Building blocks for unique people

Competence profiles for theatre technicians

PWO research project

Technical Theatre Education in Flanders

This document is published by the Expertise Centre for Technical Theatre RITS, Erasmus University College Brussels (Dutch: Kenniscentrum Podiumtechnieken RITS, Erasmushogeschool Brussel).

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PWO research project 2008 - 2011

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Contents

Introduction 4

Research method 6
- Validation by the sector 7

The complexity of theatre techniques 8

Aim and set-up 10

Basic Assumptions 14
- Occupations
- Rarities or no great shakes 16

Definition of competencies 18
- Writing competencies
- Determining a competence's weight 21
- Units of attitude 24
  - Writing the units of attitude
- Units of knowledge 26
  - Writing units of knowledge
  - Classification in disciplines 27
- Readability 29
- Clusters 30
- Weight of a competence at multiple levels of skill structure 31
  - EQF, weight and level of competencies 34
- Backbone 35

Add-ons to the competencies 36
Skills
Measuring sentences for evaluation and self-evaluation
Good practice 38
Exercises
Tips 39
Safety and ecology
Units of attitude 41
Measuring sentences for evaluation and self-evaluation
Tips for improvement 42
Units of knowledge 43
Sources
Exercises 44
Measuring knowledge
A dynamic system

Competence profiles 46
Relationship between training profiles - occupational profiles 47
Conflict between competencies - courses 50
Horizontal promotion 51

Knowledge profiles 52

Profile tools 54
A lifelong learning portfolio
An individual learning path 55
Evaluation and self-evaluation 56
Measuring training demand 57
Matching 58

The result 59

To conclude

Introduction

Introduction

The first phase of the PWO research project "OPTiV" (Opleidingen Podiumtechniek in Vlaanderen, Technical Theatre Education in Flanders), proved that there is need for a detailed definition of the occupational competence profile. The majority of teachers and trainee supervisors consider the occupational competence profiles not detailed enough and open to more than one interpretation. This led to training programs that all qualify for the same occupation, but display great differences with regard to their curriculum.

The subproject, of which you are reading the outcome here, developed a writing convention and methodology in order to reach a sufficiently detailed definition. The test case was to define the competencies, attitudes and knowledge for the theatre technician assistant and the theatre technician*. In order to realize this, we took the framework developed by DBO** as a point of departure.

In the course of the subproject, the writing convention that we developed proved to be useful in numerous other instances. In collaboration with the REcoEP project, for instance, the writing convention was linked to safety and ecological criteria.

We feel that the methodology resulted in a useful and feasible system, which may also serve as a source of inspiration in other fields.

This project was realized in association with partners active in the field of education as well as professionals. Therefore we would like to show them our deepest gratitude here for their hard work and effort.

The competence definitions and concepts we developed are presented in open source. After all, they were developed by means of government subsidy. We hope that this increases the quality of education as well as the sector.

* In the Belgian professional context, theatre technicians are polyvalent technicians that deal with all areas of the profession

** The department of professional education of the ministry of education.

Research method

Research method

In order to achieve the desired effect, we mainly applied a participative research method. This choice has different motivations. On the one hand, little literature is available on the actual working methods of the workers on stage. On the other hand, the methodologies and ways of thinking evolve very quickly.

We participated in the development (and evaluation) of a number of TSO* programs, DBO profiles and the curriculum for Syntra Leertijd**. The adjustments to the RITS program and the tests concerning the experience certificate*** obviously contributed as well. Participating in the writing process of the "derived products" gave us a clear understanding of how these products were realized. Furthermore it allowed us to determine the actual problems occurring in the developmental stage and when using the products.

Of course we used the results from earlier projects in which our Expertise Centre participated, or which we followed up as a "silent partner". These include for instance:

- The TTT-LPT project, from which we took the writing convention and part of the competence content as a point of departure. Where possible, the international definitions were maintained as well.
- The PraPAT project, carried out by the Expertise Centre under the authority of the VLOR. This project mainly provided us with the attitudes, but also tips to improve these attitudes.
- The CAPE-SV project, which gave us a number of insights regarding the assessment of competencies.

* Technical Secondary Education (EQF 4)

** National Apprenticeship Program

*** Certificate based on validated competences

Many discussions and informal conversations (as part of our network) led to new insights and possibilities, such as working with the promoter team of EVC, the theme working of the ESF - experience certificate, the Social Fund for Performing Arts (Dutch: Sociaal Fonds voor de Podiumkunsten), BASTT* and the Consultative Body for Technical Theatre Education (Dutch: Overleg Opleidingen Podiumtechniek). On the other hand, the individual contacts with teachers and trainee supervisors were of inestimable value, because they have the clearest notion of the actual needs.

Internationally, we tested the results with colleagues from CFPTS in Paris, Academia Teatro all Scala in Milan, Scenart in Bucharest, Plasa in London, Dramatisk Instituted in Stockholm, the social partners of the performing arts, OISTAT,... This resulted in a broader framework and understanding of the possibilities to create useful units internationally.

To conclude, we worked together intensively with the REcoEP project on the add-ons regarding safety and ecology.

Validation by the sector

No final validation was carried out by the sector at the end of the project. However, the results were included in the different programs and diffused by several organizations.

A formal validation seems to be advisable in the future. This may for instance be put into practice simultaneously with drawing up the specialists' competencies.

* The Belgium association of theatre technicians

The complexity of theatre techniques

The theatre technician takes care of the artistic and technical part of a production. His main tasks concern lighting, sound, projection, set, stage mechanics and the organization of the entire production. Technical theatre constitutes a professional group within the performing arts.

One of the characteristics of the performing arts is the process of creation: new, non-existent performances are created. Consequently, the theatre technicians should be creative and artistic. This input becomes higher, as the technician's level increases. Whereas the assistant is predominantly concerned with the technical affairs and hardly involved in the production process, the theatre technician / operator is expected to participate in the production process, as well as the performance. He is a "cast member" along the actors, musicians or dancers. In doing so, he needs to have the same competencies as the performers.

A clear, substantive input is expected as well during the process of creation. After all, technicians are responsible for the translation of the artistic concept into a technical execution. In order to do so, they will have to understand this artistic concept and communicate it with the designers and the artistic team.

The creation process influences matters on the level of e.g. safety competencies; for the most part, the rules should rather be interpreted than the observance of existing rules. This is also the case in the technical sphere, as existing techniques are put to use in a new way. Consequently, a broader and more profound understanding of the techniques is required.

The performing arts can be subdivided into several disciplines, which obviously all require specific competencies from the technicians. After all, a theatre performance demands a different technical approach than a dance performance or a musical performance. Moreover, the number of crossovers with other disciplines in arts such as the visual arts and film is increasing. In actual practice, theatre technicians will also be employed in the event industry and its suppliers, which also have their own specific requirements.

Technicians are employed at receptive theatres as well as (travelling) companies. This apparently results in variation with respect to the range of duties. The receiving technician will rather manage technical aspects, whereas the technician working in a (travelling) company is more involved in the creative process. Many technicians work freelance (self-employed, temporary employee or interim worker with short-term contracts). This also demands specific competencies, e.g. relating to administration or planning.

The Belgian occupational profile is multi-staged. The theatre technician also masters all competencies the assistant should possess, whereas the stage manager masters all competencies of the theatre technician. In smaller associations, the stage manager will practically answer for all aspects of technical theatre.

The technical complexity of the occupation initially lies in the horizontal specialization, as the technician should rather possess skills with a broad range instead of being very specialized in one domain. However, there is a noticeable tendency towards a larger specialization, because the technology in use is becoming more complex. As a result, more differentiated professions are formed.

In summary we may argue that the technicians cannot be lumped together anymore. Their tasks vary both in the field of technical content and the artistic input.

Aim and set-up

For the last few years the sector of the performing arts, with technical theatre* under it, has participated in the creation of occupational profiles, training programs, experience certificate criteria, tools for qualification management and projects into the exchangeability of competencies, classification and lifelong learning. In doing so, the original occupational competence profile has been "translated" at least 12 times into other formats, structures or models, which led to a fairly obscure and non-transparent system.

The analysis of these "translation exercises" put forward a number of pressure points:

- Substantial differences can be observed between the competence interpretations.
- There is uncertainty about the relationship between identical competencies that exist on multiple (EQF)** levels.
- The various writing conventions*** and formats severely obstruct the comparison of the systems as it is hardly possible to compare two profiles. There is a constant need for some sort of "intermediate table" with "lowest common denominator" in order to translate the various documents in comparable units.
- With respect to the majority of writing conventions, attitudes and knowledge components are hardly noticeable. However, employers and professionals attach great value to the attitudes and knowledge components are essential to the development of a training program.

* "Technical theatre" includes all professional qualification profiles within this domain, i.e. the cluster assistent - theatre technician - stage manager as well as the specialists in lighting, sound and projection.
** Referring to the European Qualification Framework obviously also implies a direct reference to the VKS, the Flemish Qualification Structure (Dutch: Vlaamse Kwalificatie Structuur). We refer to the EQF because it is more universal.
*** Writing conventions imply the way in which the qualifications are defined, the level of detail, the syntax etcetera.

- The present writing convention(s) is/are not detailed enough to estimate the depth and complexity of a competence. Consequently, the difference between e.g. the qualifications of a theatre technician and a specialist is not perceptible.
- The present writing convention(s) do/does not necessarily guarantee an unambiguous assessment of the competencies.
- The occupational profiles often reflect a minimal representation of an occupation because the only competencies that are considered are those existing in all instances. The total volume of competencies of an average professional is generally larger.
- There is uncertainty with regard to the relationship between (the competencies in) the various occupational profiles.
- There is uncertainty about the intrinsic relationship between "training profiles" and "job profiles".
- The classification of the profiles with respect to EQF or education levels is carried out differently by the sector and by the field of education.
- There is no connection with the international systems such as ISCO, ESCO or ROME*.

The reasons behind these pressure points are diverse and are (partly) typical of the transition of a knowledge-oriented approach towards a competence-oriented approach. Moreover, the different points of view between the sector and education and the competition between training programs are causing pressure.

- Experienced educators prove to have trouble with the practical consequences of the transition of transfer of knowledge to competence development. Mainly the requirement that competence should be reached fully instead of 50% turns out to be difficult.

* ISCO stands for International Skills, Competencies and Occupations taxonomy, ESCO for European Skills, Competencies and Occupations taxonomy. The French taxonomy ROME was derived from these two.

- Working with competencies conflicts with the culture of giving marks, which is still customary to most schools.
- The aim is to make the competencies transferable. As a result, very general, broadly interpretable, theoretically defined competencies come into being, which are hard to measure.
- Each organization has developed its own formats that should be applied to all occupations. These are provided with a number of competencies to be followed, which all apply to a level or discipline. Next to that, the number of "allowed" competencies is limited. The format assumes that an occupation can be defined by e.g. 10 competencies.
- There is a certain fear of being too observant writing the definitions and being judged later on the results.
- The material reality of the organization is consciously or subconsciously taken into account. This deals with e.g. the availability of budgets for expensive techniques, availability of educators and trainee posts or requests by specific companies.
- Companies want employees who are quickly available, educators want to turn out employees who also last in the long run.
- The classification of an occupation involves financial consequences for companies.
- The classification of an occupation determines who (at what level) may organise a training program.
- The profile writers are predominantly "professional representatives" who represent their organization for multiple occupations. The relationship with the reality on the shop floor is commonly very limited or non-existent.

The aim of this study is to reach a univocal writing convention, which is useful for the sector as well as the training programs. We intent to achieve a mutual "backbone" that will shed light on the various levels, occupations and users of the competencies. Each user may link specific information useful to his own targets to this backbone.

It is explicitly not our intention to uniformize training programs or jobs. We aim to clarify the characteristics of a training program or job by giving a specific definition.

Basic Assumptions

This study is based on a number of conclusions:

- Each individual and each professional is unique and possesses a unique combination of competencies.
- Each job is unique and the exact content of a function relates to a specific organization. Even variations within a job description add value within an organization
- Each training program is unique. A training program is a combination of content, educators, participants and local factors.

In other words, competencies should be written so as to allow for the formulation of the various unique profiles.

Occupations

One of the most important findings of the TTT-LPT project was that occupations, as a series of definite, defined competencies, in fact do not exist in the sector of performing arts. The interpretation of an occupation varies from country to country and even between organizations. Also within one and the same organization there appeared to be differences, which was considered a positive aspect.

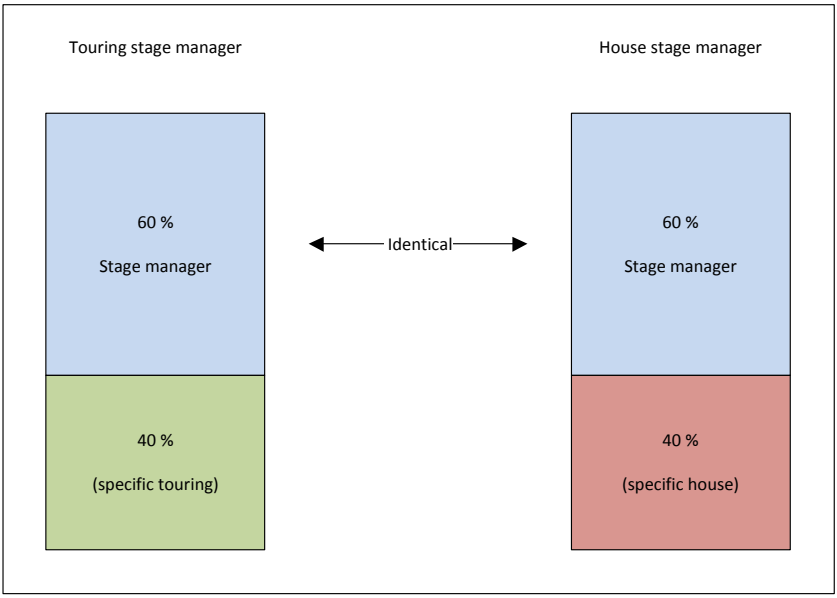
On the other hand, there is a definite need of definitions. Schools, validating organizations and the social dialogue all use the standardized occupational definitions in order to carry out their tasks.

We start from the assumption that two jobs refer to the same occupation if 60% of the competencies match. These competencies should be existent under all circumstances and be characteristic to all professionals.

The 60% margin is arbitrary. This allows for sufficient variation options to define more occupations with a smaller number of occupation profiles. It also allows for maintaining the unique characteristics of a particular training program or tuning a job to the actual needs.

The example below reflects the relationship between the various occupations, the in-house technician who receives companies in a cultural centre and the travelling technician who travels from centre to centre with a particular production. Their profiles are different, but the size of both of their core occupations is large enough as to consider their occupations similar.

The specific competencies should nevertheless be defined in order to clarify the complexity of the occupation. These may vary based on working location or experience, but the volume should be included.



Rarities or no great shakes

While defining the occupational profiles, we were urged not to look for a rarity (the perfect technician that everybody would hire instantly), but for an average technician who can function in an average work climate.

Because of the differences in job content in case of technicians, this led to a profile that defined "no great shakes". After all, the additional competencies that differ from technician to technician, but which are essential when working in a particular context, were not included.

The existing profiles practically only define the 60% of joint competencies. One could argue that this is enough to start working in the sector, but more is needed in order to keep functioning.

The existing occupational profiles do not assess the occupation at its true value. This may be rectified if an approach with fixed and variable competencies is to be adopted.

Definition of competencies

Definition of competencies

The list of competencies originated from an analysis of the available competence profiles. In this analysis, the principle of the "lowest common denominator", developed in the European TTT-LPT project, was used*. In a nutshell, the analysis proved that a competence in an arbitrary profile should at all times occur as a indivisible unity and that it should be possible to determine unambiguous if that competence is present.

The competence definition always includes the following elements:

- A title that sufficiently specifies the content. In more general documents, only the title is used to refer to the rest. An average professional should be able to assess the content of the competence by means of the title.
- Active sentence, which is an alternative definition of the title in the form of an action. These definitions are used as a reference in a number of systems.
- Context, a description of the actual context in which the competence is present. This context also indicates the professional's responsibilities.
- Level, the EQF level of competence, independent of the profile in which the competence is present. Even though the EQF definition is not designed for this purpose, it is possible to classify an individual competence.
- Weight, the weight of the competence within a profile at the given EQF level. The weight is indicated in proportion to the whole profile.
- Field. Given that the performing arts range over a gamut of disciplines, a reference to the discipline is added. In doing so, a list is used which was developed in the TTT-LPT project.
- Location in the process, which indicates the place in the production process in which the competence is most noticeable.

* The Leonardo projects Technical Theatre Training and Life Performance Training developed an interchangeable writing convention

- Measuring criteria, which indicate how the competence becomes visible in that particular context. In case of more complex competencies, the measuring criteria can be subdivided in order to increase readability. The measuring criteria are always written as positive, simple sentences.
- References to units of attitude (see below)
- References to underlying units of knowledge (see below)
- If necessary, references to requisite competencies are given, which are competencies that are needed in order to obtain the defined competence.
- Reference documents. References to passages from existing profiles can be added to these documents in order to check the interpretation.

Example of a unit of competence:

Competence unit: **Working safe with tools**

Safe use of electromechanical tools in function of the asignment

Active sentence: works safe with tools

1 Check tools

Checks tools on a regular base
Judge if tools meet standards

2 Use tools safely

Reads instructions and manuals
Uses tools only where they are meanth for
Uses machines safely
Doesn't block security
Doesn't remove security equipment

3 Manage tools

Maintains tools regulary
Stores tools safely

Underlying attitudes	Undelying knowledge
Safty concience	electrical safety Mechanical safety Risc prevention

Production phase: **independent**

EQF level **3** Weight: **12**

Professional Profile	reference
BCP Podiumtechnieken (APT)	2.3.1
BCP Podiumtechnieken (PT)	2.3.1
BCP Podiumtechnieken (TON)	2.3.1
BCP Podiumtechnicus Licht (PLT)	2.10
TTT	70 55 00 06

Writing competencies

The competencies are derived from existing profiles. Consequently, we are dealing with the refinement of the competence rather than the development of new competencies.

In the first phase, a list was worked out with the titles of the various units of competence. The references to all occupational profiles and the TTT-LPT system were later added to this list. This way, the principle of the "lowest common denominator" was guaranteed.

In the second phase, the competencies were written out and tested by multiple professionals.

To conclude, the competencies were verified according to the checklist from the TTT-LPT project, which guaranteed the universal character of the definition of competence.

Competencies checklist:

- **Independent of the regional context** (no references to local situations or legislation)
- **Independent of job titles** (no references to job titles as these vary from place to place)
- **Independent of technology** (no references to specific equipment or apparatus, if possible)
- **Lowest common denominator** (it should be impossible to find back part of the unit of competence in a profile/ training program/ job description. It should be possible to answer yes or no to the question if someone possesses the competence)
- **Noticeable/ measureable**
- **Defined objectively**

- **Unique** (the unit should clearly differ from other units, the overlap is minimal, if one unit is present in multiple fields it should be transferred to a more general category)
- **Defined as general as possible** (where necessary the content is linked to a specific field)
- **Non discriminating** (no person may be ruled out)
- **Readable** (the unit is readable and clear to an average professional)
- **Positive definitions** (the definition does not include aspects one should not do)
- **Syntax** starts with a verb (present simple tense) followed by a delimitation
- **Specific and detailed** enough in order to avoid different interpretations
- **Clear definition of the level** of knowledge and skills (e.g. the difference between knowledge, comprehension, the ability of application or between reading and interpretation)
- **No general definitions** such as "in the right way"
- **In a clear context** (there can be no doubt about the situation to be examined)
- **No self-evident skills, knowledge or attitude** (it is self-evident to work safely, it is only notified in case it is safety critical
- **No self-evident autonomy** notification, only if the skills prove the level to be insufficient
- **The unit is allocated where it is most significant**, even if its content also appears in other places

Determining a competence's weight

In order to determine the weight of a single competence, our point of departure is the existing profiles. Within these profiles, the importance of a competence is estimated in relation to the aggregate of competencies.

With regard to competencies present at multiple levels, we started from the lowest level in which the competence is found. Subsequently, its value was recalculated to a higher level. The relation between the various levels will be explained below.

With respect to a concept with universal competencies that can be used for learning as well as job objectives, two approaches for determining the weight of a competence can be distinguished. In a learner environment it seems logical to start from the average time spent on acquiring a competence. In case of a job-oriented approach, it seems more logical to start from the value within an occupation.

For the purposes of this study we used the average of both figures. Since our point of departure was an existing profile, these figures were recalculated pro rata of the total profile.

We intend to work out a more detailed and universal calculation method that can be applied to all occupations.

Units of attitude

Attitudes indicate what "disposition" or "mentality" is required in order to fully command a competence. These mostly involve aspects that can be developed rather than acquired.

As the same attitudes are required in various competencies, we decided to define these in separate units. A reference is made to this in a particular competence. The list of attitudes originated from an analysis of the existing occupational competence profiles combined with the results from the PraPAT* project.

This method allows for an enlarged feasibility and measurability in case of training situations. In addition, the increased clarity concedes to the importance attached to the attitudes in a working environment.

As the attitudes are at the core of the competencies, they are not allocated a certain value. After all, they constitute an essential part of the competence.

The attitudes are independent of a particular level. One and the same attitude may for instance be found at EQF 3 and EQF 6. Consequently, no EQF level is assigned to them.

Example of a unit of attitude:

Perseverance

Try alternatives, not giving up, persistence, power to carry through

Perseverance

Does not give up before there is a satisfactory solution
Stays alert, even with long lasting assignments, tasks or projects

Writing the units of attitude

The units of attitude's content is based on the analysis of the various occupational competence profiles and the research results of the PraPAT project.

* The Practical Learning in Technical Theatre and Audiovisual Techniques project was carried out by commission of VLOR within the scope of preparing for the HBO. Special attention was paid to the evaluation of attitudes during practical learning.

Knowledge unit: **Properties of light**

Introduction on the properties of light and their relation

The human eye

- How do we see
- Properties of the eye
- Objective and subjective properties of light
- Intensity and color

What is light

- Wave theory
- Particals theorie

Properties and units

- Lumen
- Candela
- Lux

Beheavieor

- Refraction
- Reflection
- Absorption

Required knowledge

Is underlying to following competences

- Focusing spotlights
- Follow spot
- Making a technical light plot
- Optical effects

Is used by following knowledge units:

- Lighting – procedures focusing
- Lighting - parts of a spotlight
- Lighting – maintenance
- Audio Visual techniques – projection
- Special effects – optical effects

Sources

Stage Lighting Design, Pilbrow, Richard
Tussen Licht en Donker, Van Uum Hugo
Licht en kleurboek, Boelen, Kars

Units of knowledge

Knowledge in competence systems is generally not measured or validated. This does not imply that knowledge is not required. It is somehow "at the core", as the competence cannot be achieved without knowledge. Measuring the competence also proves if someone is able to apply his/ her knowledge to a specific context.

In the domain of education, knowledge has two functions; on the one hand it is vital to the competencies' background. On the other hand, knowledge is the foundation that enables further development.

The underlying knowledge is a recurring phenomenon, as one and the same type of underlying knowledge is the foundation of several competencies. We decided to define these in separate units as well. Hence the definition of the competencies remains compact and readable.

Another advantage is that the definition of units of knowledge moderates the elaboration of teaching material and sheds light on the origins of essential theoretical background.

Similar to the units of attitude, no weight or level is attached to the units of knowledge because they form part of the competencies. In a learning environment, however, it is of course possible to attach value.

The purpose of the units of knowledge is to accommodate the process as they signal a number of possible subjects. The main objective remains the full support of the competencies. The actual relevance depends on the teachers' (or the training program's) autonomy, as these have the best command of applying the theory based on their own experience, the target group's needs and the environmental factors.

The units of knowledge can give structure and understandability to training programs that are scattered throughout multiple fields and avoid "overlaps" or "gaps" by doing so.

The breakdown in separate units does not take into account the size, required time or the importance of the unit. The breakdown is based on the necessities of the units of competence and should make it possible to make a choice during a training pathway.

The link to the competencies demonstrates what knowledge is essential. This of course does not imply that knowledge, which cannot directly be linked to the competencies, is useless. The classification, however, does reveal these relationships (and choices).

The units of knowledge indicate the relationship with other possible knowledge components. Some knowledge units build on knowledge that was already acquired.

Unlike some competence systems in the UK, for instance, we only indicate "universal" knowledge, which is not bound by a specific workplace. Knowledge of an actual case, such as an organization's labour regulation, is not defined here.

Writing units of knowledge

In order to determine the content of the units of knowledge, the essential and required knowledge was taken from the various competencies. This knowledge was listed and subdivided into different titles. This way, it could be linked to the various competencies.

Subsequently, the content of the various titles was worked out in detail. This content is partly based on the existing teaching material.

Classification in disciplines

The units of knowledge are subdivided into fields. This classification is independent of the division of subjects as part of a training program. This way, the units that come under the discipline of safety can be (preferably) taught during various subjects. At the same time, the units dealing with history (and which are spread over several disciplines) can also be taught altogether.

The division into fields is initially intended to enlarge the readability and simplify the searching process, and should therefore not be considered an indisputable fact. On the one hand, the list of fields contains more general domains that are related to multiple disciplines. These deal with:

- Documenting
- Planning and organizing
- Reflecting and communicating
- Fit up, take down and progress of a production
- Safety
- Management
- Commerce (acquisition, rental)
- Informatics
- Designing

On the other hand, the list contains fields that specifically refer to a particular discipline. These include:

- Electrical installation
- Stage mechanics
- Set
- Lighting
- Sound
- Audio-visual techniques
- Special effects
- Costume

Choosing this double classification was motivated because a number of competencies do not fundamentally differ per field. There is no difference between planning and organizing in the fields lighting and sound. When there are in fact deviations, the competencies will be included in that specific field.

Readability

The principles mentioned above imply that the number of competencies increases considerably, which is generally considered to be a negative fact. The experiments with the actual users of competencies have proven that competencies that can be used without much interpretation are more efficient than those demanding a great deal of interpretation.

In order to increase the readability (and to ease the searching process), the competencies are put in a chart. The x-axis indicates the place in the process, and the y-axis the field. Each unit of competence contains information about the most prominent place of the competence during the process and also in what field it can be found, which makes it easy to find. The competence of "focussing light", for instance, can be found in the discipline "lighting" during "preparation".

It should also be taken into account that the final user only faces a certain part of the competencies and only the information that is vital to the specific use.

Clusters

The units of competence can be combined when used in a specific context in order to increase the degree of practicality. In doing so, a group of competencies will form a cluster, which is given a separate name. These clusters make it possible to join in more closely with the existing formats without becoming less detailed.

In general, the clusters only include the titles of the units of competence or only the active sentence phrasing the title. For general purposes, the titles are most of the times clear. If necessary, the details can be looked up in the detailed definitions.

Example of a cluster

Controlling stage mechanics

- Use ladders and moveable tower scaffolds
- Use servicing platforms
- Loading and calibrating fly systems
- Using fly systems
- Setting up mobile rigging structures

Weight of a competence at multiple levels of skill structure

Identical competencies can be found at multiple levels of the skill structure. The higher the level, the less important these competencies will be to the entire profile. In order to compare the various profiles at different levels and to increase the transferability, it is necessary to find a ratio between the values assigned at different levels.

The competence of "loading and unloading a truck", for instance, is fairly important at EQF level 3. However, at EQF level 6, the importance of this competence will be far smaller with respect to the total.

In order to achieve a feasible ratio, our point of departure was the existing situation in Flemish education. In doing so, we examined the general learning effort and the transferability that was already supplied.

The learning efforts are generally expressed in credits. In higher education, the ECTS credits are adopted, whereas in vocational education, the ECVET credits are used. This distinction is of little use in the technical theatre sector (and especially at European level). Training programs leading up to the same occupation are indeed offered in various systems; a Bachelor or Master in country X may equal an apprenticeship in country Y.

Both systems convert the ratio of a competence's average learning time to the average yearly effort to a system of credits. Hence, both cases are based on the same principle.

When we have the ratio between the various years of study on different levels, we also have the ratio of a competence's importance in all levels. To calculate this, we take the following principles and conclusions as a point of departure:

- Only the final levels of the BSO and TSO were considered, for lower levels do not define the type of occupation.
- We have based our study on an average length of study.
- We take into account the conditions of admission and translate these in an absolute weighting.
- The transfer of the professional Bachelor to the Master has not been taken into account, because this concerns other (academic) competencies rather than more competencies.
- We used 60 credits per year at level EQF1 as the point of departure. This value is arbitrary, as we are dealing with ratios.

Two elements are the first indicators with respect to the ratio between the levels.

- After two years of attending BSO, the TSO level van be reached by means of a seventh year*. Two years at the EQF3 level, complemented by one year at the EQF4 level (7th level) equals two years at the EQF4 level.
- After two years of HBO**, one may be granted shortening of study time of one year at Bachelor level. Two years at the EQF5 level equals one year at EQF6 level.

* A supplementary year

** Higher professional education (EQF5)

When we take this assumption further, we reach the ratio of 1/2 at each higher level. This principle is illustrated in the table below:

		EQF1	EQF2	EQF3 BSO	EQF4 TSO	EQF5 HBO	EQF6 Ba	EQF7 Ma	EQF8
Weight per year				240	480	960	1920	3840	
Number of years				2	2	2	3	1	
Weight of training program				480	960	1920	5760	3840	
Start condition						960	960	6720	
Total				480	960	2880	6720	10560	
Alternative	Baseline condition prior to 7th year				480				
	7th year				480				
					960				
	Baseline condition shortened course						2880		
	2 years shortened course						3840		
							6720		
Convert factor to ECTS credits			1	2	4	8	16	32	64	128

By means of this table we can determine that an increased level corresponds to a doubling of the learning efficiency per year. When we express the learning effort at all levels according to the same credits, this ratio can be expressed mathematically:

credits / $2^{(\text{Target level} - \text{source level})}$

This ratio allows for the transfer of competencies from one level to the other. A competence from a lower level that is used at a higher level will therefore not carry that much weight. On the other hand, a competence from a higher level that is used at a lower level will carry more weight.

EQF, weight and level of competencies

The European Qualification Framework (EQF) is in fact not meant to classify individual competencies. It turned out, however, that the criteria are useful for such a classification, provided that there is some degree of interpretation.

With respect to the results of this study, we assumed that the classification of the competence results from the lowest classified profile in which the competence is present.

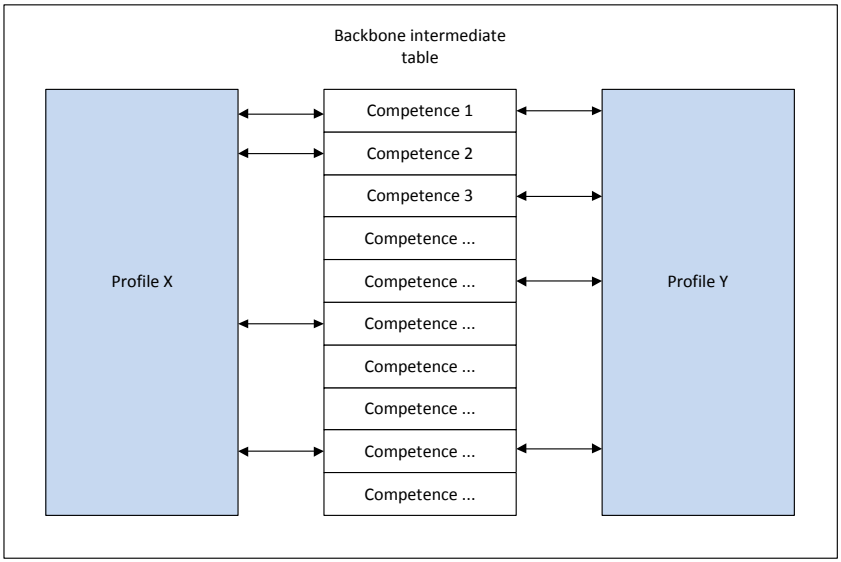
It would be advisable to develop a standardized method for classifying individual competencies and for determining its weight.

Backbone

The list of competencies forms the backbone of the developed system. Various profiles and applications can be linked to this profile. When the existing profiles are linked to the backbone, it functions as an intermediate table. This intermediate table make the differences and similarities quickly visible.

On the other hand, the backbone functions as some kind of structure to which information and derived tools can be "attached". We will discuss these tools in the next chapters.

If we want to have command of a permanent and joint structure, and at the same time avoid version conflicts, it is advisable to make the backbone digital and available online. Users may subsequently link their data to this structure and consequently possess the most recent version.



Add-ons to the competencies

Extra elements can be linked to the various competence aspects (skill, attitude and knowledge). These include training tools and tools for using the entire profiles (see tools for profiles).

Skills

Instruments that support the evaluation and the learning/ training process are linked to skills. In addition, the extra information regarding safety and working ecologically can be added.

Measuring sentences for evaluation and self-evaluation

In traditional systems, a fairly general scale is used to evaluate the skills. It indicates to what extent the professional is able to carry out an assignment, or to what extent he masters a certain skill. The scale below, for instance, gives 4 levels.

- The skill is non-existent
- The skill is still not existent enough, but something is being done about it
- The skill has been developed sufficiently (at the level of a starting professional)
- The skill has been developed more than enough

The highest level is basically not essential, but enables us to motivate or to determine someone's talents.

Experience shows that trainee supervisors have a hard time working with such a general scale at the shop floor. It is difficult to estimate the actual depth of a certain skill. If we would link actual criteria in the shape of a "measuring sentence" to the skills, the evaluator is given more to hold on to. The sentences below, which refer to the skill "read plans", are interpretable for each evaluator.

- Has never used a plan yet, does not know what to do with it
- Has trouble reading plans, can hardly interpret simple plans
- Reads a plan quickly as part of his tasks
- Is able to quickly read complex plans in different formats, has a sound grasp

Now we can write the same utterances from the learner's point of view, as part of the self-evaluation

- I have never used a plan yet
- I have trouble understanding the true meaning of the lines on a plan, I have trouble with the scale
- I regularly use plans so as to carry out my tasks, I can read them quickly
- I read very complex plans without any effort, such as cross-sections, floor plans and schematic representations

Comparing the results of the self-evaluation by the learners and the evaluation by the supervisor may help structuring and focussing the evaluation talks. Competencies on which there is agreement do no have to be discussed anymore.

Good practice

A “good practice” is a detailed description of a working method. It mostly concerns a way of working that is generally accepted in the sector. The description can take different shapes; sometimes it is a written manual, but it can also be a photo-reportage or a video.

The good practices can be put to use both by the learner and the supervisor. By linking these good practices to the skills, they can be easily found.

Exercises

The descriptions of practical exercises can be a tool for the educator when training a specific competence. In general, trainers are very experienced with respect to their field, but do not always master the pedagogical techniques to pass on a specific skill. The defined exercises may be an inspiration when training a specific component.

On the other hand, the exercises may give the learner more experience in a particular skill. Linking these exercises to the skills again creates a link to the learning path. When someone is having trouble acquiring a particular skill, the exercise is within arm’s reach. One specific exercise, for instance, is a PowerPoint presentation with a timer, which includes the lighting states. The learner may take this exercise if he wants to practice the programming of the lighting installation under pressure of time.

Tips

Similar to the exercises, the tips facilitate the acquisition of skills. The example below contributes to the understanding of a plan structure and how a plan should be drawn up.

> Take the plan's viewpoint, for instance, go to the fly loft to compare what you see with the plan .

Safety and ecology

The Expertise centre for technical theatre carried out a study into the risk and ecological analysis in the performing arts sector. This project, REcoEP, links the risks and the ecological impact to the list of competencies which was set up.

The basic assumption of this link is to bring back safety awareness and ecology care. In other words, the aim is to shift focus from procedures and paper obligations taken care of by an appointed employee to the individual employee's responsibility.

In doing so, the individual's responsibilities should be clear first. On the other hand, it should be avoided that the individual is confronted with matters he does not control, as this will merely lead to frustration.

4 questions are answered for each competence:

- What can I do myself in order to increase my own safety?
- What can I do in order to increase the safety of others?
- What should the person responsible take care of?
- What can I do myself in order to decrease the ecological impact?

The employee who saws up planks will quickly realize now that he needs to wear the correct means of protection, use an exhaust hood for the safety of his colleagues, and saw the planks in such a way as to create a minimum of waste. He also knows what means should be supplied by the employer. He is not informed about the type of wood that should be bought or the periodical inspections of the appliances. These are after all matters he does not have under control.

The answers derive from a standardized list to which extra information is linked. If necessary, additional information can be looked up quickly (legislation, good practice, material properties, safety rules…).

When a job profile is composed of the competence, risk analyses and work place regulations can be made up as well.

The safety analysis also allows for a content check of the units of knowledge. Consequently, the embedment of working safely and ecologically in the teaching material is guaranteed.

Units of attitude

As mentioned above, attitudes cannot really be acquired, which does not mean that attitudes cannot be unfolded or enhanced. For evaluation purposes and for the support of the acquisition process, tools can be linked to these attitudes.

Measuring sentences for evaluation and self-evaluation

Similar to skills, attitudes can be made concrete by using measuring sentences that are used by the supervisor or the learner in order to estimate the right level or depth.

Here, we follow the same 4 levels as in skills.

Example

Taking initiative

- Waits until others take action and does nothing. Not aware of any problems, problems are consequently not reported. Does not put forward any suggestions
- Only takes action when told what to do, or if the person in charge is around. Identifies problems, but remains passive. Puts forward suggestions in order to make things easier for him.
- Takes action spontaneously when tasks are given to him that belong to his range of duties. Identifies problems and reports them. Puts forward suggestions to improve things.
- Identifies problems and tackles them spontaneously, if possible. Puts forward suggestions concerning the working method and cooperation in order to make working more efficient.

Tips for improvement

Similar to the skills, we link a number of tips to the attitude that may help to enhance it.

Examples of tips for supervisor:

- Give positive feedback on effort
- Phrase criticism as some sort of solution
- Discuss mutual responsibility necessary to achieve the desired effect

Examples of tips for learner:

- Allow yourself to decide. Do not wait until others agree with your initiative.
- Make choices and act on it. Mind: you do not have to take the best decision, but rather one that works.
- Do not wait for inspiration. Become creative.
- Take responsibility. Risk your neck a bit more often and take charge of projects or tasks voluntarily.
- Put your plans into action. Keep to your promises and act like you said.
- Look around and see where your opportunities are. This can be something as simple as helping out a colleague who has too much work, but also suggesting an improvement to your boss.

Units of knowledge

We mainly linked the source material to the units of knowledge, together with exercises that support the processing of knowledge. This project is not aimed at a further assessment of knowledge. This should nevertheless be possible, particularly when digitalized.

Sources

The source material linked to the units of knowledge can take many different shapes. Basically, it supports the learner and trainer when acquiring knowledge.

Firstly, classic sources such as standard works about a specific subject are added. If possible, a reference is made to a chapter or section. The detailed information concerning books is taken from a book list, so that each book will have to be added only once and the link to the various units of knowledge can be generated afterwards.

Examples of sources for the unit of knowledge " Properties of a performance area"

Source	reference
Stage Mechanics, Floors, van den Haspel, Frits	chapter 11
Set, The Stage Craft Handbook, Ionazzi, Daniel A.	chapter 2
Theatre Engineering and architecture Part 2	

In a digital surrounding, digital documents from a joint library can be linked as well. These also include text, visual material, video and applets.

It is of course also possible to add links to external sources.

Exercises

Similar to the skills, exercises can be added here as well. This type of exercise rather aims at mastering knowledge fully.

Measuring knowledge

Contrary to skills and attitudes, units of knowledge cannot directly be rephrased in measuring sentences. Consequently there is doubt about how knowledge can/ should be measured in an educational or competential setting. It is nevertheless worthwhile to work on a method that is linked to the units of knowledge in the future.

An option might be a question set that can be used for evaluation and self-evaluation (in a digital surrounding)

A dynamic system

By using units of competence that were split up as a backbone to structure of various kinds of information, a dynamic system comes into being. The combined efforts between trainers, systems or levels, professionals and learners can be easily organized within this system. Moreover, information can be easily and structurally exchanged through a digital library.

New users can create new applications and link these to the structure. This way, new tools can be developed without rewriting the basics.

Competence profiles

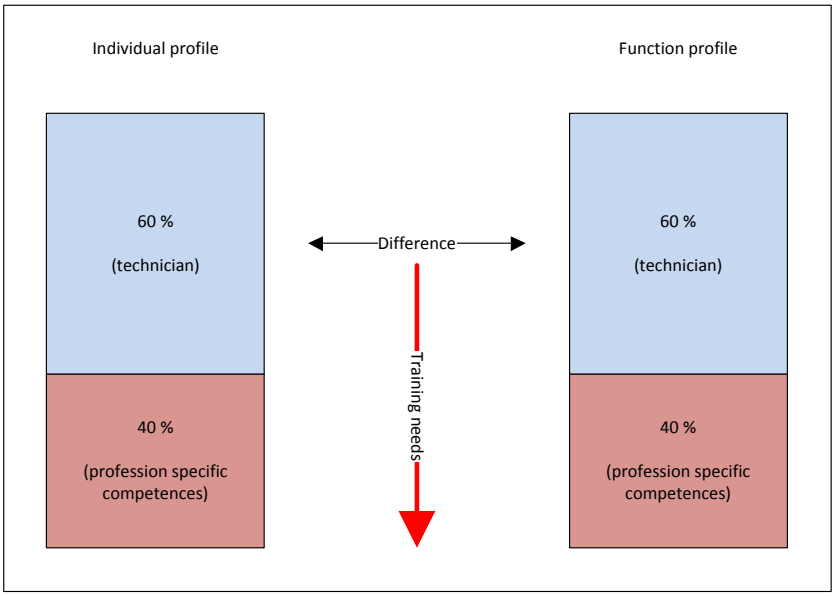
Competence profiles

Now we have given a detailed definition of the competencies, we can make up competence profiles with them. These profiles may have several functions:

- Training profile, which defines the outcome of learning that should be acquired by a participant. It defines the training objectives from which a training program can be derived.
- Job profile, which defines the required competencies for a particular job. It also includes the needs of a company and can be used for acquisitions, evaluation, promotion or other HR activities.
- Individual profiles, which define the individual's competencies. These represent the individual's capacities, regardless of their practical use in an occupation. Derived forms include a résumé, portfolio or the state of affairs concerning a training program.

The profiles can obviously also be used for purposes other than the description of competencies, such as the active supervision during a career.

- Comparing a personal profile with a job profile gives us the opportunity to match. An employer is able to see to what extent a candidate is suited for a job by means of the comparison. The missing competencies can lead to a training plan.



- A personal profile may consist of objectives of competencies yet to be achieved. This may develop into a portfolio by adding evidence.

This is however only possible if the required degree of flexibility is build in the way in which profiles are composed. Profiles that make identical copies of all training programs, jobs or individuals are neither practical nor useful. However, if we assume that occupations are determined by 60% of profile competence, we still have the required degree of flexibility. The remaining 40% can be completed with relevant, variable competencies that reflect the unique character of the training, workplace or individual.

The professional is now truly valued, as he can indicate the additional competencies that reflect his unique capacities; he can continue working on his career.

The field of education is able to adjust its training programs to the local demand. That way, it may distinguish itself from other training programs without causing confusion.

An employer can define his needs without the pressure of constantly having to create new occupation profiles or jobs. He may link the employment situation to his specific needs. Next to that, he can estimate the exact demand for training programs, without the unnecessary elements of a standard solution.

This method also solves a number of conflicts between the various fields. Some examples can be found below:

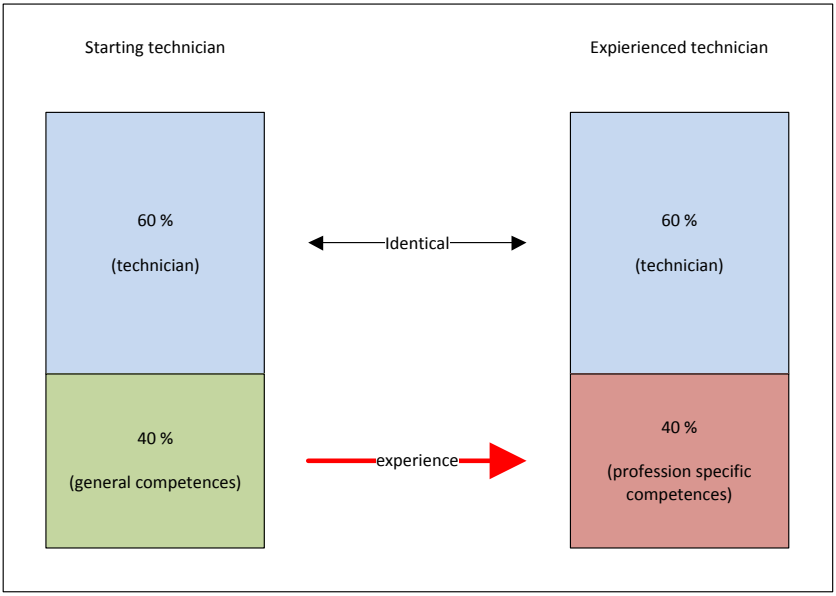
Relationship between training profiles - occupational profiles

Education focuses both on occupational competencies and more general competencies, as this is partly expected. Training programs, however, only lead up to become a “starting professional”. It is generally assumed that competencies, which distinguish a starter from an experienced person, can only be acquired through experience in the field.

The general competencies add social “pedagogical” value, but do not have a measurable value in the working sphere. Competencies such as the art of argumentation, being lettered or smart in mathematics, however, are considered important and partly determine a qualification’s level. Yet, these are not included in the job profiles.

In the course of a career (and combined with experience), the general competencies are converted into additional, measurable occupational competencies. These general competencies are the foundation from which the occupational competencies are developed; the professional evolves from “starter” to someone "experienced” .It is vital to display all these differences. At the moment, vagueness leads to conflicts, e.g. when classifying profiles or conferring about the training program’s content.

We will steer clear of this problem when we assume an occupation to be defined by 60% of joint competencies. The remaining 40% can after all be completed differently by the education institute and sector organisation.



The educational institute may add 40% of general competencies and fulfil their mission. The sector-user can add 40% of profession specific competences to his profile and accordingly define an experienced professional.

However, the elements discussed above give rise to another dilemma. The competencies of an experienced professional should not be delivered by the field of education. Yet, education should take care of giving additional knowledge that can be put to use later. Therefore, this knowledge component should somehow be included in the program.

Conflict between competencies - courses

Using competencies in the field of education sometimes clashes with the organizational structure frequently present in “courses”. The division into courses, with corresponding teachers and classrooms, is nevertheless essential when creating a practical organization.

An example illustrates what may happen: Basic electricity is essential in the courses lighting, sound and to a lesser degree in production and stage mechanics. Its content can be found in multiple competencies. There is a chance that some knowledge is brought up during four different courses, or perhaps all assume the others to bring it up. Lighting technicians or sound technicians are not always the most suitable persons to teach abstract courses such as electricity. On the other hand, an electricity teacher may not be suited for teaching specific applications.

By introducing a clear and intricate structure, the electricity teacher knows exactly what is necessary for the other fields. He knows what competencies to substantiate and what units of knowledge follow his course. On the other hand, the teachers of specific courses know how to continue. “ Frequencies and phase shifts”, for instance, may end up at sound, and “phase cutting” at lighting.

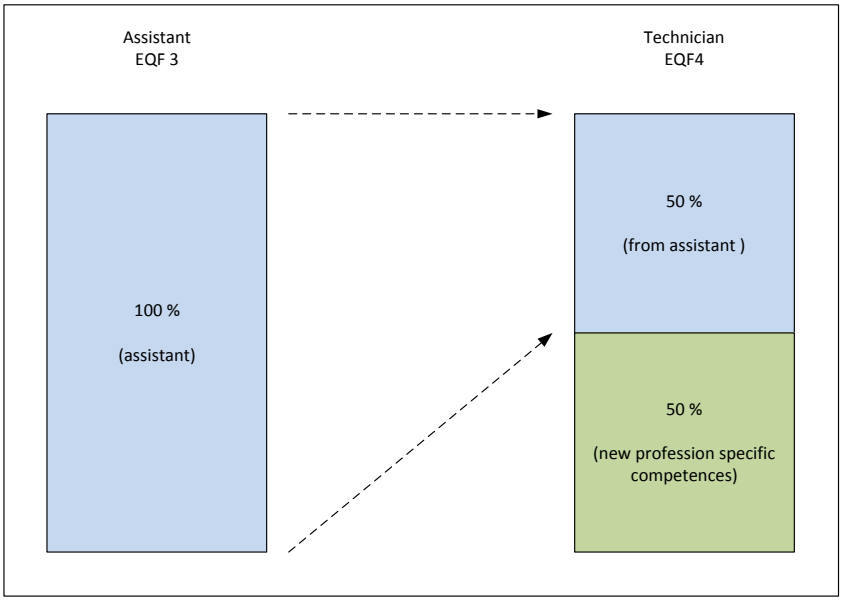
This way, it immediately becomes clear what parts belong to theory courses (knowledge) and what parts to practical courses (competencies). The division may also lead to a clearer structure at the assessment. The units of knowledge are rather part of the process’ assessment, which leads to the actual competence, whereas the units of competence are part of the final assessment, which requires the full acquisition of a competence.

Horizontal promotion

In a traditional working environment, employees are awarded by placing them higher on the hierarchical ladder. The result is that the best and most experienced employees leave the shop floor and are employed in jobs demanding more organizational skills. Consequently, experience cannot be awarded and the employee cannot be employed where he is most useful.

By using objectively assessable competencies, with a weight linked to the level, it is possible to introduce horizontal promotion objectively. An employee, who masters sufficient competencies in order to meet the requirements of a higher level, can consequently also be classified at that level.

The example below takes place in daily practice. It might stimulate its application at other levels.



Knowledge profiles

By linking the units of knowledge to the units of competence, a knowledge profile can be derived from a competence profile. In education, this can ultimately be used for the derivation of a logical order, division into “subjects” and a program.

The logical order of this program is partly determined by the sequence of the units of knowledge and partly by the organization’s competence training.

In the units of knowledge, the sequence is defined by means of the required advance knowledge and the units succeeding it. This way, the unit "three-phase power follows after the unit “basic variables electricity” and is followed by “three-phase power assessment". The unit is essential to the competence “connect apparatus to a three-phase network”.

This working method results in a transparent and clear program. Such a program illustrates the necessity of each unit and the link between the units of knowledge. Each trainer uses a clear framework and “overlaps” or “gaps” are avoided.

Audio-visual techniques

- Image signals
- Cables and connectors
- Processing equipment
- Properties and maintenance of projectors
- Projection techniques
- Types of recording carriers

Lighting

- Properties of light
- Parts of lanterns
- Lanterns and accessories
- Maintenance methods
- Hard patch systems
- Permanent installations
- Basic technical light plot
- Focussing procedures
- Control signals analogue
- control signals DMX
- Cabling methods for DMX
- Control signals networks
- Cabling methods for theatre networks
- Manual light board methods
- Programming methods for conventional lighting
- History of lighting

Set

- Basic tools
- Woodwork construction
- Plastic construction
- Metal construction
- Construction methods sets
- History of set construction
- Set change methods
- History of scenography

Profile tools

The competence profiles can be introduced to the learning and HR process at several moments. By using a standardized writing convention, the backbone (the list of competencies) can be used for other tools again and again.

Extra information required by a new application can be easily added to the existing structure, as the integrity and exchangeability remain.

An additional advantage is that it leads to a dynamic system. The sector evolves continuously, which also demands new competencies. The use of small-scale competencies, together with profiles, makes it possible to make adjustments without rewriting the profiles. It is sufficient to work out a new competence and add this to the backbone.

Below, a number of examples illustrate the applications based on this principle.

A lifelong learning portfolio

Portfolios are gradually becoming the standard instruments for documenting a career, but are also useful for training and HR purposes. Its use fits in with competence-oriented and lifelong learning. Remarkably enough, there is no continuity when using it. Most people assume lifelong learning to start after school, which is why portfolios used during training programs get lost. Moreover, when a person switches between jobs, HR carries out the same measurements each time.

Within the discipline of technical theatre, it was common to use short and more general résumés together with a job listing per season. A separate joblisting is necessary as freelancers may have multiple employers per week, which would lead to an inconveniently arranged resume. The detailed list gives a good idea of the experience gained in different jobs, but also the style and type of production a technician is used to.

Job listing is usually not documented in case of technicians, with the exception of scenographers. Their portfolios include detailed, mostly visual documentation, which was generally not validated.

Taking the backbone as a departure point gives the professional the opportunity of drawing up an individual profile of the competencies he masters. He may also arrange a collection of evidence with the same structure as the job listing. This evidence may include pictures, videos and sound fragments. Other material, which is not directly linked to a production or task, can also be added to this library, such as certificates and diplomas. When we link the individual profile to the evidence, a detailed portfolio comes into being.

In such portfolios, an external party can validate the evidence and/ or competence. As a result, the portfolio can, for instance, be used for EVC applications. Using a backbone consisting of standardized competencies guarantees that other users (e.g. HR, EVC) can use the information again.

An individual learning path

Learning is becoming more simultaneous in different contexts. A skill can be acquired at work, school, extra trainings, by self-teaching, etcetera.

An important tool is the plotting of a learning path, which includes the competencies and objectives to be achieved. Such a learning path can be set up as a profile that takes the competencies out of the backbone structure.

In doing so, the link to the study material and units of knowledge is created; from this learning path, the learner is able to collect the material that helps him having command of a particular competence.

The learner can also add documents himself that reflect his progress. The supervisor/ coach may use this individual profile as a means of observance and evaluation. If a competence has been mastered, it can be passed on to the portfolio.

Evaluation and self-evaluation

With respect to the learning process, it is advisable to evaluate and, if necessary, make adjustments on a regular basis. The evaluation criteria result from the learning objectives that were drawn up. By linking the learning path to the evaluation and self-evaluation measuring sentences, the learner and supervisor are able to evaluate efficiently.

When comparing both evaluations, possible issues will become clear. The evaluation talk may focus on these elements so as to leave no doubt about the level achieved.

After this talk, the objectives can be adjusted by making adaptations to the learning path and the obtained competencies can be added to the portfolio. In doing so, the number of competencies someone is working on is limited and the learning process remains well organized.

By comparing evaluations carried out at different moments, the progress during the entire learning process can be examined.

Measuring training demand

In order to come to a structured training policy within an organization, the training demand should be measured. The profiles can contribute to this as well. There are several possibilities, depending on the situation.

When the individual portfolios are already in use, they can be combined with the job profiles. The differences indicate the specific demands for training programs and practically automatically lead to a learning path.

In case someone does not have an individual profile, the job profile or a more extensive list of competencies can be used to make enquiries about that particular employee. The information assesses 3 elements:

- Job necessity
- Extra training advisability
- Level of competence

We can infer extra training priorities from these three elements.

The main advantage of this method is that the competencies are small-scaled. Only the missing elements should be given further training. A specific example in actual practice will illustrate this:

The evaluation shows that the employee is not always able to make a three-phase power determination. When using large competence units, the employee will be sent to an extra training of electricity, where he should learn all the basics of electricity (which he already knows). At the time that the topic "three-phase technology" is taught, he probably already dropped out because he has not learned anything new during the basics. The topic "three-phase technology" will merely be a small part of the in-service training, which is why it was not fully considered.

When we use a concrete measurement based on small-scale competencies, we will only send the employee to a short course on three-phase technology. This course can dilate upon the topic and is also shorter and therefore more efficient.

Matching

When we have job profiles and individual profiles at our disposal that are written in the same form, we can easily look for a suitable candidate for a specific job. We can select this candidate based on the comparison with the job profile.

On the other hand it is important that the individual is in charge of his own profile and able to hand over an adjusted/ selective profile. A digital environment is required to realize this.

The result

The full list of competencies, units of knowledge and attitudes is available online and is regularly updated. In doing so, the most recent adjustment are available at all times. In order to guarantee the integrity of the information, the units are not adjusted but rather replaced by units with a more recent production date. A statement is added to the old units with a reference to the new unit.

To conclude

This study was first and foremost intended for the performing arts, due to the problematic nature of horizontal and vertical transfer and varying job definitions. However, we are absolutely convinced that the methodology can also be applied to other fields. These sectors are consequently invited to put our views to the test in their field of action.

Our work is not finished and in fact it will never be. The constant evolution in the professional world requires permanent adjustments. We are convinced that the methodology contributes to a faster and more efficient manner of updating competence profiles.

To conclude, we would like to make a plea in favour of the further development of a joint, detailed writing convention of competencies, both horizontal and vertical. In our opinion, such a universal writing convention is a prerequisite for the stimulation of lifelong learning in its broadest sense. After all, it draws together sectors and educators more closely as well.

OPTiV

OPTiV stands for “Opleidingen PodiumTechniek in Vlaanderen” (Technical Theatre Education in Flanders).

The project analysed the theatre-technical educational landscape in a fast changing technical – artistic context. It formulated answers to the demand for optimisation of the educational landscape as well as the content of the programs. In the side-line the project formulated recommendations for policies to support the different programs.

The OPTiV project tried to answer following questions:

- Do the programs match the demands of the work field and how can this match be improved?
- What innovative methods and work forms are available in the programs and how can the quality of the programs be improved?
- How can authorities and industry improve the support to the education programs?

The project was developed in the framework of the PWO research program of the Erasmus University College Brussels. PWO is research that originates from concrete questions within the educational and / or professional practice and seeks solutions that are useful and applicable in the same context. Social and / or educational relevance are additional concerns.

The project is developed with the appreciated support of the Social Fund for the Performing Arts in Flanders.

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The Expertise Centre for the Technical Performing Arts has grown organically from the research- and education projects of the technical theatre department of RITS (EHB). The Expertise Centre provides continuity in order to disseminate the results of research and to guarantee the cooperation with the industry, educational and research institutes and international networks.

The Expertise Centre wants to evolve into a permanent contact point for training providers, industry and policy makers. It wants to be part of the reality rather than observing it.

The focus points of the centre are:

- Competence systems in the technical fields of the performing arts, including the accurate definition of the profession content.
- Development of teaching techniques and simulation techniques.
- Training for industry and intermediaries - training providers.
- Durability, health and safety
- History of technical theatre

The Expertise Centre develops its own projects and participates as partner in projects of others.