowed developing Competence Profiles of training programmes from various countries. Additionally, experts from the occupational field were consulted for the evaluation of the descriptions. They checked the sector, domain, context and also the professional reference of the descriptions.

Secondary sources

The following secondary sources were analysed and used for the outline of the Competence Matrix:

- Information from the VQTS II partners about curricula, certificate supplements, job descriptions, available sector-related competence descriptions and approaches for national qualifications frameworks and particularly the outline for a Competence Matrix from Malta.
- Research results from the following projects:
  - pilot project business- and work process-oriented vocational training (GAB – www.gab.uni-bremen.de), especially research related to the electronics engineer.
  - Leonardo da Vinci project AMOR (Approach for the matching process of outcome-based curricula to the EQF in vocational education – www.amor-project.eu): The AMOR project developed the following procedure: in the first phase, the curricula of selected trainings programmes ('electronics engineer – field of electrical and building services engineering' in Germany and the training for electrician in Luxembourg) were analysed to collect information about possible 'working situations' that the graduates of the chosen training programmes usually master successfully. An 'activity-matrix' (a kind of qualification profile) was developed as a working basis for the next phase, namely the identification of learning outcomes. The identified learning outcomes were then referenced against the EQF levels.
  - Leonardo da Vinci project EUQuaSIT (European Qualification Strategies in Information and Communications Technology – www.euquasit.net).
  - Occupational field analyses by Falk Howe (cf. Howe 2004).
  - professional-scientific analyses of the fields of action of the electrician by Thomas Hägele (cf. Hägele 2002).
- Analysis of 'job descriptions' from the industry and the skilled crafts primarily from the English-speaking countries.
- Considerations for the competence measuring from a large-scale study at technical colleges in Hessen and Bremen, KOMET: Occupational competences and professional identity of trainees in the electrical trades.

Scope of the Competence Matrix 'electronics/electrical engineering'
As a starting point for determining the scope of the competence matrix, those professional classifications from ISCO-08 and the corresponding ISCED levels that reflect the professional work and VET and the transition to HE in electrical engineering/electronics were analysed and determined.

The breadth of the electrical and electronic applications and fields of application (building installation and automation; energy supply, processing and distribution; industrial production/automation engineering; household and consumer electronics; audio and video applications; event technology; process control; process supervision and visualization; microelectronics/computer technology; data transmission and communication technology; radio engineering; etc.) require certain compromises regarding the context in developing the Competence Matrix.

Due to the challenges resulting from the breadth of the field, the project partnership also discussed whether it would make sense to narrow the scope of the occupational field or to develop two matrices – one for electronics engineering and one for electrical or electro-technical engineering. However, this idea was rejected because work process analyses showed that the tasks are not separated that way in the world of work. On the other hand, some training programmes focus either on electronics or on electrical engineering. In order to address these issues, it was decided to refer to both fields in the descriptions, connecting them by using the phrase 'and/or'. Developing Competence Profiles requires specification of the relevance of both or only one of the fields.

The complexity of the sub-sectors is also taken into account by focussing on the core sectors (facility management, industrial plants, machines and propulsion systems, automation systems). Most 'electricians /electronics technicians' work in these core sectors while competence descriptions for tasks of specific sectors (such as medical engineering, radio engineering etc.) can be attained by the addition of suitable examples in the Competence Matrix.

The Competence Matrix 'electronics/electrical engineering' contains integral professional qualifications above the second ISCO-skill level and competences related to programmes above the ISCED level 2C. At the same time, this does not include competences on a level, which presuppose a completed (second or third) study cycle (EQF level 7 and 8); yet, parts of a first study cycle (EQF level 6) can be the object of the competence descriptions. Therefore, the Compe-

tence Matrix 'electronics/electrical engineering' describes competences on all levels of professional qualifications including the transition from the vocational training on a secondary level (initial vocational training) to the academic education (bachelor level).

When using the Competence Matrix, the equivalence between parts of VET programmes and parts of HE programmes ('overlapping areas') will be identified based on descriptions related to tasks and the working world. Therefore, the tasks described on the higher steps of competence development are more demanding and the competences expressed are also of a higher level. However, the Competence Matrix does not include academic tasks oriented towards research and development.

Difficulties encountered in developing the Competence Matrix 'electronics/ electrical engineering'

The greatest difficulties in denominating context- and task-related competences in the chosen sector were caused by:

a. the complexity of the sub-sectors; and
b. the variety of strictly work-related tasks in the area of the qualifications which presuppose a vocational training in comparison with the tasks worked upon in the HE sector.

Discussions with the VQTS II project partners reflected these problem areas. Different ideas on the breadth of the sector (or the sub-sectors to be included), the depth of task formulations (qualifications of skilled workers, technicians, engineers) and specific knowledge areas led to developing a Competence Matrix balanced between abstraction and specificity. Therefore, the Competence Matrix 'electronics/electrical engineering' results from the methods described as well as discussions between the project partners and expert workshops with representatives from enterprises.

A first draft of the Competence Matrix was developed by Mattias Becker (biat, DE) and discussed within the project partnership as well as with external experts from the partner countries. Based on these discussions, a second draft was developed and once more discussed and further elaborated within the project partnership. The Competence Matrix was then adapted and fine-tuned (for example by adding examples) in a small working group (Matthias Becker – biat, DE; Ronald Dol – KW1C, NL; Josef Radlbauer – HTBLuVA St. Pölten, AT; Karin Luomi-Messerer – 3s, AT). The project owes a special thanks to all colleagues who contributed to the development of the Competence Matrix and quite often even used their spare time for this exercise!

Competence Matrix "Mechatronics"

Competence area	Steps of competence development					
1. Maintaining and assuring the reliability of mechatronic systems	He/She can perform the basic scheduled maintenance on mechatronic machines and systems and adhere to the equipment maintenance plans.	He/She can master the maintenance procedures for mechatronic systems such as the use of service documents and maintenance plans and, if faced with new challenges, can make the necessary adaptations.	He/She can use preventive maintenance to assure the trouble-free operation of mechatronic systems. In addition, he/she can modify operational sequences to implement quality-assurance measures	He/She can develop the necessary procedures for maintenance of mechatronic devices and systems, and can schedule the maintenance and quality-assurance procedures.		
2. Installing and dismantling mechatronic systems and facilities	He/She can use written instructions to install and dismantle individual components (e.g., sensors, actuators, drives, motors, transport systems, racks) that form a functional group of mechatronic systems.	He/She can master the installation and dismantling of mechatronic systems that use several technologies (e.g., mechanics, hydraulics, pneumatics, electrical-mechanics, electronics), set up the connexion technology, and check the efficiency of the overall system.	He/She can provide independent mechatronic solutions for the construction of production lines, assure their overall ability to function, and, in addition, can use both existing and modified standard components.			
3. Installing and adjusting mechatronic components in systems and production lines	He/She is able to install and adjust standardized mechatronic components (e.g., individual electro-pneumatic valves, sensor and actuator units).	He/She can install and adjust components of mechatronic subsystems (e.g., linear drives, measuring systems, transport systems).	He/She can install and adjust complex mechatronic facilities that include diverse technologies and instrumentation and control (I&C) equipment, adjust the associated parameters, test the facilities overall functions, and assure their reliability			
4. Designing, adapting, and building mechatronic systems and facilities on the basis of client needs and site plans	He/She can use machine tools controlled either manually or via computer-program to fabricate (according to production designs and customer requirements) the individual components for mechatronic systems. He/she can provide simple designs and descriptions of mechatronic subsystems and can use basic CAD applications.	He/She can build simple mechatronic subsystems by using engineering drawing and can install the devices according to specific production needs. He/She can act on extensive knowledge of standards and regulations (e.g., on surface treatments) and is able to use CAD's more advanced functions (e.g., interference check).	He/She can build mechatronic systems by using both original construction techniques and previously designed parts. He/She fully understands CAD functions and can document system developments (e.g., parts lists, descriptions of function, operating instructions).	He/She can design and build autonomous mechatronic subsystems and, with suitable measuring and testing facilities, can assess the necessary production accuracy. He/She can document the results with quality-control systems.	He/She can make independent adaptations to the various devices (including selection of drives, sensors, PLC) and can use CNC programs for building the system. He/She can, through a digital mock up, assemble and simulate the functioning system and use computer-aided computations (e.g., FEM). He/She can perform cost-benefit analyses (e.g., as a basis for deciding whether components should be bought or individually constructed.)	He/She can independently develop complex mechatronic systems and can calculate the economic usefulness of the system. He/She can optimise CNC programs for the manufacturing of complex mechatronic devices and systems and monitor the automated quantity of an open loop control system.

5. Putting mechatronic systems into operation and providing clients with technical and economic support	He/She can, according to specifications and blueprints, put mechatronic devices into operation and provide support to the client in the hand-over phase.	He/She, after considering the enterprise's needs and basic conditions, can put the mechatronic systems into operation, create the necessary documentation, advise the customer on safe operations of the devices, and advise on future technology selection.	He/She, after considering all basic conditions, can master the start-up of interconnected mechatronic systems and machines, and can provide the necessary documentation including a manual. He/She can review client needs and configure machines that provide solutions. He/She can train the customer where necessary and provide support for safe operating procedures.	He/She can evaluate customer requirements for mechatronic facilities, develop solutions, and can plan the system's implementation and operation.	He/She can direct, including scheduling and time management, the start-up of the project from the creation of a proposal to the client's acceptance.
6. Supervising and evaluating both the process sequences of mechatronic systems and facilities and the operational sequence (including quality assurance)	He/She can supervise process sequences according to specifications as well as implement any requested quality-control measures.	He/She can independently supervise the process sequences, evaluate the results, operate an accompanying statistic process control (SPC) for the quality control plan, and prepare simple work schedules, including production schedule and time management.	He/She can operate and supervise mechatronic facilities, choose testing and monitoring plans, set up the accompanying SPC, seek the optimal results of the production line according to material-flow, and provide work schedules including standard production times.	He/She can master the monitoring of complex mechatronic systems using virtual instruments and PPS systems as well as open loop control for the optimisation of machinery arrangement, material flow analysis, and scheduling.	He/She can optimise the process cycles of mechatronic production lines, provide instructions on modifying the PPS systems (e.g., adjustment to SAP systems) and introduce quality systems for continuous improvement processes (CIP/KVP).
7. Installing, configuring, programming and testing hardware and software components for control and regulation of mechatronic systems and facilities	He/She is able to install and configure programs for hardware and software components as well as set up simple programmable logic control programs (PLC).	He/She can master the selection of hardware and software for mechatronic systems (e.g., sensors, actuators, interfaces, communication procedures) and can provide and test simple programmable logic control programs (PLC) according to production process requirements.	He/She can integrate and configure program-, control-, and regulation-mechanisms in mechatronic systems, program simple devices (in co-operation with developers), and simulate the program sequence before start-up.	He/She can develop, test, and configure hardware and software solutions for networked mechatronic systems; and can monitor system conditions with suitable measuring and visualisation tools.	
8. Preparing and distributing the technical information for adjustment of each enterprise's mechatronic systems	He/She can provide descriptions and designs of mechatronic subsystems and is familiar with the basic CAD applications.	He/She can fully understand the management of technical information documents for mechatronic systems and can prepare and adapt these documents according to an enterprise's specific operating requirements.	He/She is able to analyse complex operational sequences separately in order to understand the connections and draw up maintenance and production procedures. He/She can understand that the system parameters are important for the equipments' functions and can independently assess and document the wear and general conditions of the mechatronic equipment.		
9. Diagnosing and repairing malfunctions with mechatronic systems and facilities, advising clients on avoiding malfunctions, and modifying and expanding mechatronic systems	He/She can diagnose and repair errors and malfunctions on the simple components and devices in the mechatronic systems. He/She can use the necessary checking, measuring, and diagnostic tools.	He/She can independently correct problems in mechatronic production equipment with the help of (computer-aided) diagnostic systems and the use of expert systems, databases, and error documentations.	He/She can diagnose and repair errors and disturbances in complex mechatronic equipment and is able to advise clients on how to avoid sources of malfunctions through changes or upgrades in the equipment and system.	He/She can develop, through analyses of malfunctions in the mechatronic equipment, a monitoring and diagnostic system	

Competence Matrix "Electronics/Electrical Engineering"

Competence areas (core work tasks)	Steps of competence development			
1. Preparing, planning, mounting and installing electrical and/or electronic systems for buildings and industrial applications	He/She can prepare and carry out simple electrical and/or electronic installations (e.g., cables, electrical outlets, connection and distribution systems, modular electronic components, computer components) as well as carry out and check the necessary wirings and mountings.	He/She can plan, prepare and connect electrical and modular electronic installations (e.g., energy supply in private and business premises, incl. lighting; alternating and three-phase current; electronic systems as units, wireless LAN, multimedia systems). He/She can advice the costumer and select the best implementation according to customer specifications.	He/She can plan complex electrical and/or electronically networked installations (e.g., systems of energy distribution, building management systems / KNX, regulation and monitoring systems, building access systems, RFID-systems) and fully wire them. He/She can configure, service and diagnose the functionality of the installation according to customer requirements and for this purpose can use computer-assisted tools.	
2. Inspecting, maintaining and servicing electrical and/or electronic systems and machinery	He/She can carry out basic and scheduled maintenance tasks, inspections and checks at electrical and/or electronic equipment according to maintenance schedules and predefined instructions (e.g., checking voltage tolerances, changing wearing parts in industrial plants, switching and control systems, electrical machinery, computer systems). He/She can use the measuring and testing tools necessary for it.	He/She can carry out and document preventative maintenance and alignment tasks at electrical and/or electronic industrial appliances and systems according to established quality assurance methods (e.g., continuous monitoring of a CNC machine tool)	He/She can analyse and determine availability and condition of electrical and/or electronic systems. He/She can analyse influencing factors on reliability and performance of electrical and/or electronic systems and find causes of malfunctions (e.g., leakage current analysis, power factor correction, EMC analysis).	He/She can develop and document maintenance and inspection methods for electrical/electronic systems based on production and service process analysis as well as on quality management and customer requirements. He/She is able to develop related maintenance, inspection and quality assurance plans (e.g., optimizing MTBF of a production line, planning reserve power supply).
3. Setting up, putting into operation and adjusting electrical and/or electronic systems	He/She can set up, adjust and put into operation electrical and/or electronic systems (e.g., allocating frequency channels for a TV set, basic settings of a frequency converter or a thermo relay for a motor) following customer requirements and instructions from the technical documentation.	He/She can obtain and set system test parameters for setting up and operating electrical and/or electronic systems and select and carry out test procedures for installation and adjustment (e.g., adjusting interfaces in multimedia system, sensitivity setting of alarm equipment, elevator control unit).	He/She can select, set up and adjust electrical and/or electronic systems and their control including accompanying sensors and actuators according to requirement analysis (e.g., energy supply systems, drive systems, electrical machinery, radio relay systems).	
4. Designing, modifying and adapting wirings and circuit boards for electrical and/or electronic systems including their interfaces	He/She can modify, plan and build up simple electrical and/or electronic circuits according to standards and guidelines (e.g., wiring for rooms, connection diagram of basic motor circuits, simple operational amplifier applications, small programmable control units).	He/She can modify, plan and build up standard electrical and/or electronic appliances according to customer requirements and official regulations (e.g., fire-warning devices, layouts for electrical/electronic wirings with the help of CAD programmes, energy supply in private and business premises).	He/She can design, build up and improve electrical and/or electronic applications and its interfaces together with experts working in interdisciplinary teams according to EMC standards and confirming tests (e.g., electronic control circuits and equipment, microcontroller applications, PLC and related software).	He/She can design, build up and configure devices, facilities and units for process control systems including related programming and considering complex system requirements (e.g., controlled drive systems, process monitoring, automated production line, real time microcontroller applications for car control, GSM data transmission for monitoring and remote control).

5. Developing custom designed electrical and/or electronic projects	He/She can develop and propose solutions for simple electrical and/or electronic system based on customer requirements (e.g., lighting installations, power supply unit, basic automation and control systems).	He/She can design electrical and/or electronic systems (e.g., PLC program for industrial applications, microcontroller application, ensuring expansion capability) and provide the necessary documentation (operational, maintenance, safety instructions, function, integration and acceptance tests).	He/She can develop technical solutions for electrical and/or electronic systems and applications (e.g., microcontroller board for heating and air condition, RFID access system, new production line) and provide appropriate documentation and customer training.	
6. Supervising and supporting work and business processes including quality management	He/She can check process steps in the production with suitable process tools (e.g., PPS, ERP, MRP) and carry out quality controls.	He/She can evaluate results of the process monitoring with software tools and determine quality assurance actions (work, production and time schedules).	He/She can develop controlling methods in the production (e.g. PPS, MRP, ERP) and process planning/control and supervision (e.g. CAP) and implement these with the help of software supported systems.	
7. Installing, configuring modifying and testing of application software for setting up and operating electrical and/or electronic systems	He/She can install programmes for hardware and software environments and carry out simple configuration tasks as well as updates (e.g., starter software, graphical programming for measurement and automation).	He/She can select hardware and software for production systems following the business requirements and test programmes.	He/She can integrate hardware and software into existing system environments and use simulation and diagnostic programs (e.g. implement and adapt a driver for a CAD/CAM interface).	He/She can combine hardware and software to networked system environments and carry out network specific checks of all signals and adapt by means of software (e.g., OPC-Server, process control system).
8. Diagnosing and repairing of electrical/electronic systems and equipment	He/She can carry out standardized test procedures and diagnostic methods using wiring diagrams and test tools and carry out simple repairs at electrical and/ or electronic systems (e.g., power measurement, level measurement).	He/She can use testing and diagnostic tools as well as expert systems for the fault diagnosis at electrical and/or electronic systems up to the component level and carry out the necessary repairs (e.g., software control test, spectrum analyzer).	He/She can select and use diagnostic methods for complex electrical and/ or electronic systems and carry out preventative measures for the avoidance of disturbances and malfunctions in arrangement with customers (e.g., detection of bit error rate, over-voltage protection analyse).	He/She can carry out system analyses (e.g., FMEA, FTA) of electrical and/or /electronic systems, determine error types and develop suitable diagnosis and repair methods including preventative measures.

Acronyms

CAD: Computer Aided Design
CAP: Computer Aided Planning
CAM: Computer Aided Manufacturing
CNC: Computer Numeric Control
EMC: Electro Magnetic Compatibility
ERP: Enterprise Resource Planning
FMEA: Failure Mode and Effect Analysis
FTA: Failure Tree Analysis
GSM: Global System for Mobile Communications
MRP: Machine Resource Planning
MTBF: Mean Time Between Failures
OPC: Object Linking Embedding for Process Control
KNX: Konnex is the most established standard for home and building electronic systems. The Konnex technology is based on the well-tried EIB-System (European Installation bus - EIB)
LAN: Local Area Network
PLC: Programmable Logic Control
PPS: Production Planning System
RFID: Radio Frequency Identification

6. Checklist for developing a Competence Matrix

1. Scope of the Competence Matrix

Is the scope of the Competence Matrix clear in terms of

- the sector,
- the occupational field,
- the professional profiles to be included and the segments of the qualifications system it should be useful for?

2. Competence areas, core work tasks

- Are the relevant competence areas and steps of competence development included in the Competence Matrix?
- Are the competence areas consistently formulated in relation to the work process, are they always aligned with the core work tasks within the context of the occupational field (instead of using subjects from the curriculum for structuring the Competence Matrix)?
- Have the core work tasks been empirically derived?
- Is the delimitation between competence areas clearly based on the respective work processes/core work tasks within the context of the occupational field?

3. Description of competences in relation to the work context on various stages of the competence development process

- Are complete sentences used (for example, 'He/She can carry out standardized test procedures and diagnostic methods using wiring diagrams and test tools and carry out simple repairs at electrical and/or electronic systems [for example, power measurement, level measurement].')?
- Is the detail and precision ('granularity') of the descriptions adequate?
- Do the descriptions of the steps of competence development show a clear progression on horizontal level?
- Are the differences between the steps of competence development related to each competence area sufficiently expressed (for example, by referring to dimensions like the degree of independence, the assessment of the complexity of a task or the dynamics of a situation)?
- Is the scope of the single steps of the competence development too broad or too narrow?

- Are the competences consistently formulated in relation to the work process and always align with the core work tasks within the context of the occupational field?
- Are analytical formulations of competences that cannot be identified in the work context avoided?
- Can holistic professional competences be depicted in the descriptions of the steps of competence development and not only isolated job task descriptions?
- Do the descriptions sufficiently include work-related categories as context characteristics, for example, objects (contents or processes), tools, methods, organisations or requirements of skilled work?
- Do the descriptions sufficiently include examples that provide necessary information to characterise the work context (level of demand of a work task) and the different competence levels (to fulfil these work task)?
- Does the Competence Matrix fit on one (maximum two) page(s)?

4. Methods and resources for developing a Competence Matrix

- Have appropriate resources been used for identifying core work tasks?
- Have the relevant experts been included?

5. Application of the Competence Matrix

Particular issues for determining if the Competence Matrix is a feasible instrument for enhancing transparency:

- The transfer of vocational competences acquired abroad (mobility in VET):
  - Are training institutes able to form Competence Profiles of training programmes, i.e. are training institutions able to identify the competences of their students or graduates?
  - Are training institutes in different countries able to identify common and different parts of their training programmes?
  - Are training institutes able to identify the competence development that should be in the focus of the mobility period?

- The transfer and recognition of competences acquired within the official VET system as well as competences achieved through non-formal or informal learning:
  - Does it support the recognition of competences acquired achieved in other learning contexts on national level?

- Developing qualifications:
  - Can it be used as basis for identifying modules and or building blocks that could support the structuring of the curriculum or training plan?

- Composing job profiles as well as personnel (human resources) planning;
  - Can it be used for identifying job profiles in companies, for mapping the Competence Profiles of staff with these profiles or for deciding on Competence Profiles of new employees?

- Referencing qualifications to qualifications frameworks:
  - Do the work-related descriptions in the draft Competence Matrix facilitate the matching of Competence Profiles with an EQF or NQF level?

- Enhancing permeability between VET and HE:
  - Is it possible for VET and HE providers to identify equivalence between (parts) of VET and HE training programmes?
  - Is it possible for HE providers to recognise learning outcomes from VET in HE?
  - Can the Competence Matrix be used as a starting point for establishing new partnerships between VET and HE providers? (For example, for a joint definition of Competence Profiles for the admission into training programmes/courses at HE, for tuning or adapting training programmes/curricula in VET and HE to be more compatible, for coming to an agreement about the possibility of giving credits for already acquired learning outcomes that will count towards an HE award.)

Part II: Competence Profiles and Competence Profile Certificates (including Credit Points)

1. Introduction

With the aid of a Competence Matrix a Competence Profile can depict the stages of competence development to be achieved in a training programme or the stages already achieved by a person at a particular time.[3]

This part seeks to describe how the Competence Matrix can be used to develop Competence Profiles of training programmes (qualifications) or of a person in training. The instructions for forming Competence Profiles include a general introduction to this topic as well as information on how the Competence Matrix should be interpreted for this purpose. In addition, this section will present the procedure for allocating credit points and for issuing a Competence Profile Certificate.

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3 This chapter focuses on developing Competence Profiles for transnational mobility projects. When using the Competence Matrix for other purposes, the approach will have to be adopted accordingly.

2. Instructions for forming Competence Profiles

2.1 General approach

Competence Profiles are formed from particular parts of a Competence Matrix. They generally only cover a limited spectrum of the competences described in the Competence Matrix. They are developed by identifying competences 'included' in a specific training programme or qualification (Organisational Profile) or reflecting the competences acquired so far by a person in training (Individual Profile).

Organisational Profiles
An Organisational Profile reflects the range and extent of competence development offered by a specific training programme or specific qualifications in a Competence Matrix's occupational field. Organisational Profiles are formed by indicating the 'relevant' competences of the specific training programme or qualification on the Competence Matrix. 'Relevant' in this case means that learners (participants of the particular training programme) are prepared for working in the respective competence areas and are developing competences as described in the respective steps of competence development.

Competence Profiles must reflect the specific context of a training programme. The Competence Profiles developed by using a specific Competence Matrix can only refer to the competences described in the Matrix. Since training programmes might also include additional vocational competences or competences outside the vocational field as described by the Competence Matrix, one should include this further information as an addition to the Competence Profile. This information will be included in the Competence Profile Certificate (see section 4.).

Organisational Profiles are usually developed by the authorities responsible for a training programme or qualification. Those involved in this exercise should have a very good knowledge about the curriculum or training plan as well as about the core work tasks expected of a graduate of the respective training programme. Therefore, one should include people involved in the training process (for example, representatives from training providers, such as teaching and training personnel or people with similar functions), representatives from the working world, graduates or persons in training.

In order to identify the Organisational Profile, the following procedure is suggested (for further information see section 2.2):

1. Begin with reading the descriptions of the entire Competence Matrix.
2. Compare the descriptions in the Competence Matrix with the curriculum or training plan and the competences acquired during the training programme.
3. Identify the relevant competence areas.
4. Identify the relevant steps of competence development.
5. Check again the curriculum or training plan as to whether all relevant parts are reflected in the competence areas and step of competence development already identified.
6. Write down those parts or subject areas included in the curriculum or training plan but that lie outside the main vocational profile focus or that refer to additional vocational competences developed during the training programme but not covered by the Competence Matrix. This information will be relevant for the Competence Profile Certificate (see section 4).
7. Write down further information regarding differences between the descriptions in the Competence Matrix and the curriculum or training plan (for example, in some cases only parts of the description of a step of competence might be relevant for the training programme). Again, this information will be relevant for the Competence Profile Certificate (see section 4).
8. Review the result together with other people involved in the training process; for example, teaching and training personnel or people with similar functions, representatives of enterprises where graduates of the training programme are working, persons in training or graduates.
9. If necessary, revise the result based on their feedback.
10. Finalise the Organisational Profile (for example, by colouring the relevant fields in the Competence Matrix in grey).

Challenges
Developing Competence Profiles requires an interpretation against the background of the specific training and work context. The crucial question for this exercise is how well a curriculum or training plan can be mapped on the Competence Matrix. Since the competences described in the Competence Matrix are strongly linked to the work process and are not explicitly related to certain subjects of a curriculum or a training plan, the mapping process will be easier in those cases where the curriculum or training plan is developed and described in a competence-based or learning-outcomes-based man-

ner. Probably more difficult to map on the Competence Matrix will be the curricula or training plans that are more or less described with references to 'input aspects' (such as teaching objectives, learning content, duration) and with lists of teaching subjects. Therefore, greater effort will be needed for 'translating' them into the descriptions of the Competence Matrix. For example, the following question will have to be asked for each teaching subject: To which step(s) of competence development is the teaching subject related to?

The learning-outcomes-oriented approach is quite new for many countries and requires a paradigm shift by all stakeholders concerned. Since no uniform methodology exists to describe learning outcomes, the descriptions of qualifications based on learning outcomes or competences can also differ quite extensively from the approach used in the Competence Matrix. Furthermore, the representation of competence development might not be clearly expressed. Therefore, these qualifications will also need to be 'translated' into the descriptions of the Competence Matrix.

However, it should be possible to develop Competence Profiles in each case: Also training programmes with curricula or training plans focusing on input-related descriptions are aiming at preparing their students for dealing with the specific tasks in the occupational field and therefore at developing the required competences.

Finally, it has to be stated that mapping a curriculum or training plan on a Competence Matrix is not an 'exact science'. This exercise is not about identifying full congruence but as much equivalence as possible.

Individual Profiles

By using an Organisational Profile one can make visible the competences acquired so far by a person in training.

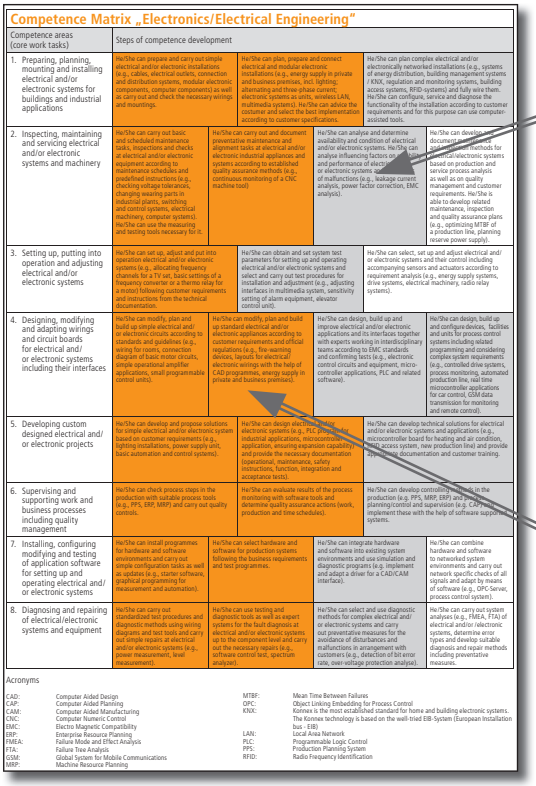
The training provider develops individual profiles. Those people should be involved who are well informed about the competence development process during the training programme (teaching and training personnel or people with similar functions and the person in training).

In principle, an Individual Profile can be developed at any time during the training. It might be easier to do it, though, at the end of terms (particularly in those

cases where examinations to evaluate the stage of competence development [only] take place at certain stages during the training programme).

In order to identify an Individual Profile, the following procedure is suggested

1. Begin by reading the descriptions covered by the entire Organisational Profile.
2. Compare the part of the curriculum or training plan the person in training has already gone through with the competence descriptions in the Organisational Profile.
3. Check which stage of competence development the person in training has reached so far by identifying the relevant competence areas and steps of competence development.
4. In case the competence development is not yet complete for a certain step (for example, the respective person in training is in the middle of a step of competence development), write down which competences are still missing or must still be acquired. This information will be relevant for the Competence Profile Certificate (see section 4).
5. Check the respective part of the curriculum or training plan to see whether all relevant parts are reflected in the competence areas and steps of competence development.
6. Write down those parts or subject areas included in the curriculum or training plan but that lie outside the main vocational profile focus or that refer to additional vocational competences developed during training and that the person in training has already gone through. This information will be relevant for the Competence Profile Certificate (see section 4).
11. Review the result together with other people who are well informed about the competence development process during the training programme (teaching and training personnel or people with similar functions as the training provider and the person in training).
12. If necessary, revise the result based on their feedback.
13. Finalise the Individual Profile and indicate the already acquired competences of the person in training on the table that also displays the Organisational Profile of the training programme or qualification (for example, by colouring the relevant fields in the Competence Matrix in orange).



Competence Matrix „Electronics/Electrical Engineering"

Competence areas (core work tasks)	Steps of competence development			
1. Preparing, planning, mounting and installing electrical and/or electronic systems for buildings and industrial applications	He/She can prepare and carry out simple electrical and/or electronic installations (e.g., cables, electrical outlets, connection and distribution systems, modular electronic components, computer components) as well as carry out and check the necessary wirings and mountings.	He/She can plan, prepare and connect electrical and modular electronic installations (e.g., energy supply in private and business premises, incl. lighting; alternating and three-phase current; electronic systems as units, wireless LAN, multimedia systems). He/She can advice the costumer and select the best implementation according to customer specifications.	He/She can plan complex electrical and/or electronically networked installations (e.g., systems of energy distribution, building management systems / KNX, regulation and monitoring systems, building access systems, RFID-systems) and fully wire them. He/She can configure, service and diagnose the functionality of the installation according to customer requirements and for this purpose can use computer-assisted tools.	
2. Inspecting, maintaining and servicing electrical and/or electronic systems and machinery	He/She can carry out basic and scheduled maintenance tasks, inspections and checks at electrical and/or electronic equipment according to maintenance schedules and predefined instructions (e.g., checking voltage tolerances, changing wearing parts in industrial plants, switching and control systems, electrical machinery, computer systems). He/She can use the measuring and testing tools necessary for it.	He/She can carry out and document preventative maintenance and alignment tasks at electrical and/or electronic industrial appliances and systems according to established quality assurance methods (e.g., continuous monitoring of a CNC machine tool)	He/She can analyse and determine availability and condition of electrical and/or electronic systems. He/She can analyse influencing factors on [illegible] and performance of electrical or electronic systems and [illegible] of malfunctions (e.g., leakage current analysis, power factor correction, EMC analysis).	He/She can develop and document maintenance and alignment methods for electrical/electronic systems based on production and service process analysis as well as on quality management and customer requirements. He/She is able to develop related maintenance, inspection and quality assurance plans (e.g., optimizing MTBF of a production line, planning reserve power supply).
3. Setting up, putting into operation and adjusting electrical and/or electronic systems	He/She can set up, adjust and put into operation electrical and/or electronic systems (e.g., allocating frequency channels for a TV set, basic settings of a frequency converter or a thermo relay for a motor) following customer requirements and instructions from the technical documentation.	He/She can obtain and set system test parameters for setting up and operating electrical and/or electronic systems and select and carry out test procedures for installation and adjustment (e.g., adjusting interfaces in multimedia system, sensitivity setting of alarm equipment, elevator control unit).	He/She can select, set up and adjust electrical and/or electronic systems and their control including accompanying sensors and actuators according to requirement analysis (e.g., energy supply systems, drive systems, electrical machinery, radio relay systems).	
4. Designing, modifying and adapting wirings and circuit boards for electrical and/or electronic systems including their interfaces	He/She can modify, plan and build up simple electrical and/or electronic circuits according to standards and guidelines (e.g., wiring for rooms, connection diagram of basic motor circuits, simple operational amplifier applications, small programmable control units).	He/She can modify, plan and build up standard electrical and/or electronic appliances according to customer requirements and official regulations (e.g., fire-warning devices, layouts for electrical/electronic wirings with the help of CAD programmes, energy supply in private and business premises).	He/She can design, build up and improve electrical and/or electronic applications and its interfaces together with experts working in interdisciplinary teams according to EMC standards and confirming tests (e.g., electronic control circuits and equipment, micro-controller applications, PLC and related software).	He/She can design, build up and configure devices, facilities and units for process control systems including related programming and considering complex system requirements (e.g., controlled drive systems, process monitoring, automated production line, real-time microcontroller applications for car control, GSM data transmission for monitoring and remote control).
5. Developing custom designed electrical and/or electronic projects	He/She can develop and propose solutions for simple electrical and/or electronic system based on customer requirements (e.g., lighting installations, power supply unit, basic automation and control systems).	He/She can design electrical and/or electronic systems (e.g., PLC programming industrial applications, microcontroller application, ensuring expansion capability) and provide the necessary documentation (operational, maintenance, safety instructions, function, integration and acceptance tests).		He/She can develop technical solutions for electrical and/or electronic systems and applications (e.g., microcontroller board for heating and air condition, door access system, new production line) and provide [illegible] documentation and customer training.
6. Supervising and supporting work and business processes including quality management	He/She can check process steps in the production with suitable process tools (e.g., PPS, ERP, MRP) and carry out quality controls.	He/She can evaluate results of the process monitoring with software tools and determine quality assurance actions (work, production and time schedules).		He/She can develop controlling methods in the production (e.g. PPS, MRP, ERP) and [illegible] planning/control and supervision (e.g. CAP) and implement these with the help of software supported systems.
7. Installing, configuring modifying and testing of application software for setting up and operating electrical and/or electronic systems	He/She can install programmes for hardware and software environments and carry out simple configuration tasks as well as updates (e.g., starter software, graphical programming for measurement and automation).	He/She can select hardware and software for production systems following the business requirements and test programmes.	He/She can integrate hardware and software into existing system environments and use simulation and diagnostic programs (e.g., implement and adapt a driver for a CAD/CAM interface).	He/She can combine hardware and software to networked system environments and carry out network specific checks of all signals and adapt by means of software (e.g., OPC-Server, process control system).
8. Diagnosing and repairing of electrical/electronic systems and equipment	He/She can carry out standardized test procedures and diagnostic methods using wiring diagrams and test tools and carry out simple repairs at electrical and/or electronic systems (e.g., power measurement, level measurement).	He/She can use testing and diagnostic tools as well as expert systems for the fault diagnosis at electrical and/or electronic systems up to the component level and carry out the necessary repairs (e.g., software control test, spectrum analyzer).	He/She can select and use diagnostic methods for complex electrical and/or electronic systems and carry out preventative measures for the avoidance of disturbances and malfunctions in arrangement with customers (e.g., detection of bit error rate, own-voltage protection analyse).	He/She can carry out system analyses (e.g., FMEA, FTA) of electrical and/or /electronic systems, determine error types and develop suitable diagnosis and repair methods including preventative measures.

Acronyms

CAD:	Computer Aided Design	MTBF:	Mean Time Between Failures
CAP:	Computer Aided Planning	OPC:	Object Linking Embedding for Process Control
CAM:	Computer Aided Manufacturing	KNX:	Konnex is the most established standard for home and building electronic systems. The Konnex technology is based on the well-tried EIB-System (European Installation bus - EIB)
CNC:	Computer Numeric Control		
EMC:	Electro Magnetic Compatibility		
ERP:	Enterprise Resource Planning	LAN:	Local Area Network
FMEA:	Failure Mode and Effect Analysis	PLC:	Programmable Logic Control
FTA:	Failure Trea Analysis	PPS:	Production Planning System
GSM:	Global System for Mobile Communications	RFID:	Radio Frequency Identification
MRP:	Machine Resource Planning		

Organisational Profile (grey and orange)

Individual Profile (orange)

2.2 Some further information on reading and interpreting a Competence Matrix

Comprehensive reading of the Competence Matrix

As mentioned previously, one should always start with comprehensively reading the Competence Matrix before identifying the relevant competence areas or steps of competence development. In particular, the title of a competence area should not be seen on its own nor should one only make conclusions based on single key words. One should look at the descriptions related to the entire core work tasks.

Role of examples

Because the descriptions of a Competence Matrix should fit on one or, at most, two pages, the competences cannot be described in too much detail. Nor can they be described too generally in order to remain comprehensible for users. For this reason, not every specific detail of the work-related competences in the respective occupational field can be considered. Consequently, some might get the

impression that some competences may have been described too succinctly. As a result, the examples used in the descriptions have a very important role when forming Competence Profiles by interpreting the Competence Matrix. Examples can illustrate the level of demand of certain work tasks and consequently the level of competence development. In order to avoid 'overloading' a Competence Matrix, only a limited number of examples can be described. However, the examples provide the basis for 'analogies'. Experts from the particular field will be able to identify further examples that express a similar level of demand or of competence development.

Higher steps of competence development build on previous development processes
When interpreting a Competence Matrix, one should consider that the descriptions of a higher step of competence development always must be seen together with the previous step(s) or with competence development in other competence areas. In order to reduce the volume of the descriptions in a Competence Matrix, the descriptions of the previous step(s) or any other competences developed before are not repeated on the higher step(s). But the higher step(s) has (have) to be understood as also including the competences described on the lower step(s). Consequently, the competence development process cannot be seen as an arbitrary combination of steps. Each step is based on the previous one(s) and the competence development process in this and also other competence areas. Therefore, Competence Profiles are not supposed to show empty spaces (cells) between already reached steps of competence development (for example, if a Competence Profile indicates that in a certain competence area the third step has been reached, than steps one and two or at least relevant competence development processes from other competence areas must automatically be included).

Interrelation between competence areas
Whereas the steps of competence development are presented in the order of their necessary development, the sequence of competence areas displayed does not indicate the competence acquisition process. Depending on the core work tasks, different competence areas might be related to each other so that a certain step of competence development in one competence area might be a precondition for a step up in another competence area. However, these dependencies are not shown in the Competence Matrix.

Aspects of legitimacy, entitlements or legal regulations are not reflected
Although the descriptions reflect higher autonomy and responsibility on the higher steps of competence development, they do not include aspects of legal

regulatory legitimacy. Such regulations and entitlements depend greatly on national regulations. They might be expressed in the qualification profile and are quite often very important to understanding, in the national context, the training programme or the entitlements of its graduates. Relevant information related to a specific training programme should therefore be included in the Competence Profile Certificate (see section 4).

Competence Profiles of HE study programmes
The Competence Matrix 'electronics/electrical engineering' has a broader scope than the one developed for 'mechatronics' because some steps of the competence development relevant for HE programmes are included. But it does not reflect all competence areas or steps of competence development relevant for a HE programme. Thus, it is not possible to map a complete Organisational Profile of a HE programme on the Competence Matrix. However, the Competence Matrix can be used for making visible some parts of Organisational Profiles of HE programmes and for identifying overlapping areas between Organisational Profiles of VET programmes and HE programmes (for further information see Part IV).

3. Credit Points

3.1 ECVET points[4]

In the context of the European Credit System for Vocational Education and Training (ECVET), points are used to complete the description of qualifications and units. 'ECVET points' are defined as 'a numerical representation of the overall weight of learning outcomes in a qualification and of the relative weight of units in relation to the qualification' (European Commission 2009, Annex 1).

ECVET points are allocated to a qualification based on the following convention: 60 points are allocated to the learning outcomes expected to be achieved in a year of formal, full-time VET. From the total amount of ECVET points allocated to a qualification, each unit is allocated a certain amount of ECVET points based on its relative weight within the qualification. Different approaches can be used for establishing the weight of a unit.

4 For further information on ECVET see: http://ec.europa.eu/education/policies/educ/ecvet/index_en.html.

3.2 Credit Points – VQTS model

The VQTS model also uses credit points as quantitative measurements of specific parts of a training programme or qualification. These quantitative elements are understood as additional information, but should not be viewed independently of competence descriptions!

In accordance with the ECVET recommendation, within one year of typical training (formal full-time VET programme or 'main tracks' of training) a maximum of 60 credit points can be achieved (specialised programmes – for example, extended programmes for people with special needs – must be quantified specifically). This means that in a three-year training programme, a maximum amount of 180 credit points can be issued, 240 for a four-year programme, etc.

The following main differences between ECVET credit points and the approach used in the VQTS model can be identified:

Units
The VQTS model does not use the term 'unit'. However, the 'steps of competence development' can be seen as 'units of description' – to describe competence development and to characterize differences between steps within a competence area. They express the observable threshold in the competence development and are imbedded in a comprehensive concept. However, an arbitrary combination of the steps of competence development – in the sense of individual building blocks – is not possible! As mentioned previously, a higher step always has to be seen together with the previous step(s).

Allocation of credit points (Organisational Profile)
In the VQTS model, credit points reflect the duration of the competence development. They are based on the 'learner's workload' (1 credit point equals about 30 hours of learner's workload) required to achieve the objectives of a programme (specified in competences to be acquired). This refers to the notional time an average person in training might be expected to need to acquire the respective competences corresponding to a training programme or qualification. This 'learner's workload' includes all learning activities relevant for the acquisition of competences (for example, directed study such as attending lectures or seminars, practical work, information retrieval, independent study, home work, preparation for and the taking of examinations, etc.).

The total amount of credit points for a training programme is divided according to the average time a person in training needs to acquire competences or to reach a step of competence development. The time necessary to reach a step of competence development (the duration of the competence acquisition) can be different within the steps of a competence area as well as between competence areas. Therefore, credit points present the individual 'value' of a certain step of competence development within the Competence Profile of a training programme or qualification (Organisational Profile).

To determine credit points, one could allot a syllabus or class schedule of a curriculum or training plan to the Organisational Profile and use the notional time a person in training spends on individual units (such as seminars, lectures, practical training in workshops or companies) to calculate the distribution percentages. Translating a curriculum into an Organisational Profile or mapping of subjects and work tasks is not an easy exercise and, again, not an exact science. The amount of credit points for each competence area and step of competence development should be estimated as thoroughly as possible and should be based on available evidence. The decision should also be based on discussions with those people well informed about the competence development process during the training programme (in particular, teaching and training personnel or people with similar functions at the training provider and persons in training).

Awarding of credit points (Individual Profile)
Credit points will be awarded to the individual learner based on the competences developed or step(s) of competence development reached. As a matter of principle, the credit points allocated to the steps of competence development included in the Individual Profile is concordant with the credit points allocated to the respective steps of competence development of the Organisational Profile. This means, for example, that if 10 credit points are allocated to a step of competence development in an Organisational Profile, then 10 credit points will also be allocated to this step of competence development when included in an Individual Profile. Furthermore, the Individual Profile of 'talented learners', who might need less time to reach this step of competence development, will show the same number of credit points as defined by the Organisational Profile. Consequently, competence development from informal learning over a longer period of time, but recognised by the authorities responsible for a training programme or qualification, can be awarded only the credit points allocated to the respective step(s) of competence development included in the Organisational Profile. This principle for awarding credit points when using the VQTS model

shows that the number of credit points only makes sense in the context of a specific training programme or qualification.

4. Competence Profile Certificate (CPC)

A Competence Profile Certificate can be issued for a training programme as well as for a person in training.

Competence Profile Certificate - Organisational Profile

The Competence Profile Certificate for a training programme requires the development of an Organisational Profile and the allocation of credit points. It includes the following information:

1. General information:
   - title of the training provider/programme;
   - duration of the training;
   - EQF level;
   - name of the person responsible for issuing the CPC;
   - date it was issued.

2. Organisational Profile
It indicates the relevant competence areas and steps of competence development for the training programme and the corresponding credit points.

3. Additional information:
Many training programmes include not only vocational competences, but also other kinds of competences that are not directly relevant to the vocational profile. The Competence Profile Certificate includes an area specifically for recording additional competences outside the vocational profile: If necessary, data on additional competences (or subject areas) that are completed within the framework of the training programme, but which are not part of the vocational profile can be added as well as the corresponding credit points. These credit points can then be calculated into the final total.

4. Further remarks:
If necessary, further remarks regarding differences between the descriptions in the Organisational Profile and the curriculum or training plan can be included

(for example, in some cases only parts of the descriptions of a step of competence development might be relevant for the training programme).

Competence Profile Certificate - Individual Profile

The Competence Profile Certificate for a person in training requires the development of an Organisational Profile and – based on this – an Individual Profile and the allocation of credit points. It includes the following information:

1. General information:
   - title of the training provider/programme;
   - duration of the training;
   - personal data of the person in training;
   - name of the person responsible for issuing the CPC;
   - date it was issued.

2. Organisational Profile and Individual Profile
It indicates the relevant competence areas and steps of competence development for the training programme and respectively the stage of competence development that the person in training has reached so far and the corresponding credit points.

3. Additional information:
If necessary, data on additional competences (or subject areas) that are completed within the framework of the training programme by the person in training, but which are not part of the vocational profile can be added as well as the corresponding credit points. These credit points can then be calculated into the final total.

4. Further remarks:
If necessary, further remarks regarding differences between the descriptions in the Organisational Profile and the curriculum or training plan can be included (for example, in some cases only parts of the descriptions of a step of competence development might be relevant for the training programme). Furthermore, if the competence development has not yet been completed for a certain area or step, and the respective credit points have not yet been awarded for this step, one should note which competences are still missing or must still be acquired. Information about additional competences developed by the person in training could also be added.

Competence Profile Certificate (CPC)

Training Provider:

Training Programme:

Duration of the training:

EQF level:

Responsible person for issuing the CPC:

Person in training:

Date:

www.VocationalQualification.net

Competence Areas (core work tasks)	Steps of competence development Credit Points				Credit Points Org. Profile	Credit Points Individ. Profile
1. Preparing, planning, mounting and installing …	5	5	10		20	10
2. Inspecting, maintaining and servicing…	5	5	5		15	10
3. Setting up, putting into operation…	10	10			20	10
4. Designing, modifying and adapting…	5	5	10	10	30	10
5. Developing custom designed…	10	10	15		35	20
6. Supervising and supporting work…	5	10	10		25	15
7. Installing, configuring, modifying…	10	15	25		50	25
8. Diagnosing and repairing…	5	10	10		25	15
Credit points for the vocational profile					220	115
Additional competences:					20	5
Total credit points					240	120
Further remarks:						

Competence Profile Certificate for a person in training (including Organisational Profile and Individual Profile) based on the Competence Matrix "electronics/electrical engineering"

5. Checklist for developing Competence Profiles and Competence Profile Certificates

1. Involving relevant experts

- Are those involved in the development of Competence Profiles and Competence Profile Certificates very well informed about the particular training programme and the learner's workload required to develop the respective competences?

2. Understanding the Competence Matrix

- Is the starting point for developing Competence Profiles a comprehensive reading of the Competence Matrix?
- Has a sufficient overview been reached about the competence areas and steps of competence development covered by the Competence Matrix?
- Have the principles for reading and understanding the Competence Matrix been taken into account (for example, using the examples to understand the level of demand of the work tasks as well as the level of competence development or considering that higher steps always have to be seen together with lower steps)?

3. Analysing the curriculum or training plan

- Has the curriculum or training plan sufficiently been analysed in order to compare it with the Competence Matrix in order to identify:
  - the relevant competence areas;
  - the relevant steps of competence development;
  - the additional competences (or subject areas) that are completed within the framework of the training programme, but which are not part of the vocational profile;
  - further differences between the Competence Matrix and the training programme;
  - the corresponding amount of credit points?

4. Reviewing the results

- Have the results been discussed with other people well informed about the competence development process during the training programme (in particular, teaching and training personnel or people with similar functions and the person in training) and, if needed, have the results been revised based on the feedback?

Part III: Mobility Procedure, Memorandum of Understanding, Learning Agreement

1. Introduction

Using the VQTS model in mobility projects provides the basis for validating and recognising competences acquired internationally. Thus, learners who participate in VET placements abroad can avoid unnecessary redundancies in their individual learning path.

This part includes information about the planning and the organisational steps necessary when using the VQTS model for international VET placements. In particular, the procedures for the development and the structure of a memorandum of understanding as well as of a learning agreement will be presented. Since developing Competence Profiles and Competence Profile Certificates play an essential part in this procedure, one should learn about these elements before starting with the mobility procedure.

2. The Mobility Procedure[5]

The mobility procedure

- describes the planning and the organisational steps necessary for an international VET placement when using the VQTS model,
- provides recommendations concerning the most important issues that should be considered by the:
  - institutions responsible for activities such as definition of qualifications, methods for assessing and validating learning, setting training objectives, determining the content of learning outcomes, implementing training programmes, validating and recognising credits;[6]
  - 'training provider in the *home* country' or 'sending provider/organisation'– the VET provider in the home country (educational institution or company) offering the training programme for the person in training who wants to gain training experiences abroad;
  - 'training provider in the *host* country' or 'hosting provider/organisation' – the VET provider in the host country (educational institution or company) chosen for the training abroad;
  - 'mobile learner' – person in training who wants to take part in a VET placement abroad.

Additional information and recommendations:

- The mobility period should last for at least three months. Shorter international study periods usually do not require such an elaborate procedure, so it would also not be necessary to follow this procedure step by step for stays of shorter duration.
- A necessary requirement for a successful international training period is the commitment of the person in training (mobile learner). He or she should therefore be involved in all steps of the procedure from the very beginning.
- According to different requirements related to institutional, regional or national legal basics concerning mobility in VET and recognition of competences acquired abroad, training providers must follow certain directives. These regulations will have to be taken into account.

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5 This chapter is partly based on the procedure developed in the VQTS project (cf. Luomi-Messerer & Markowitsch 2006).

6 In the context of ECVET, these institutions are called 'competent bodies'. They can have different functions depending on the regulations in the national context. In some countries, training providers could also be considered as competent bodies.

- The mobility procedure describes only the most important aspects of the process. Several initiatives and projects have developed approaches, guidelines and supporting instruments for international VET placements. In particular, the Pro Mobility project (www.pro-mobility.net) provides much useful information. This project has developed the Pro Mobility Toolkit (PMT) including basic information about short- and longer-term mobility stays during VET, which could also be incorporated in the context of the mobility procedure described below.

Pro Mobility Toolkit (PMT) - www.pro-mobility.net

Relevant information about qualifying mobility, including information about the required infrastructure and necessary tools, is made available through the Pro Mobility website to the interested public.

Structured into three mobility phases – preparation, implementation and follow-up – the PMT answers frequently asked questions and gives useful hints, tips and advice. In addition, the PMT includes checklists about every mobility phase and references to interesting websites and useful tools. Hence, it provides everyone interested in mobility issues – students, apprentices, VET institutions – with a preliminary overview of everything they should know about mobility stays.

Phases of the mobility procedure

The mobility procedure described below is structured into four phases:

- *Preliminary phase*: establishment of partnerships between competent bodies/institutions and development of a Memorandum of Understanding (MoU);
- *Preparation phase*: conclusion of a Learning Agreement (LA) in the framework of a MoU;
- *Implementation phase*: training period (VET placement) abroad;
- *Final phase*: follow-up of the VET placement abroad.

2.1 Preliminary phase: establishment of a partnership and development of a MoU

Competent institution / training provider in the home country	Competent institution / training provider in the hosting country	Tasks/Activities
		Look for a suitable training provider in another country and request information on its training programme(s) offered. National requirements must be observed (for example, in some countries, the training provider in the host country must be accredited according to national regulations) and basic requirements or prerequisites must be cleared (for example, language requirements).
		If appropriate, send a statement of purpose or intent declaring the intent to establish a partnership for mobility of persons in training.
		Establish a Memorandum of Understanding (MoU) to provide a general framework of co-operation and networking between the partners through which a climate of mutual trust is established. The MoU should enable the partners to design specific arrangements for credit transfer for learners (see section 3).

2.2 Preparation phase: conclusion of a Learning Agreement in the framework of a MoU

Competent institution / training provider in the home country	Competent institution / training provider in the hosting country	Tasks/Activities
		Establish a Learning Agreement between the relevant institutions (for example, training providers in the home and hosting country or other organisations), in the framework of a MoU, and the mobile learner to specify the particular conditions for an international training period (see section 4).

	Send an information package to the person in training who wants to take part in the international VET placement (including information about the requirements in the host country for a permit to stay, information about financial matters, insurance, accommodation, etc.).
	Support the person in training to prepare for his or her training period in the other country and culture. This could be done, for example, by organising a preparatory course (to practice the language of the hosting country, to become acquainted with the culture of and habits in the hosting country, etc.)
	The mobile learner begins his or her international training period.

2.3 Implementation Phase: international training period (VET placement)

		During the international training period, the mobile learner fulfils the training plan at the training provider in the host country, which was agreed upon in the Learning Agreement.
		If necessary, the training provider in the home country stays in touch with the training provider in the host country (for further enquiries, etc.). The person in training should also stay in regular contact with the training provider in the home country.

		The competent institution (for example, training provider) in the host country is responsible for updating the Competence Profile Certificate after the international training period. At the end of the stay, the augmented Competence Profile Certificate is sent to the competent institution (for example, training provider) in the home country. A letter of reference to confirm that the person in training actually has taken part in the VET placement abroad should also be included.
		After the designated international training period, the mobile learner returns to the training provider in the home country.

2.4 Final Phase: follow up of the VET placement abroad

Competent institution / training provider in the home country	Competent institution / training provider in the hosting country	Tasks/Activities
		After completing the international training period, the competent institution in the home country verifies whether all formal requirements, as well as the stipulations stated in the Learning Agreement, have been met. The Competence Profile Certificate updated by the competent institution in the host country is checked for competences achieved by the mobile learner. If everything is correct, the updated Competence Profile Certificate will be validated and awarded to the mobile learner. If acquisition of certain competences must be made up, this is organised according to the annex of the Learning Agreement.
		After the international training period, the mobile learner should be able to give feedback and to pass on his or her experiences; training providers should make use of the experiences of a training period abroad.

3. Memorandum of Understanding[7]

3.1 Introduction

The MoU is a voluntary partnership agreement in which conditions for an international VET placement are concluded between 'competent bodies' from different countries.

In this agreement, organisations accept each other's status as competent institutions and accept each other's quality assurance, assessment, validation and recognition criteria and procedures as satisfactory for the purpose of transferring credits at the end of a training period abroad. They agree on the general conditions such as objectives and duration, use the VQTS model to agree on the comparability of qualifications concerned for the purpose of credit transfer and identify other actors and further institutions that may be involved.

The MoU should be formulated before the international VET placements. To be able to establish such an agreement, sufficient information must be made available to the partners involved.

3.2 Content of the Memorandum of Understanding

The following paragraphs describe the information that should be made available by the partners and the elements to be agreed upon. A proposal for a 'MoU format' is available at the project website.

General objectives of the MoU
The MoU sets out the general framework of cooperation and networking between the partners through which a climate of mutual trust is established. It also enables the partners to design specific arrangements for credit transfer for learners (placements abroad, mobility projects) and to prepare a Learning Agreement (involving two partners and a specific mobile learner).
If the partners have agreed upon further objectives, they should also be stated in the MoU.

7 This part is partly based on the documents prepared by Tom Arends and Martin Bröcker (Kenteq, NL) in the context of the VQTS II project.

Period of eligibility of the MoU
Information should be given on the period of eligibility of the agreements set down in the MoU. For example, in some cases, it makes sense to agree on a period of a few years; in others cases, more years are more appropriate. However, it is suggested to agree on a periode of several years.

Information about the partners
The partner organisations involved could have different functions. In some cases, they might be training providers (educational institutes, companies) in the sending and hosting country or other kinds of institutions authorised to establish such a MoU. The MoU should include relevant contact information from all these organisations as well as information on their functions and roles.

Information about the training programmes (including Competence Profile Certificate[s] of the Organisational Profile[s])
Transparent and sufficient information about the relevant training programme(s) or qualification(s) in the home and host country is the basis for mutual trust. Therefore, Competence Profile Certificate(s) of the Organisational Profile(s) should be developed. If this is not applicable (because the VET placement abroad is supposed to take place in a company which is usually not offering training in the context of a certain training programme) then at least the possible competence development to be offered should be indicated on the Competence Matrix. The Competence Profile Certificate(s) or any other related information should also be included in the annex of the MoU. In addition, the EUROPASS Certificate Supplement(s) should be included in the annex.

General agreement on the relevant part(s) of competence development during international training periods
The most important issue in the MoU is the agreement on the part(s) of the training programme(s) that can, in principle, be considered for the competence development during the international training period. This can be done by referring to the respective parts of the Organisational Profile(s). If the training programmes or qualifications in the home and host country are quite similar, this agreement might be related to the whole Competence Profile(s). In other cases, only certain competence areas or steps of competence development might be selected for the mobility projects.

Responsibilities

Information should be provided on the responsibilities of the stakeholders involved: the competent institutions, the sending and hosting provider or any other intermediate organisation and the person in training. The aspects to be clarified could include, for example, financial aspects (it should be clarified whether the mobile learner will be paid for his or her international training and if yes, how much and what kind of responsibilities might result from this, for example, taxes and social insurance) and responsibilities for preparatory activities.

Information should be provided on which (organisational) activities the hosting organisation takes responsibility and which activities are the responsibilities of the home organisation or the person in training. These preparatory activities might be related to arranging accommodation in the host country, providing working clothes, arranging travel to work, health insurance, work accident insurance and costs of living. In particular, the training provider in the hosting country should send an information package to the specific mobile learner before the international placement (including information about the requirements in the host country for a permit to stay, information about financial matters, insurance, accommodation, etc.).

Furthermore, the documents to be provided before and/or after the international training period should be specified (for example, Learning Agreement, Competence Profile Certificate of a person in training before and after the training period abroad, reference letter to confirm that the training has taken place).

Quality assurance

Information about quality assurance of the training programme(s) and, in particular, the quality assurance activities and measures relevant for the international training periods should be included in the MoU. For example, the minimum quality-standards expected to be fulfilled by the hosting provider during the mobility period could be described. These standards could be supplemented with specific criteria and/or standards required by the sending country.

Assessment

It should be described how and when the hosting organisation will assess the mobile learner. The method to be used should be agreed on in cooperation with the sending organisation that has the final responsibility for the whole competence development of the person in training. Assessment could be related to the vocational competences (in a narrower sense) as well as to social and other work-related skills and abilities. The assessment could take place several times

during the international placement and the results should be discussed with the mobile learner.

Updating the Competence Profile Certificate
The procedure and responsibilities for updating the Competence Profile Certificate of the person in training for providing information about the actual competence development during the international training period should also be specified.
The consequences and procedures should be described if, for any reason, the international placement should be ended sooner than planned.

Validation and recognition
The following procedures and criteria should be described, specifying the methods and processes used for:

- Validation: for confirming that certain assessed learning outcomes achieved or competences developed by the person in training during the stay abroad correspond to specific outcomes or steps of competence development that are required for the specific training programme or qualification);
- Recognition: attesting officially achieved learning outcomes or steps of competence development reached through the awarding of an updated Competence Profile Certificate) should be described.

Signatures
With the signing of the MoU, the partners confirm the accuracy of all statements made in this agreement and thereby accept all principles and articles expressed therein.

Annexes
Required und agreed documents, such as the EUROPASS Certificate Supplement(s) and Competence Profile Certificate(s) of the Organisational Profile(s) should be included in the Annex.

4. Learning Agreement[8]

4.1 Introduction

A Learning Agreement (LA) is concluded by the authorised institutions (for example, training providers in the home and hosting country or other competent body), in the framework of a MoU, and a specific mobile learner. It should specify the particular conditions for an international training period (mobility project), such as the information about the person in training, duration of the mobility period and the learning outcomes expected to be achieved or competences to be developed and the associated credit points. It should also clarify the responsibilities of the stakeholders involved. In particular, it should clarify that, if the expected learning outcomes have been achieved or the specified competences have been developed by the mobile learner and positively assessed according to agreed criteria by the hosting country, the home institution will validate and recognise them as part of the requirements for a qualification.

Sufficient information should be provided about the competences already acquired by the person in training. This should ensure that the mobile learner is given tasks and responsibilities that correspond with the level of competence of the learner and the educational objectives for the training period and that the learning outcomes achieved or competences developed will be validated and recognised by the competent institution in the home country. Therefore, the hosting provider needs to be able to determine which competences can be built upon and to find suitable areas or work tasks. Relevant documents should be sent to the hosting organisation. Representatives of the hosting organisation should analyse these documents and, if necessary, obtain additional information from the training institution in the home country. This should ensure that the person in training is neither under- nor over-challenged during his or her stay abroad.

4.2 Content of the Learning Agreement

The following paragraphs describe the information that should be made available by the partners and the elements to be agreed upon. A proposal for a 'LA format' is available at the project website.

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8 This part is partly based on the documents prepared by Tom Arends and Martin Bröcker (Kenteq, NL) in the context of the VQTS II project.

General objectives of the LA
The purpose of international placements is to provide learners with training experience in an environment that differs in cultural, educational and work-related aspects from his or her own country. In the LA, specific arrangements for credit transfer for a mobile learner are described and agreed upon. In case the partners have agreed upon further objectives, they should also be stated in the LA.

Information about the partners
The LA should include relevant contact information on representatives from the partners involved, for example, training providers in the home and hosting countries or any other competent institution and the person in training.

Period of international placement covered by this LA
The start-date and the total time of the training period should be decided upon in the LA, taking into consideration the training plan of the student in the home country and the work or training plan of the hosting organisation.

Contact and communication
The arrangement about the types and means of contact and communication (between the home organisation and the person in training and the home organisation and the hosting organisation) during the international placement should be described. In general, contact and communication should take place on a predefined regular basis and whenever there is specific need for it. The language for communication should also be clarified.

Competences of the person in training (including Competence Profile Certificate of the Individual Profile)
In order to specify the level of competence development of the person in training, a Competence Profile Certificate should be developed for this person and included in the annex of the LA. To provide further information additional documents, such as a EUROPASS CV, the European Language Passport or any other internationally recognised certificates (for example, ECDL – European Computer Driving Licence – www.ecdl.com) could be added to the annexes of the LA. The training provider in the home country should help the person in training to collect all relevant documents and certificates.

Agreement on competences to be developed by the person in training during the international placement

The relevant competence area(s) including the respective step(s) of competence development that are to be handled during the mobility phase of the specific learner should be fixed. This specification has to be based on the general agreement on the part(s) of the training programme(s) that can, in principle, be considered for the competence development during the international training period (see MoU).

A personal development plan for the person in training should be added to the annex of the LA or developed during the first part of the international placement. The personal development plan should include a description of which kind of tasks the person in training will perform/practice and/or which classes the person in training will attend to reach the agreed-upon step(s) of competence development.

Catch up on missing competences

It has to be clarified if the training placement abroad will result in missing certain competences that would have been acquired in the training programme in the home country and whether these competences are essential. If appropriate, information should be provided on how the person in training can catch up on competences he or she will have missed because of the international placement. This clarification should be stated in an annex of the LA, as an agreement between the training provider in the home country and the person in training.

Signatures

With the signing of the LA the signatories (authorised representatives of the competent organisations, training providers and the mobile learner) confirm the accuracy of all statements made on this form and agree to all principles and articles expressed therein.

Annexes

Required und agreed documents (such as the EUROPASS CV and the Competence Profile Certificate of the Individual Profile) should be included in the annex.

5. Checklist for developing a Memorandum of Understanding and a Learning Agreement

Memorandum of Understanding

1. Are the general objectives of the MoU specified in a written agreement? In particular, does this agreement include:

- a general framework of cooperation and networking between the partners and also
- other general objectives relevant to the partnership?

2. Is the period of eligibility of the MoU agreed on? Does this agreement include:

- information on the period of eligibility of the agreements set down in the MoU and
- advise on the time period?

3. Is all relevant information about the partners involved included? In particular, does the MoU include:

- relevant contact information from all these organisations, and
- information on their functions and roles in the partnership?

4. Is all relevant information about the training programmes (including Competence Profile Certificate[s] of the Organisational Profile[s]) included? Does it include:

- transparent and sufficient information about the relevant training programme(s) or qualification(s),
- the Competence Profile Certificate(s) or any other related information that should be in the annex of the MoU, and
- the EUROPASS Certificate Supplement(s) that should be in the annex?

5. Is there general agreement on the relevant part(s) of competence development during international training periods? Is it done through:

- agreement on the part(s) of the training programme(s) that can, in principle, be considered for the competence development during the international training period,
- references to the respective part(s) of the Organisational Profile(s) and
- specification on the competence area(s) and step(s) of competence development that can, in principle, be selected for training periods abroad?

6. Is there a clear and mutual agreement on the responsibilities of the stakeholders involved that includes:

- roles and responsibilities of the partners involved;
- recommended aspects to be clarified, such as financial aspects and responsibilities for preparatory activities, organisational aspects (accommodation, working clothes, travel to work, health insurance, work accident insurance, costs of living, etc.) and information package for mobile learners;
- specification of the documents to be provided before and/or after the international training period?

7. Do the quality assurance activities and measures clearly include:

- relevant information about quality assurance of the training programme(s) and
- the quality assurance activities and measures relevant for the international training periods?

8. How is the assessment organised? Does it involve a:

- description of how and when the hosting organisation will assess the mobile learner,
- an agreement on the method(s) to be used?

9. How is the updating the Competence Profile Certificate organised? Does it include:

- the procedure and responsibilities for updating the Competence Profile Certificate to provide information about the actual competence development during a person's international training,
- the consequences and procedures in case of unplanned ending of the training abroad?

10. How is the process of validation and recognition organised? Does it include:

- a description of procedures and criteria that specify the methods and processes used for validation and recognition?

11. Is the MoU signed by all relevant partners?

12. Are all relevant documents included in the annex?

Learning Agreement

1. Are the general objectives of the Learning Agreement (LA) covered in a written agreement? Does this include:

- a description of specific arrangements for credit transfer for a mobile learner and
- other objectives?

2. Is all relevant information about the partners involved included? In particular, does this include:

- relevant contact information on representatives from the partners involved?

3. Is the period of international placement covered by this LA specified? Does this include:

- the start date and the total time of the training period?

4. How are contact and communication carried out? Does the LA specify:

- the arrangement about the types and means of contact and communication during the international placement,
- the language for communication?

5. Are the competences of the person in training (including Competence Profile Certificate of the Individual Profile) sufficiently documented? Does this include:

- a Competence Profile Certificate for the person in training,
- additional documents (such as EUROPASS CV, the European Language Passport, ECDL)?

6. Are the competences to be developed during the international placement specified? Does this include:

- the relevant competence area(s) including the respective step(s) of competence development that are to be handled during the international training period and
- the personal development plan for the person in training?

7. Is there a plan for the student to catch up on missing competences? Does this include:

- information on how the person in training can catch up on competences he or she will have missed because of the international placement?

8. Is the LA signed by all relevant partners?

9. Are all relevant documents included in the annex?

Part IV: Using the VQTS model for enhancing permeability between VET and HE

1. Introduction

Recognising prior learning in order to enhance permeability between vocational education and training (VET) and higher education (HE) is included in European-wide educational policies and high on the official agenda in many European countries. However, only a few examples of good practice have been developed so far.[9] In the VQTS II project, we have discussed the use of the VQTS model as a methodological approach or instrument to recognise prior learning. The first part outlines the background by summarising European-wide political processes towards enhanced recognition of prior learning and by describing terms and concepts.[10] This section also covers challenges and important aspects of adjusting VET and HE for enhancing permeability between VET and HE. Finally, the possible use of the VQTS model as an instrument for facilitating permeability and for adjusting VET and HE programmes will be discussed.

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9 Some examples from the partner countries of the VQTS II project are described in the report 'Permeability Between Vocational Education and Training and Higher Education. Examples from Austria, Czech Republic, Germany, Malta, The Netherlands and Slovenia' (Luomi-Messerer, Ed., 2008).

10 See also Luomi-Messerer 2008.

2. Background

2.1 European processes supporting the recognition of prior learning

The European educational environment increasingly supports the acceptance of both lifelong learning and accreditation of prior learning (APL) in HE. In 2000 – the same year as the announcement of the Lisbon Strategy – the European Commission released a Memorandum on Lifelong Learning 'to launch a European-wide debate on a comprehensive strategy for implementing lifelong learning at individual and institutional levels, and in all spheres of public and private life' (European Commission 2000, 3). A key message of the Memorandum includes the development of systems for the accreditation of prior learning: 'It is absolutely essential to develop high quality systems for the Accreditation of Prior and Experiential Learning (APEL), and to promote their application in a wide variety of contexts. Employers and admissions tutors in education and training institutions also need to be persuaded of the worth of this kind of certification' (European Commission 2000, 15). The European Union (EU) promotes 'Lifelong Learning' in two ways: by creating before 2010 the European Higher Education Area (EHEA) (Bologna Process) and by implementing processes triggered by the Copenhagen Declaration relating to VET (Copenhagen Process).

The Bologna Process includes three priorities: introducing the three-cycle system (bachelor/master/doctorate), developing quality assurance and recognising qualifications and periods of study. Lifelong learning was recognised as an essential element of the EHEA since the meeting in Prague in 2001 of the ministers responsible for HE in the participating countries of the Bologna Process. During the 2005 meeting for a mid-term review and for setting goals and priorities towards 2010, the ministers agreed that 'the development of national and European frameworks for qualifications [is seen] as an opportunity to further embed lifelong learning in higher education. We will work with higher education institutions and others to improve recognition of prior learning including, where possible, non-formal and informal learning for access to, and as elements in, higher education programmes' (Bergen Communiqué 2005, 3). Thus, recognition issues received a distinctive position within the Bologna Process[11] and the respective aims were stressed again in the London Communiqué (2007, 3: 'Fair recognition of higher education qualifications, periods of study and prior learning, including the recognition of non-formal and informal learning, are

11 Cf. Adam 2008 or Zgaga 2008.

essential components of the EHEA, both internally and in a global context.') as well as in the Leuven and Louvain-la-Neuve Communiqué (2009, 3): 'Successful policies for lifelong learning will include basic principles and procedures for recognition of prior learning on the basis of learning outcomes regardless of whether the knowledge, skills and competences were acquired through formal, non-formal, or informal learning paths.'

The EU particularly tries to support lifelong learning by promoting the development of qualifications frameworks. As a neutral reference instrument that covers all areas of learning, the European Qualifications Framework (EQF) should promote transparency and mobility within and between national education and employment systems. In addition, National Qualifications Frameworks (NQF) are developed primarily as a response to the need for more transparency and permeability between different segments of the national qualifications systems. A qualifications framework shows the relationships between qualifications and, therefore, can also provide information about the possibilities for progression. Thus, the development of the EQF – or, also, an NQF – generates very high expectations for enhancing permeability: the NQF should promote a better balancing of VET and academic qualifications. Because many European countries face a gap between VET and HE, the NQFs should support bridges between these two educational segments or subsystems. However, until now, mainly aims and intentions have been formulated; the future will show how they will be realised. Both on the European and national levels, current practices focus more on formal learning than on non-formal or informal learning. Many countries have only recently started developing a NQF and a credit transfer system in VET.

2.2 Terms and concepts

Recognition of prior learning relies not on learning paths, but primarily on the concept of acquired knowledge, skills and competences. However, as with many European and national discussions of terms and concepts, Europe's well-known diversity shapes the landscape of definitions and traditions in understanding and recognising prior learning. Even the term 'recognition' requires accurate definitions as well as further explanations. European countries have – albeit to different extents – developed specific models that relate to the national qualifications systems and more or less to the traditional relationships between the worlds of VET and HE. 'The national terminology very often mirrors these systems and relationships, and the fine nuances between the use of the terms

validation, recognition, assessment or accreditation reflect the different cultural habits which are underlying the practice' (Freitag 2007, 3).

Although several terms are often used synonymously (for example, 'recognition', 'accreditation' or 'validation' of skills and competences), the context-related differentiations become, as Adam (2008, 29) points out, 'a source of confusion, especially when terms are translated across Europe.'

In the Cedefop (2004) glossary, recognition is understood as 'the process of granting official status to skills and competences either through the award of certificates or through the grant of equivalence, credit units, validation of gained skills and/or competences.' Accreditation of prior learning (APL) is used as a synonym for validating the informal or non-formal learning that is seen as 'the process of assessing and recognising a wide range of knowledge, know-how, skills and competences, which people develop throughout their lives within different environments, for example through education, work and leisure activities.' A competent body validates or confirms the acquisition of the required learning outcomes and typically provides certification. 'Recognition' and 'accreditation' of prior learning differ in that 'recognition of prior learning' could be understood as the formal acknowledgement of previous learning (formal, non-formal or informal), and 'accreditation of prior learning' could be understood as formal acknowledgement by granting specific credit for a person's previous learning. The UNESCO defines APL as the 'process by which individuals are awarded credit toward qualifications based on their prior learning and (sometimes) experience (also called experiential learning). The credit is awarded upon clear evidence that the respective learning has resulted in the student having achieved the appropriate learning outcomes' (Vlãsceanu, et al., 2004).

When looking at processes and practices in higher education institutions, APL can be seen as an umbrella term including both 'Accreditation of Prior Certificated Learning' (APCL) and 'Accreditation of Prior Experiential Learning' (APEL) (see also Adam 2008; Freitag 2007):

APCL refers to the recognition of certificated learning outcomes (certification awarded by an education/training provider) for academic purposes. The main characteristic is that the learning outcomes of an education/training programme or the respective qualification are assessed for equivalence, not the individual learner. APCL can be used in two different ways.

- As an *individual claim for certified learning*: In this case, the previously certified learning will not be assessed again by the HE institution. In fact, it will be evaluated as to what extent the certified qualification is equivalent to the required learning outcomes in the respective HE programme. This approach is very often combined with APEL.
- As a *formal process of credit transfer*: In this case, learning outcomes of a VET training programme or qualification will be assessed and related to the learning outcomes of the HE programme.

APEL refers to the accreditation (assessment and recognition for academic purposes) of an individual's learning outcomes gained in non-formal and informal learning environments (non-certificated learning gained from experience usually unrelated to an academic context, for example, workplace learning, life experience, and family and voluntary work). This approach involves a case-by-case assessment of an individual's learning outcomes and the main question is to what extent they can be considered as equivalent to the required learning outcomes of a specific HE study programme. The main challenge in this context is again the question of equivalency and also the fact that APEL involves a translation process since it does not assess experience, but the learning gained from experience: 'The main tool portfolio is strongly based on writing. The translation always involves two "texts", the source "text" – portfolio – and the target "text" – the learning outcomes of the course or module. It also involves concepts of perceiving the world. Good knowledge of the language, the cultural, institutional and professional concepts are necessary' (Freitag 2007, 12).

In the context of HE, the APEL and APCL primarily serve to widen participation in HE and to offer strategies for how students could best use their previous learning. The introduction of APL attempts: a) to create new paths in education and training and, in particular, a more flexible transition between VET and HE, b) to reduce redundancies on the interface between VET and HE and c) to shorten the duration of learning in HE. The following functions or purposes of APL in relation to HE can therefore be identified:

- *Access*, entry into a course or a programme is gained through APL (laws or government regulations usually determine the certificates that generally provide entrance into HE);
- *Admission*, applicants to a certain study programme are selected based on APL;
- *Exemption*, APL allows exemption from parts of the study programme because credits are given for previously acquired learning outcomes seen

as equivalent to learning outcomes in the HE study programme and these credits will count towards an academic degree;
- *Full equivalence*, in case all achieved learning outcomes are seen as equivalent to the learning outcomes in the HE study programme, APL allows exemption from all parts of the study programme.

In the context of recognising prior learning in HE, one important question includes: How can equivalent learning outcomes be determined? Depending on the APL approach, this question would have the following concrete implications:

- APCL: How can learning outcomes of a specific certificate be identified as equivalent to learning outcomes of a study programme in HE? Identifying equivalence is a precondition for accrediting prior learning. Equivalent learning outcomes can be regarded as the interfaces of VET and HE.
- APEL: How can informal and non-formal learning outcomes of an individual person be identified as equivalent to learning outcomes of a study programme in HE? In this context, before equivalence can be determined, learning outcomes must be assessed (for example, in the traditional written or oral exam or by completing an assignment or compiling a portfolio).

2.3 Challenges and barriers for enhancing permeability from VET to HE

One main challenge is, of course, coordinating different processes (Copenhagen and Bologna), different procedures and different languages, while also arranging for permeability from VET in HE by recognising prior learning. However, VET and HE processes might become increasingly merged through the development and implementation of the EQF.

Another challenge is coordinating the various actors and stakeholders involved in the governance and regulation of VET and HE systems and overcoming their sometimes long-standing separation. Procedures and instruments need to be developed to identify and assess learning in VET and HE and to identify equivalence. Then, a discussion should cover the real meaning of equivalence and the actual perception of equivalent learning outcomes. Furthermore, adequate organisational structures and funding are needed to support permeability between VET and HE and general lifelong learning.

Implementing the learning outcomes approach and allocating qualifications to EQF or NQF levels will affect VET and HE and, to some extent, structural changes will also be necessary to facilitate recognition of APL in HE. For example, recognition issues interlink with and have an impact on quality assurance issues. Transparent criteria and rules must be established to identify equivalence of contents and levels. In the case of APCL, assessment procedures and criteria also must be described transparently in order to establish mutual trust. For APEL, assessment and validation procedures will have to be developed and implemented.

Analysis of the cases described by the partners of the VQTS II project leads to the conclusion that the following aspects must be considered when adjusting VET and HE to enhance permeability (cf. Luomi-Messerer [Ed.] 2008):

- One basic aspect important for adjusting VET and HE to be more compatible is their legal status. Relevant legal regulations can be considered as fundamental issues for cooperation between VET and HE providers or, in many cases, for the HE accreditation of VET learning outcomes.
- Apart from this legal aspect, the institutions themselves must be involved. First, they have to be convinced that cooperation brings benefits. VET and HE providers must show their commitment to enhance permeability and recognize the importance of such initiatives. All actors involved (including lecturers and students) need to be motivated and inspired to ensure that relevant initiatives continue.
- Trusting students' abilities and advising students on the appropriate educational track are crucial factors in enhancing permeability between VET and HE. One needs to support instead of 'select' students.
- Pilot projects can help to build experiences, to promote dialogue between institutions, and to develop mutual trust. Exchanging pilot-project experiences with other VET or HE institutions helps them learn from each other. Such projects can include cooperation activities between VET and HE institutions.
- Finally, tools to support the adjusting of VET and HE programme can be developed, tested and disseminated. The VQTS model offers such tools with the Competence Matrix and the Competence Profiles. The relevance of the VQTS model in enhancing permeability between VET and HE is described in the following section.

3. VQTS model and recognition of prior learning in HE

3.1 Possibilities

The VQTS project originally intended to develop a systematic procedure for transferring competences that can be used to enhance a person's mobility: to compare Competence Profiles from VET programmes of different countries and to identify similarities and differences in these VET programmes. This section will outline how the VQTS model could also be used for identifying equivalences (as well as differences) between learning outcomes from inside and outside HE.

The VQTS model and, in particular, the description of competences in relation to the work context can support understanding between the world of education and the world of work. Hence, the approach developed can be used not only to transfer competences acquired internationally, but also for other purposes where the transparency of competence profiles is highly important, for example, on the interface between VET and HE. We assume that the VQTS model can also help make visible the overlapping areas of the Competence Profiles of VET and HE qualifications.

For this purpose, a Competence Matrix was created in VQTS II based on the principles developed in the VQTS project but with a broader scope (see Part I). In the first VQTS project, the focus was on the skilled worker level and on VET programmes from secondary level education. A Competence Matrix useful in recognising prior learning in HE should not only make visible the Competence Profiles of VET programmes, but also at least some parts of Competence Profiles of HE programmes and therefore must include some steps of competence development relevant for HE. Therefore, the scope of the Competence Matrix must be broadened and the development process should include expert opinion from the world of work, from VET and from HE. However, all competence areas and steps of the competence development do not necessarily need to be included in Competence Profiles of HE programmes because, in this context, the only relevant area is the overlap between outcomes of prior learning and learning outcomes of the HE programme.

Competence Profiles can be formed using procedures similar to that described in Part II. Depending on the APL approach, the Competence Profiles can show

either a VET programme's relevant competence areas and steps of competence development (APCL – 'Organisational Profile') or an individual's competences gained in non-formal and informal learning environments (APEL). An HE study programme's relevant steps of competence development will also be identified. However, the Organisational Profile of the HE programme will not be complete. Following this, equivalence can be identified through the overlapping areas between the Competence Profiles of the VET programme and the HE programme.

In this way, the VQTS model can be used as an instrument to enhance transparency and thus help develop trust in the accreditation process. With the VQTS tools, curricula can be 'translated' and compared, and one can identify equivalences and differences of learning outcomes. Recognising prior learning from formal, non-formal and informal learning can also be enhanced with the VQTS tools.

The results of this process can not only be used to recognise learning outcomes on an individual basis but also to promote sustainable advancement from VET to HE. This can be done by establishing new partnerships between VET and HE providers for developing learning paths for students progressing from VET to HE. Examples would include:

- a joint definition of Competence Profiles for the admission into training programmes/courses at HE,
- tuning or adapting training programmes/curricula in VET and HE to be more compatible,
- agreeing about the possibility of giving credits for already acquired learning outcomes that will count toward an HE award.

To visualise the process of forming Competence Profiles of a VET programme and of a HE programme in order to identify equivalence, the 'key-lock-principle' could be used as a metaphor: A key has to be shaped to fit perfectly into the cylinder of the lock. If the key does not fit the shape or if the lock has to be changed, something has to be added or removed. When making VET and HE programmes more adaptable, this would mean that ill-fitting programmes should be refined to be more compatible. In other cases, this could mean that a graduate of a VET programme would have to gain additional learning outcomes in order to fulfil the entrance requirement of the HE programme ('something is missing and has to be added'). Or, in another example, he or she would get credits for previously acquired learning outcomes (the acquisition of the learn-

ing outcomes will be 'removed' from the HE programme for this particular student).

Different opportunities when using the VQTS model can be identified for key stakeholders:[12]

- For policymakers, the VQTS model provides a rationale to ease HE access for persons with relevant skills.
- Learners can, with the Competence Profile for individuals, show their competences and their level of qualification. They can also receive credits in HE for learning outcomes acquired outside HE or even for learning outside educational institutions.
- VET providers can show the capabilities of their graduates or their institution and the level of qualification obtained with the Competence Profile for institutions. This information helps potential students, potential employers and HE providers. VET providers can also compare Competence Profiles and adjust training programmes; for example, to provide relevant learning outcomes required for HE admission or to reduce the length of HE studies.
- HE providers can better understand VET students' Competence Profiles. The VQTS model helps them to compare Competence Profiles, to adjust training programmes or to decide on credits for learning outcomes obtained outside HE.

3.2 Limitations

The VQTS model can be used for a first identification of equivalence and serve as a starting point for further developments. However, the discussions in the VQTS II project also show that there are limitations for using the VQTS model in this context.[13]

Using existing procedures instead of new instruments
Some countries have (sometimes rather informal) ways and procedures – of course, based on the relevant legal regulations – for accrediting learning outcomes from either VET in HE or already existing instruments that fit the purpose of the institutions. Therefore, one must consider whether a need actually exists for implementing a new instrument like the VQTS model.

12 Cf. Luomi-Messerer, Ed., 2008.

13 These limitations were mainly identified in discussions within the project partnership.

Lack of willingness
Furthermore, the HE provider must be ready and willing to acknowledge professional competences as part of engineer-scientific and labour-market-oriented competences. The fundamental question is how much value is given to professional competences for ability to study.

Meaning of 'overlapping areas'
The meaning of the overlapping areas between the Competence Profile of the VET programme and the HE programme needs to be carefully explained: Also, identifying many 'overlapping areas' does not mean that the training programmes are actually the same or at the same level; although, one could come to this conclusion by looking only at the Organisational Profiles. One must remember that the descriptions in the Competence Matrix leave some space for interpretation and therefore the same descriptions do not necessarily mean the same for VET and HE providers. First, some work tasks have different natures depending on whether they are carried out within a HE programme or a VET programme. For example, both VET students and HE students seem to be able to fulfil a certain task. However, the HE students can, for example, have more tools available to solve a problem and more ways to come to a solution or can find new solutions; they might be able to more quickly cope with an unfamiliar task. Furthermore, the fulfilling of work tasks by HE students includes more so-called 'academic competences', such as particular knowledge, conceptual thinking and critical reasoning. One can therefore assume that they adopt a somewhat different approach when dealing with the tasks described.

Subject orientation versus competence orientation
A description of vocational, domain-related competences can help improve the possibilities for recognitions and credit transfer. However, possibilities and limits to recognising competences from VET depend largely on how useful the developed competences are for HE training programmes.
The suitability of the Competence Matrix for visualizing overlapping areas between VET and HE programmes depends on the orientation of the HE courses (see Becker et al 2009; Becker 2009). When curricula are strongly subject-related and strongly orientated towards theoretical knowledge and skills, competences described by the Competence Matrix cannot be shown easily. Because these curricula are not based on competence descriptions, they do not match the competence-oriented descriptions of the Competence Matrix. Identifying common competences between VET and HE programmes is particularly difficult or not at all possible when the HE study programmes – at least during the

first terms – focus primarily on teaching a theoretical foundation and hardly teach professional (for example, engineering) competences. In these cases, specific practical skills (such as that of an engineer) and thus vocationally orientated competences are rather irrelevant in the courses at the beginning of the studies. Therefore, hardly any overlapping areas can be identified. If HE curricula are aligned to develop profession-relevant competences from early on, common competences and overlapping areas can easily be identified with the help of the Competence Matrix.[14] Since such programmes rarely exist, the VQTS Competence Matrix provides few possibilities for influencing the permeability between VET and HE. However, overlapping areas could also be more easily worked out with the aid of the competence descriptions of the higher steps and with reference to the task descriptions contained in ISCO (see ISCO-88 nd.) for activities in an area such as engineering. However, the relevant VET and HE providers must be willing to identify overlapping areas for the country-specific and culturally divergent training schemes.

Despite these limitations, the VQTS model can serve as a useful starting point and facilitate structured dialogue between VET and HE providers. This will create better understanding and cooperation between these two cultures.

4. Checklist for using the VQTS model to enhance permeability between VET and HE

General questions

1. Which legal regulations must be considered for enhancing permeability between VET and HE? In particular, do the regulations relate to:

- accrediting VET learning outcomes in HE,
- enhancing cooperation between VET and HE institutions or
- adjusting VET and HE programmes for more compatibility?

2. Do the institutions involved show commitment for enhancing permeability between VET and HE?

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14 For example, such a curriculum can be found at the University of Southern Denmark (Syddansk University). There, the bachelor study programme "Electrical energy engineering" is strongly organized in a project-manner (see http://www.sdu.dk/~/media/Files/Om_SDU/Fakulteterne/Teknik/Study_Programmes/All_at_a_Glance_09/BEng_ElectricalPowerEngeering.ashx).

- Do they see any benefits for themselves?
- Do they recognize the importance of such initiatives?
- Are all relevant actors involved and motivated (including lecturers and students)?

3. Is there a need for implementing a new instrument like the VQTS model?

- Have other procedures or instruments for identifying equivalent learning outcomes already been implemented?
- Do these already existing instruments fit the purpose of the institutions or is there a need for a new instrument?

Using the VQTS model

1. For which purpose(s) will the VQTS model be used? Will it be for identifying relevant learning outcomes:

- to allow entrance into a HE study programme (access);
- to select applicants for a certain HE study programme (admission) or
- to give credits for previously acquired learning outcomes that are seen as equivalent to learning outcomes in the HE study programme (exemption)?

2. Will new partnerships be established between VET and HE providers for developing learning paths for students progressing from VET to HE? Examples would include:

- jointly defining Competence Profiles for the admission into training programmes/courses at HE;
- tuning or adapting training programmes/curricula in VET and HE to be more compatible and
- agreeing about the possibility of giving credits for already acquired learning outcomes that will count towards an HE award.

3. Have the principles for developing a Competence Matrix (as described in Part I) and the principles for developing Competence Profiles (as described in Part II) sufficiently been considered?

- Is the scope of the Competence Matrix broad enough (including at least some steps of competence development relevant for HE programmes)?
- Is it possible to use the Competence Matrix for making visible at least some parts of Competence Profiles of HE programmes?

4. Have the limitations for using the VQTS model in this context been considered sufficiently?

- Is the meaning of 'overlapping areas' clear (for example, is clear that the descriptions in the Competence Matrix leave some space for interpretation and therefore the same descriptions do not necessarily mean the same for VET and HE programmes)?
- Does subject orientation versus competence orientation acknowledge that when curricula are strongly subject-related and strongly orientated towards theoretical knowledge and skills, competences described by the Competence Matrix cannot be shown easily? Because these curricula are not based on competence descriptions, they do not match the competence-oriented descriptions of the Competence Matrix.

Glossary

Competence
The holistic concept of competence refers to vocational or professional competence in the sense of expertise. The competence descriptions must refer to the sector, the domain, the context and the occupational tasks.

Competence area
Comprises various forms of competences necessary for completing core work tasks in a certain occupational field and In the Competence Matrix, they are listed in the left column of the table.

Competence Matrix
Displays work-related competences descriptions structurally in a table according to core work tasks and the progress of competence development (‘steps of competence development’).

Competence Profiles
Are formed from particular parts of a Competence Matrix and are developed by identifying competences ‘included’ in a specific training programme or qualification (Organisational Profile) or reflecting the competences acquired so far by a person in training (Individual Profile).

Competence Profile Certificate
Is issued by a competent body either for a specific training programme or for a person in training. A Competence Profile Certificate for a training programme shows an Organisational Profile including credit points and some further information. A Competence Profile Certificate for a person in training shows an Or-

ganisational and an Individual Profile together and also includes credit points as well as some further information.

Competent body
Is an institution responsible for designing and awarding qualification or recognising units or other functions linked to ECVET, such as allocation of ECVET points to qualifications and units, assessment, validation and recognition of learning outcomes, under the rules and practices of participating countries.

Core work tasks
Comprehensive tasks within the work context of a person with the respective occupational profile.

Credit points - VQTS
Are used as quantitative measurements of specific parts of a training programme or qualification. In the VQTS model, credit points reflect the duration of the competence development and are based on the 'learner's workload' required to achieve a programme's objectives (specified in competences to be acquired). The total amount of credit points for a training programme is divided according to the average time a person in training needs to acquire competences or to reach a step of competence development. Within one year of typical training (formal full-time VET programme or 'main tracks' of training), a maximum of 60 credit points can be achieved.

ECVET (European Credit system for Vocational Education and Training)
Is intended to facilitate the recognition of learning outcomes, in the framework of mobility, for achieving a qualification. ECVET is based on the designing of coherent and meaningful units of learning outcomes and aims for better comparability and compatibility of qualifications and VET systems.

ECVET points
Are a numerical representation of the overall weight of learning outcomes in a qualification and of the relative weight of units in relation to the qualification. As a convention, 60 points will be assigned to the learning outcomes expected to be achieved in a year of formal, full-time VET.

EQF (European Qualifications Framework)
Is a reference tool for the comparison of qualification levels in national qualifications systems and also in qualifications systems developed by international sectoral organisations.

Individual Profile
Is based on an Organisational Profile and reflects the stage of competence development of a person in training.

ISCED (International Standard Classification of Education)
Was designed by UNESCO in the early 1970's to serve as an instrument suitable for assembling, compiling and presenting statistics of education both within individual countries and internationally. ISCED constitutes an internationally accepted classification of programmes of education that distinguishes six levels, beginning with elementary school (Level 1) and extending to a PhD and postgraduate programmes (Level 6).

ISCO (International Standard Classification of Occupations)
Is an international classification under the responsibility of the International Labour Organisation (ILO). ISCO is a tool for organizing jobs into a clearly defined set of groups mainly based on the similarity of skills required to fulfil the tasks and duties of the jobs. Four broad skill levels are defined with reference to the ISCED levels. The ISCO classification is intended both for statistical users and for client-oriented users.

Key competences
The sum of skills needed to live in contemporary knowledge society (including communication in the mother tongue and in foreign languages, competences in maths, science and technology, digital competence, learning to learn, interpersonal, intercultural and social competences, and civic competence, entrepreneurship, cultural expression).

Learning Agreement (LA)
Is concluded by the authorised institutions (for example, training providers in the home and hosting country or other competent body), in the framework of a MoU, and a specific mobile learner. It should specify the particular conditions for an international training period (mobility project).

Learning outcomes
Are statements of what a learner knows, understands and is able to do on completion of a learning process and which are defined in terms of knowledge, skills and competence.

Memorandum of Understanding (MoU)
Is a voluntary partnership agreement in which conditions for an international VET placement are concluded between 'competent bodies' from different countries.

Mobility Procedure
Describes the planning and the organisational steps necessary for the training period abroad when using the VQTS model.

Occupational field
In the context of the VQTS model, occupational fields are understood as 'groups of family-like (*familienähnlicher*) occupations' or 'families of occupations' sharing common characteristics such as activities, tasks, tools, requirements, language, attitude to work, etc. In the Competence Matrix, the occupational field is structured according to common tasks.

Organisational Profile
Reflects the range and extent of competence development offered by a specific training programme or specific qualifications in a Competence Matrix's occupational field.

Sector
Usually means a grouping of professional activities based on their main economic function, product, service or technology.

Skilled worker level
Refers to workers who have acquired special skills – usually after several years of training – and who are prepared for immediate employment at the labour market. In many countries, this level is reached by graduates of training programmes at ISCED level 3.

Step of competence development
Represent the horizontal structure of a Competence Matrix and illustrate the competence development process within certain core work tasks (competence areas).

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