Permeability in vocational education and training – an example from the chemical industry (EQF Chemistry)

Leonardo – Projekt DE / 06 / B / F / PP 146 529

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16 Partners from:	Austria	Germany
	Great Britain	Sweden
	Italy	Netherlands
	Czech Republic	Hungary

Duration: *10 / 2006 – 09 / 2008*
Budget: *496.118,00 €*

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Within the framework of increased European cooperation in vocational education and training and in university-level education,
the goal is
the establishment of a European qualifications and credits framework comprising all areas of education and training ***(Maastricht Communiqué).***

Whilst maintaining the principle of subsidarity, national qualifications and credits frameworks are to be developed.

A qualifications and credits framework should:

- create transparency of qualifications / skills;
- promote ease of access between general educational, vocational and university-level areas of training;
- take account of skills acquired in informal learning processes;
- enable mobility on the labour market.

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The EQF in brief

The European Qualifications Framework (EQF) is a European framework that will make it possible to classify training certificates and qualifications on the basis of defined European levels.

The proposal for an EQF envisages:

- Eight levels that cover both vocational training and university-level training
- An orientation toward learning outcomes
- Descriptions of learning outcomes, based on the terminology:
    - knowledge,
    - skills and
    - competences
- Inclusion of informally acquired competences.

The EQF will help inject greater transparency into qualifications in Europe and improve permeability between and within education systems.

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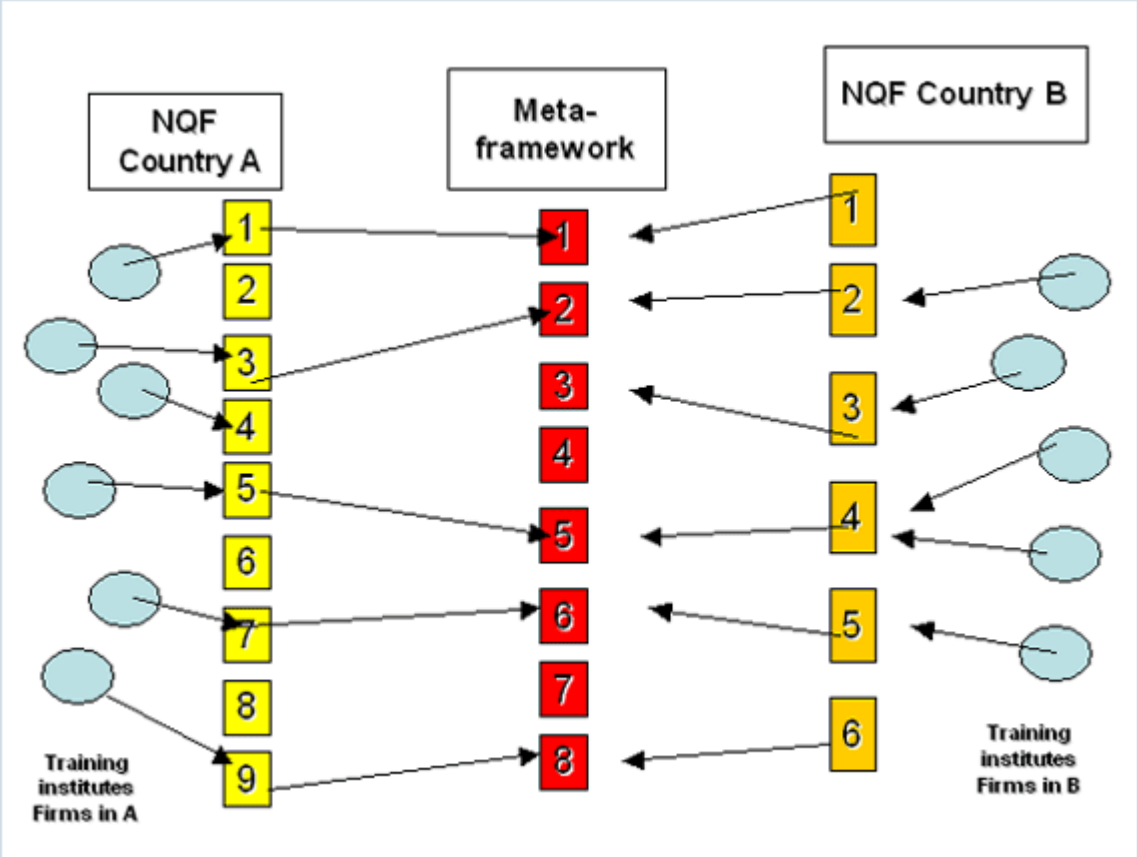
How the EQF will work



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Level	description	qualification
8	top level further education and training	Master / PhD
7	high level further education and training	Bachelor / Master
6	medium level further education and training	Bachelor / Supervisor (senior)
5	First level further education and training	Supervisor (junior)
4	initial education and training (2 to 3 1/2 year)	Operator
3	initial education and training (up to 1 year)	Worker
2	Short time training (few weeks)	Worker (low)
1	without education and training	without

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Aim of the project:

With the Leonardo project, the 16 project partners want to compile a reference base for EQF and permeability between the levels

- **(4) = initial education and training = General Operator**
- **(5 / 6) = medium level further education and training = Supervisor**
- **(6 / 7) = high level further education and training = Process Engineer**

in the Process industries.

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Components of the project are:

- Selection of the occupations/activities from the NQF of the partner countries
- Compilation of competence lists for occupations/activities
- Suggestions of the project partners for a sector oriented methodology for the development of competence lists in occupations/activities
- Design of Competence - Profiles
- Design for a sector oriented methodology for permeability of competences between the levels (4), (5 / 6) and (6 / 7)
- Exemplary suggestions for the organization of operational agreements on the classification of qualifications and competences in the sector
- External evaluation of the competence lists for occupations/activities

Project Status

- Comparison list of kind of training and education standards for Operators, Supervisors and Process Engineers in chemistry in the partner countries
- The demands on the competences of operators, supervisors and process engineers were formulated (*main competences*), described in examples in detail (*details*) and co-ordinated
- At present, the partners are determining the competence profiles and searching „equivalents“ between the „competence matrix“ for the levels (4), (5 / 6) and (6 / 7)

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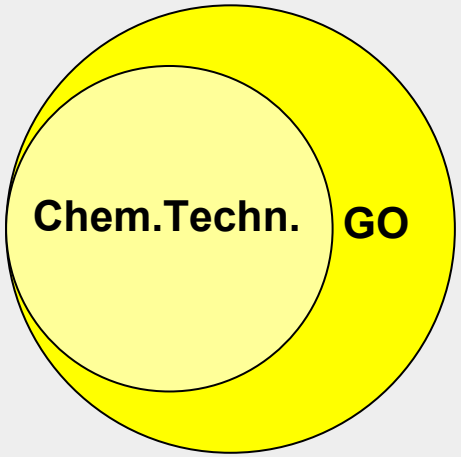
	Knowledge	Skills	Competence
	In the EQF, knowledge is described as theoretical and/or factual.	*In the EQF, skills are described as cognitive (use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and Instruments).*	*In the EQF, competence is described in terms of responsibility and autonomy.*
Level 5 General Operator	comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	a comprehensive ränge of cognitive and practical skills required to develop creative Solutions to abstract problems	exercise management and supervision in contexts of work or study activities where there is unpredictable change review and develop Performance of seif and others
Level 6 Supervisor	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups
Level 7 Process Engineer	highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research critical awareness of knowledge issues in a field and at the interface between different fields	specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	manage and transform work or study contexts that are complex, unpredictable and require new Strategie approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the Strategie Performance of teams

No.	Main competences (Title) in the project “EQF Chemistry”
1	Operating Machinery, Performing Plant Operation Procedures
2	Process Control, Plant Monitoring and Control
3	Analysis of the Process, Fault Finding and Problem Finding
4	Process Hazards and Emergency Procedures
5	Logistic Jobs
6	Quality Control
7	Maintenance Work and Safety Working Conditions
8	Leadership
9	Organisational behaviour and Personnel Management
10	Budgeting and reporting
11	Process and plant continuous improvement
12	Process development
13	Plant design
14	Information management

1	**Operating Machinery, Performing Plant Operation Procedures**	
	General Operator	Can start and stop the process, plant and machinery according to procedure. Can operate the equipment according to the SOP and safety, economic and environmental requirements. (SHEQ) Can work and communicate in teams, with supervisors and maintenance staff.
	Supervisor	Can instruct and give technical and operational directions to colleagues, according to procedures. Can train and coach colleagues on the job
		Can monitor operating staff. Can teach staff about the principles of the process, the plant and machinery operations, and can coach them
	Process Engineer	Can develop and approve start-up and shutdown procedures on process plant. Can approve regular operating procedures. Is able to advise and approve commissioning procedures



General Operator = Chemical Technician
+ nonformal and informal Learning

General Operator = 180 Credits (Chemical Technician)
+ 120 Credits (nonformal and informal Learning)
= **300 Credits**

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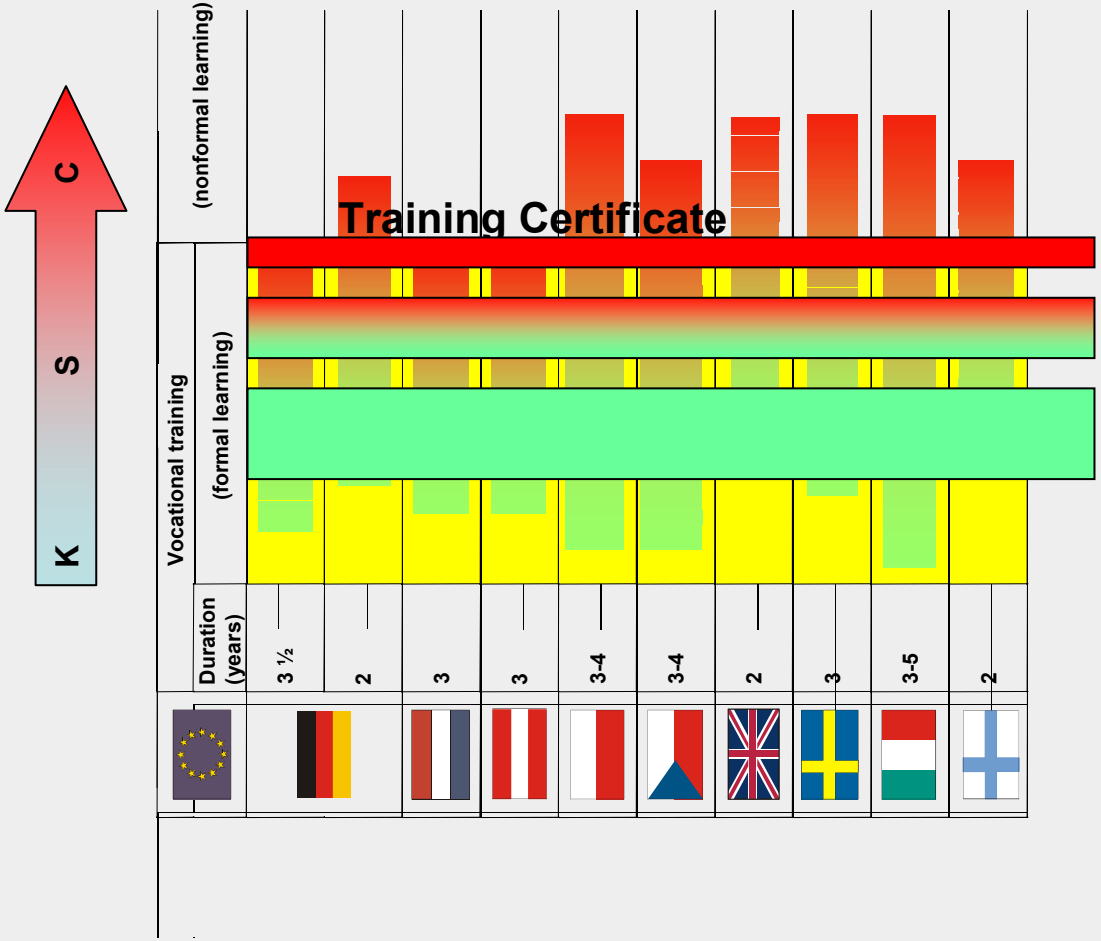
Result in the Project „ECTS Chemistry“



Anrechenbarkeit von Ausbildungsmodulen / -sequenzen

Competence (< 50 %)

Skills (60 – 80 %)

Knowledge (> 90 %)

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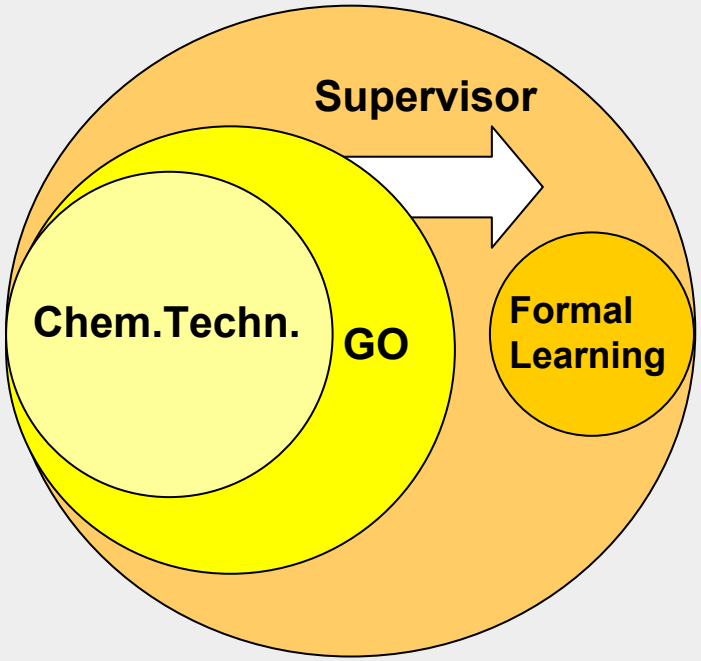

Supervisor = General Operator + formal + nonformal and informal Learning

or

Supervisor = 300 Credits (General Operator)
+ 120 Credits (formal Learning (≈ deutsche Meisterausbildung))
= 420 Credits

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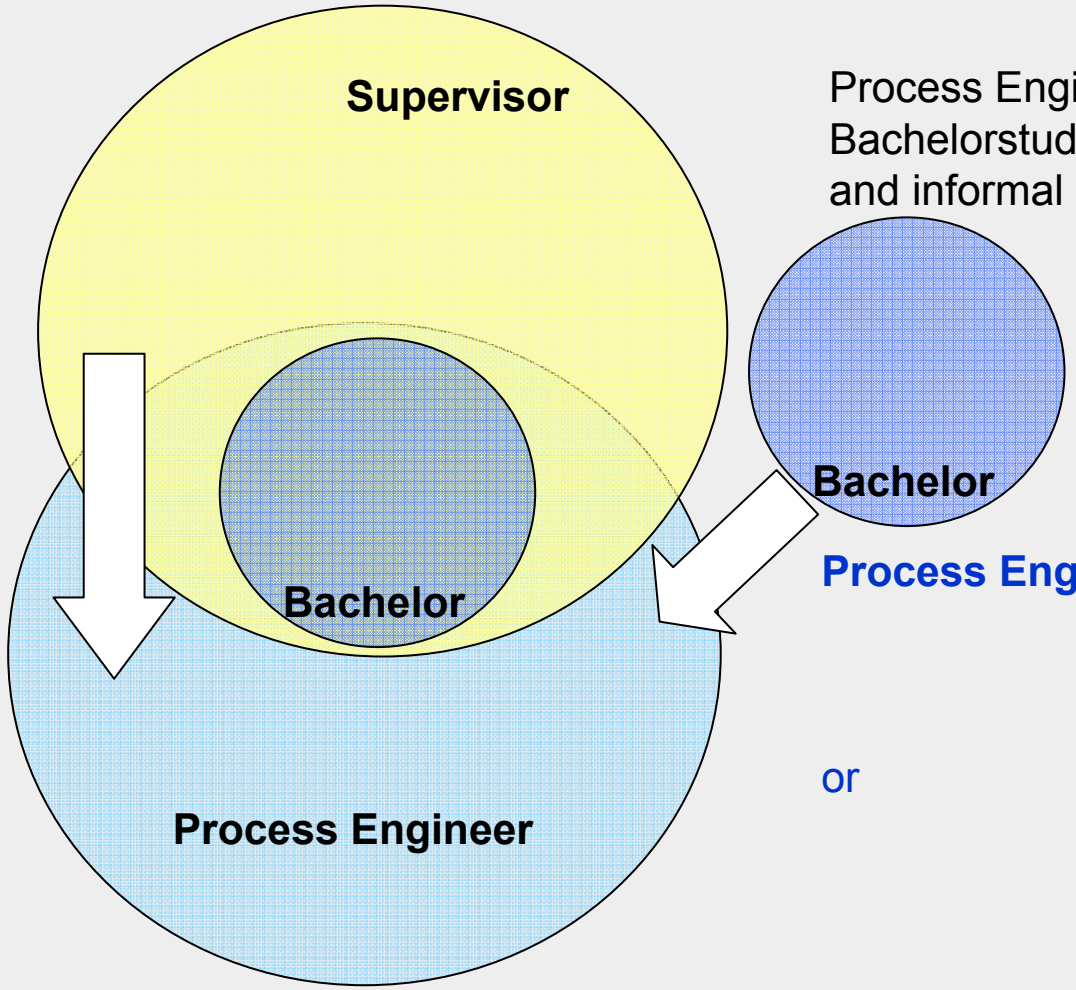

Process Engineer = Supervisor (+ Bachelorstudies) or Bachelor + nonformal and informal Learning

Process Engineer = 180 Credits (Bachelor)
+ 120 Credits (Traineetime)
+ 120 Credits (Assistent)
= 420 Credits

or = 300 (?) Credits (Supervisor)
+ 120 Credits (Bachelorstudies)
= 420 Credits

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Project Status

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- At present, the partners are determining the competence profiles and searching „equivalents“ between the „competence matrix“ for the levels (4), (5 / 6) and (6 / 7)

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Competenceprofile for a General Operator

(∑ over all maincompetences = 100 %)

	Maincompetence (Title)	2	4	6	8	10	12	14	16	18	20
1	Operating Machinery, Performing Plant Operation Procedures										
2	Process Control, Plant Monitoring and Control										
3	Analysis of the Process, Fault Finding and Problem Finding										
4	Process Hazards and Emergency Procedures										
5	Logistic Jobs										
6	Quality Control										
7	Maintenance Work and Safety Working Conditions										
8	Leadership										
9	Organisational behaviour and Personnel Management										
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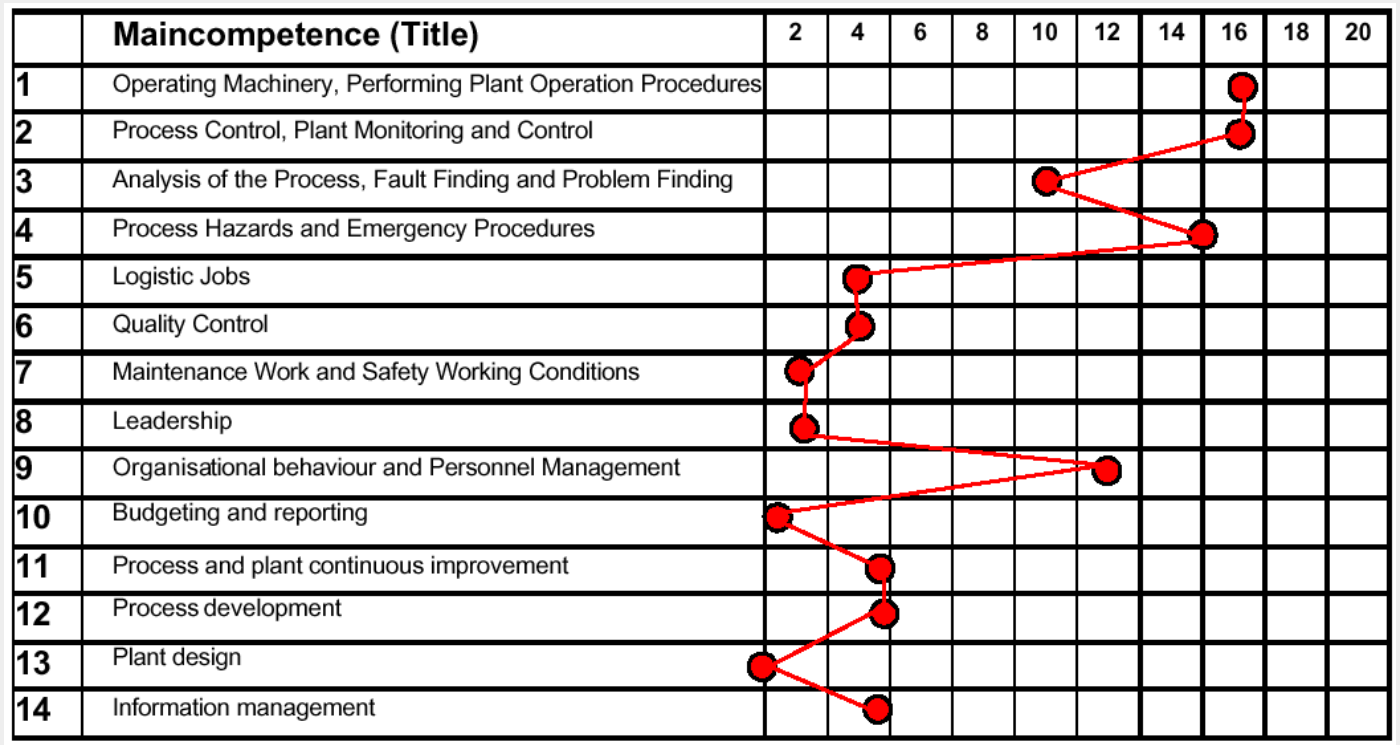

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Knowledge		
to know fundamental principles	kp	10 %
to know math./ phys. Principles	km	20 %
to know examples	ke	30 %
Skills		
to use examples in praxis	up	40 %
to know applications in the field	ka	50 %
to use fundamental principles	pu	60 %
Competence		
to master math./ phys. Principles	mm	70 %
to understand examples	eu	80 %
to solve tasks in team	st	90 %
to know applications in the field and work together with other experts	we	100 %

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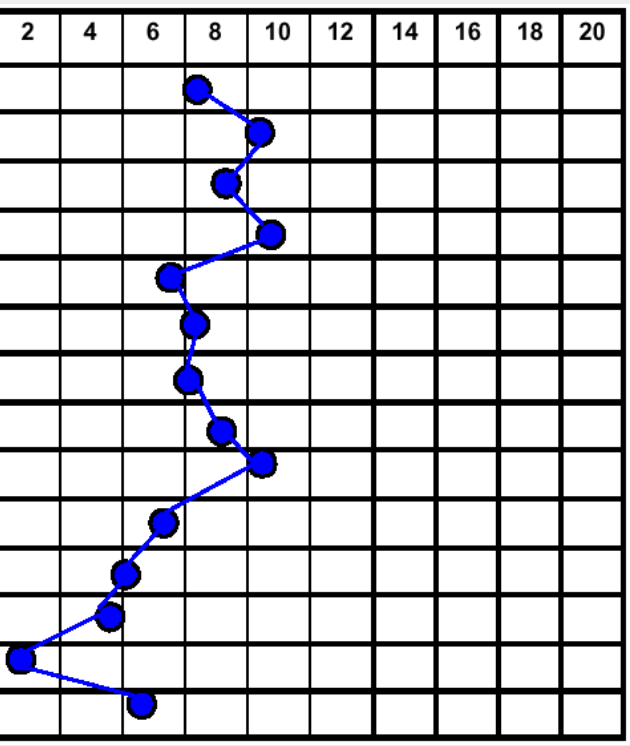
Competenceprofile for a Supervisor

(∑ over all maincompetences = 100 %)

	Maincompetence (Title)	2	4	6	8	10	12	14	16	18	20
1	Operating Machinery, Performing Plant Operation Procedures										
2	Process Control, Plant Monitoring and Control										
3	Analysis of the Process, Fault Finding and Problem Finding										
4	Process Hazards and Emergency Procedures										
5	Logistic Jobs										
6	Quality Control										
7	Maintenance Work and Safety Working Conditions										
8	Leadership										
9	Organisational behaviour and Personnel Management										
10	Budgeting and reporting										
11	Process and plant continuous improvement										
12	Process development										
13	Plant design										
14	Information management										



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Competenceprofile for a Process Engineer

(∑ over all maincompetences = 100 %)

	Maincompetence (Title)	2	4	6	8	10	12	14	16	18	20
1	Operating Machinery, Performing Plant Operation Procedures										
2	Process Control, Plant Monitoring and Control										
3	Analysis of the Process, Fault Finding and Problem Finding										
4	Process Hazards and Emergency Procedures										
5	Logistic Jobs										
6	Quality Control										
7	Maintenance Work and Safety Working Conditions										
8	Leadership										
9	Organisational behaviour and Personnel Management										
10	Budgeting and reporting										
11	Process and plant continuous improvement										
12	Process development										
13	Plant design										
14	Information management										

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What can we do with these results?

1. **We can describe the competences of**
   - **General Operators,**
   - **Supervisors and**
   - **Process Engineers**

   with *one* Competence matrix.

   (Better results through questions outside the project)
2. **We can give a first answer for permeability in vocational education and training**

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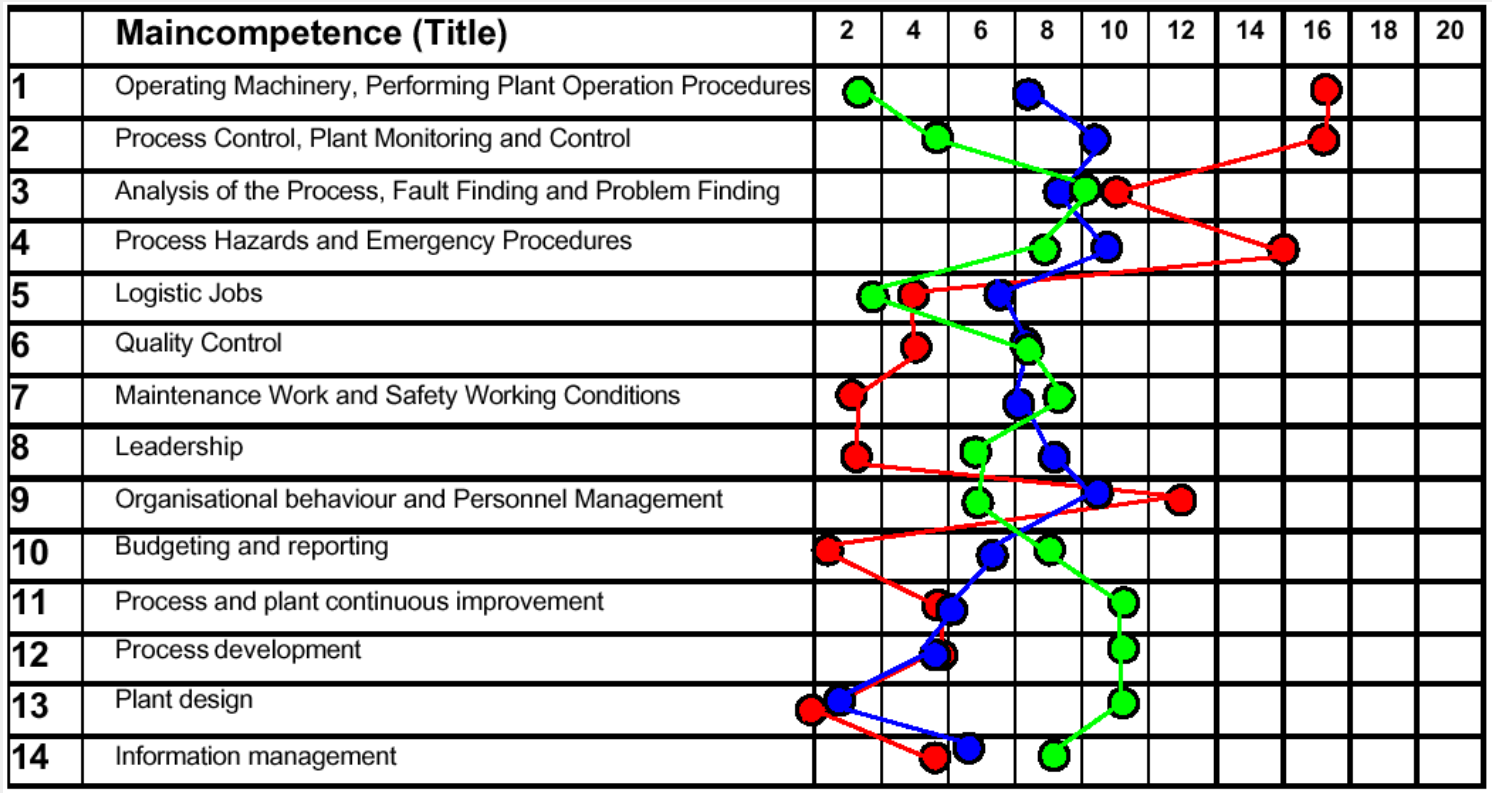

Side effect: Translation Assistance

- „main competences“ in English and 7 other national languages
- „details“ for the „main competences“ in English and in 7 other national languages
- "Equivalents" of the respective national education standards

in Germany	Training regulations „ChemikantIN“
	Framework curriculum „CTA“
in The Netherlands	Framework plan „Processoperator B“
in the UK	NVQ II „Chemical Technician“
and so on ...	

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What we have to do:

1. Open the Translation of the Competence-Matrix for other users

2. Think about the Competence-Profile for Op, Sv and PE
   - for a better result
   - for more details

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Thank you for your attention !

Europäisches Bildungswerk für Beruf und Gesellschaft gGmbH
Dr. Frank Schmidt

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