

VOCATIONAL AQUALABS

IDENTIFICATION OF (QUALIFICATION) LEVELS AND NUMBERS OF CREDITS OF THE COURSES AND UNITS

1 Introduction

This document focuses on the identification of the (qualification) levels and numbers of credits for the different units of the Vocational Aqualabs-courses:

- Fundamentals of Experimental Design
- Entrepreneurship
- Data and Statistical Management
- Scientific writing
- Project management
- Research Funding Procurement
- Networking – key for a successful career

It is important to clarify the words “course” and “unit” as they are used in this context. This kind of terminology is not fixed, but it is important that it is made clear how these have to be interpreted in the context of this project.

The European Credit System for Vocational Education and Training (ECVET) provides the following definition of “unit”: *a component of a qualification, consisting of a coherent set of knowledge, skills and competence that can be assessed and validated.*

There is hence, in this definition, a clear link between a “unit” and a “qualification”. In a context of primarily professional development, the concept of “qualification” and the link with its components (“units”) is less clear. But one can not deny that all units offer coherent sets of *knowledge, skills and competence that can be assessed and validated.*

Overall, the coherent clusters of units developed are rather small, limited in time and scope and can hence hardly be referred to as “qualifications”. This means that the use of an alternative, in this case the word “course”, is justified.

For all these courses and units, an indication is provided of the:

- “level” in relation to qualifications frameworks
- “number of credits” (ECTS / ECVET)

2 Identification of levels

To provide an indication of the level of the courses and units, all kinds of materials related to the courses and units (descriptions, study material, evaluation forms,...) have been scrutinized taking into account the following elements:

- The level of the learning outcomes based on the different elements of learning outcomes descriptions:
 - active verb form;
 - indication of the type of learning outcome: knowledge, cognitive processes, skills, or other competences
 - topic area of the learning outcome: this can be specific or general and refers to the subject matter, field of knowledge or a particular skill;
 - indication of the standard that is intended / achieved by the learning outcome;
 - the scope and/or context of the learning outcome
- The study material provided (professionalism, content, references,...)
- Teaching staff (level, experience,...)
- The target groups / participants
- The provider of the course/unit
- Participants' feedback on evaluation forms

Based on this analysis, the level of the courses and units is equivalent to **level 7 of the European Qualifications Framework for Lifelong Learning**.

The generic description of the learning outcomes relevant to EQF-LLL Level 7 is:

KNOWLEDGE:

- 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

SKILLS:

- 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

COMPETENCE:

- manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches
- take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams

This level is equivalent to the second cycle level of the **Framework of qualifications for the European Higher Education Area** (the so-called "Bologna Framework")

The generic description of the learning outcomes relevant to this second cycle level of this QF is as follows.

Qualifications of **the second cycle** are awarded to students who:

- have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context;
- can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study;
- have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments;
- can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences clearly and unambiguously;
- have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

It has to be noted however that both these Qualifications Frameworks are not only European of nature; they are also so-called "meta-frameworks". This means that their primary purpose is for referencing national or sectoral Qualifications Frameworks. Referencing has to be understood as checking whether the descriptors used to describe the qualifications in a national or sectoral context are in line with the descriptors of the Framework of qualifications for the European Higher Education Area and/or the European Qualifications Framework for Lifelong Learning.

The following hence has to be taken into account:

- not all national or sectoral Qualifications Frameworks use the same typology, the same number of levels etc. (which means that e.g. EQF-level 7 might be equivalent to a "level 8" or even a "level F" in a national QF)
- there is no guarantee that a levelling exercise based on the descriptors of a given National Qualifications Frameworks or a certain sectoral Qualifications Framework automatically leads to the same outcomes
- equally this means that the levels might differ from one country to another (because different sets of level indicators/descriptors have been used)

One might be confident however that in this case evidence is clear enough to avoid big discrepancies.

3 Identification of the number of credits

Less evident is the allocation of a number of credits to the different units related to the total of the course and/or the duration.

The duration of most courses and certainly units is very limited. Even if one considers the total study load and not only contact hours, we are talking about a few hours per unit / a few days per course maximum.

This makes the regular use of ECTS-credits not easy, since this is a system primarily designed for long-term courses (months/years).

For this reason, we first start this chapter with some more background on not only the European Credit Transfer & Accumulation System (ECTS), but also on its counterpart the European Credit System for Vocational Education and Training (ECVET). After all, ECVET offers a methodology to allocate ECVET-points (comparable to ECTS-credits) on the relation between a qualification (e.g. a course in this case) and its units and this not only in a formal but equally in a non-formal or informal learning setting¹.

3.1 ECTS-credits versus ECVET-points

3.1.1 Some general information on the use of ECTS-credits

What are ECTS credits?

ECTS credits are based on the workload students need in order to achieve expected learning outcomes. Learning outcomes describe what a learner is expected to know, understand and be able to do after successful completion of a process of learning. They relate to level descriptors in national and European qualifications frameworks. Workload indicates the time students typically need to complete all learning activities (such as lectures, seminars, projects, practical work, self-study and examinations) required to achieve the expected learning outcomes.

60 ECTS credits are attached to the workload of a fulltime year of formal learning (academic year) and the associated learning outcomes. In most cases, student workload ranges from 1,500 to 1,800 hours for an academic year, whereby one credit corresponds to 25 to 30 hours of work.

How can you use ECTS credits?

Credits are allocated to entire qualifications or study programmes as well as to their educational components (such as modules, course units, dissertation work, work placements and laboratory work). The number of credits ascribed to each component is based on its weight in terms of the workload students need in order to achieve the learning outcomes in a formal context. Credits are awarded to individual students (full-time or part-time) after completion of the learning activities required by a formal programme of study or by a single educational

¹ At European level, the following definitions are used for these different types of learning (http://ec.europa.eu/education/lifelong-learning-policy/doc52_en.htm):

- Formal learning is typically provided by education or training institutions, with structured learning objectives, learning time and learning support. It is intentional on the part of the learner and leads to certification;
- Non-formal learning is not provided by an education or training institution and typically does not lead to certification. However, it is intentional on the part of the learner and has structured objectives, times and support;
- Informal learning results from daily activities related to work, family life or leisure. It is not structured and usually does not lead to certification. In most cases, it is unintentional on the part of the learner.

component and the successful assessment of the achieved learning outcomes. Credits may be accumulated with a view to obtaining qualifications, as decided by the degree-awarding institution.

If students have achieved learning outcomes in other learning contexts or timeframes (formal, non-formal or informal), the associated credits may be awarded after successful assessment, validation or recognition of these learning outcomes. Credits awarded in one programme may be transferred into another programme, offered by the same or another institution. This transfer can only take place if the degree-awarding institution recognises the credits and the associated learning outcomes. Partner institutions should agree in advance on the recognition of periods of study abroad.

How does credit allocation work?

Credit allocation is the process of assigning a number of credits to qualifications/programmes or to educational components. ECTS credits are allocated on the basis of the typical workload necessary to achieve the required learning outcomes.

The number of credits allocated to the entire qualification or programme depends on the national or institutional regulations and the respective cycle of the Bologna Framework (see section 3.3). Based on the ECTS key feature that 60 credits are allocated to the workload of a full-time academic year, 30 ECTS credits are normally allocated to a semester and 20 ECTS credits to a trimester. Qualifications which have formal programmes lasting three fulltime academic years are allocated 180 ECTS credits.

Each academic year, semester or trimester is split into educational components. An educational component is understood to be a self-contained and formally structured learning experience (such as a course unit, module, seminar or work placement). Each component should have a coherent and explicit set of learning outcomes, appropriate assessment criteria, defined workload and specified number of ECTS credits.

How can you allocate credits to educational components?

Credit allocation to educational components The allocation of credits to single educational components is performed as part of curriculum design with reference to national qualifications frameworks, level descriptors and qualifications descriptors. Generally it is the responsibility of higher education institutions and academic staff, but in some cases may be decided by external bodies.

Prior to allocating credits to individual components, an agreement should be reached on the 'profile' of the specific study programme and the associated learning outcomes. By profile is meant the description of the programme in terms of its main features and its specific aims. It is good practice to define this profile after consultation with relevant stakeholders.

On the basis of the qualification profile, the academic staff design the curriculum by defining the learning outcomes and allocating credits to the programme components. Credit allocation to educational components is based on their weight in terms of the workload needed for students to achieve the learning outcomes in a formal context.

3.1.2 Some general information on the use of ECVET-points

What are ECVET points?

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.

Together with units, descriptions of learning outcomes and information about the level of qualifications, ECVET points can support the understanding of a qualification. The number of ECVET points allocated to a qualification, together with other specifications, can indicate for example, that the scope of the qualification is narrow or broad. The number of ECVET points allocated to a unit provides the learner with information concerning the relative weight of what s/he has accumulated already. It also provides the learner with information concerning what remains to be achieved.

How many ECVET points are allocated to a qualification and how is it done?

Allocation of ECVET points to a qualification is based on using a convention according to which 60 points are allocated to the learning outcomes expected to be achieved in a year of formal full time VET.

For a given qualification, one formal learning context is taken as a reference and on the basis of 60 ECVET points per year of formal full time VET, the total number of ECVET points is assigned to that qualification.

In a number of European countries qualifications' descriptions are independent of the education and training programme preparing for these qualifications. Furthermore, it is also possible that the same qualification can be prepared through various programmes. Therefore ECVET allocates credit points to qualifications and not to

education and training programmes. However, to decide on the number of ECVET points allocated to a qualification, one formal learning programme is chosen as a point of reference.

It is up to the competent institutions in charge of designing qualifications to decide which specific programme will be chosen as a point of reference (e.g. the initial VET or the most common programme). The duration of the selected reference programme together with the ECVET convention on ECVET points, will give the number of ECVET points allocated to the qualification (see Section C.12).

How many ECVET points are allocated to units and how is this done?

From the total number of ECVET points allocated to a qualification, each unit is allocated a number of ECVET points based on its relative weight within the qualification. The relative weight of a unit is established using one or a combination of these approaches:

- *the relative importance of the learning outcomes which constitute the unit for labour market participation, for progression to other qualification levels or for social integration;*

This method of allocating ECVET points is based on how different actors “value” the different units which are part of the qualification. For example, some units may be core to the professional profile that the qualification leads to. It can be decided that such core units would have a higher number of ECVET points than the others. It is also possible that some units would enable progression to other qualifications levels (e.g. general knowledge, skills and competence to enable progression to higher education).

- *the complexity, scope and volume of learning outcomes in the unit;*

This approach is based on evaluating the complexity, scope and volume of knowledge, skills and competence in a unit, with regard to those in the qualification. It can be based on indicators such as the level of performance for assessment of learning outcomes. For example: the body of technical, technological, scientific and general knowledge that have to be mobilized in order to execute the skills and competences expected; the number of procedures or methods to follow, the complexity of combinations of these procedures or methods; the variety and complexity of material and documentation resources to use.

- *the effort necessary for a learner to acquire the knowledge, skills and competence required for the unit;*

This method of allocating ECVET points is based on the education and training programme taken as a point of reference and on the estimation of learners’ effort (which can be also translated as workload or notional learning time) to achieve the expected learning outcomes.

Examples of approaches to allocate ECVET points to units are described in Section C.13.

Who allocates ECVET points?

Allocation of ECVET points is normally part of the design of qualifications and units. The allocation of ECVET points to qualifications and/or to units is carried out by the institution competent for the design of qualifications or the institution empowered to allocate ECVET points within a country or a qualifications system.

In the context of the current ECVET pilot projects, the range of institutions experimenting with ECVET points allocation is wide and ranges from ministries, sectoral organisations or social partners to training centres.

When and how are learners awarded ECVET points?

The successful achievement of a qualification or of a unit triggers the award of the associated ECVET points, independently of the actual time required to achieve them.

Hence when a learner satisfies the criteria for a unit or a qualification, meaning s/he has achieved the expected learning outcomes and these are assessed and validated, s/he is awarded the corresponding ECVET points. These are recorded, together with the learning outcomes and units, in his/her personal transcript.

3.1.3 Comparison of ECTS and ECVET

Below is a table which compares some of the key elements of both systems with one another. This provides some more insight into how both can be used and why they are what they are.

| # | <i>Element</i> | <i>ECTS</i> | <i>ECVET</i> |
|----------|---------------------------------|--|--|
| 1 | History | Conceived in parallel with the ERASMUS mobility scheme, as a transfer system. Equally now an important pillar of the Bologna-process. | As a support mechanism for EQF-LLL, especially in the framework of the Copenhagen-process. |
| 2 | Learning context | Primarily Formal learning in a higher education context; but potentially broader. | Independent of the learning context / focused on lifelong learning (formal, informal & non-formal learning). |
| 3 | Approach | One can notice an evolution from content and study load per 'course' towards <i>learning outcomes</i> (formulated in terms of competences) and learning efforts per 'educational component'. | Based on <i>learning outcomes</i> ('knowledge – skills and competences') and qualification (subdivided into ' <i>units of learning outcomes</i> ') |
| 4 | Credits vs. Points | 60 credits per academic year (full time study) 1 credit equals 25 to 30 hours time of study | 60 <i>points</i> for 1 year in a formal VET-context (as an indication). Different methodologies proposed for the allocation of points to units. |
| 5 | Instruments / procedures | Different instruments in use e.g. •Erasmus Student Application Form •Erasmus Learning Agreement •Erasmus Training Agreement •Erasmus Transcript of Records | Under construction / test phase |
| 6 | Information provision | By means of a 'Course Catalogue' | Responsibility of the competent institutions involved |
| 7 | Partnerships | By means of "Bilateral Agreements" in the framework of the LLP/Erasmus programme | <i>Partnership agreement</i> or <i>Memorandum of understanding (MoU)</i> , in the framework of a formal learning context |

3.2 Identification of the number of “ECTS-credits” or “ECVET-points” for the Vocational Aqualabs courses and units

From the above mentioned information on ECTS and ECVET, a number of conclusions can be drawn relevant for the identification of the number of “ECTS-credits” or “ECVET-points” for the Vocational Aqualabs courses and units:

1. ECTS is a more mature system and has a long-standing tradition in higher education, including “educational components” at EQF-level 7 / QF-EHEA “second cycle”-level
2. ECTS, however, is particularly useful for “educational components” with a certain duration, in a formal setting, as part of degree programme etc.
3. The calculation/allocation of ECTS-credits is primarily based on the concept of “the typical workload” (necessary to achieve the required learning outcomes). Such a concept is not easily applicable to the Vocational Aqualabs context, in which the workload seems more difficult to measure.
4. As described above, the calculation/allocation of ECVET-points can be done in a variety of ways, based on either one of these methodologies or a combination thereof:
 - *the relative importance of the learning outcomes which constitute the unit for labour market participation, for progression to other qualification levels or for social integration;*
 - *the complexity, scope and volume of learning outcomes in the unit;*
 - *the effort necessary for a learner to acquire the knowledge, skills and competence required for the unit*

The latter is most comparable to ECTS and hence least useful in this context.

A combination of the other two however might be quite well applicable to the Vocational Aqualabs context, at least for the units within a given course.

Based on these conclusions we propose to allocate ECVET-points to each unit within a given course based on the relative importance of this unit within the complete course. The complexity, scope and volume of the envisaged learning outcomes of the unit are important elements to decide on this relative importance. When at the level of the courses, in future, ECTS-credits are established, it is not only possible but easy to recalculate the ECVET-points of each unit into ECTS-credits, as is made clear by the *exemplary* scheme below for the randomly chosen course Scientific Writing, consisting of three units. In this scheme the relative weight of each unit is translated into ECVET-points (on the assumption that there is a 60 points per annum basis) and ECTS-credits.

| COURSE: Scientific writing <i>(e.g. 5 ECTS-credits)</i> | | | |
|---|--------------------------|--|---------------------|
| <i>Units</i> | <i>"relative weight"</i> | <i>ECVET-points</i> (in a system of 60 per annum) | <i>ECTS-credits</i> |
| Unit 1: Basic concepts of scientific writing | 20% | 1 point | 1 credit |
| Unit 2: Organization of a scientific paper | 20% | 1 point | 1 credit |
| Unit 3: Evaluating scientific papers | 60% | 3 points | 3 credits |

The main challenge here is of course how to decide on this relative weight. For this, the following methodology is proposed.

3.3 Methodology framework - to link ECVET-points to units

The combination of two methodologies (see above) forms the basis of the methodology:

1. *Defining the relative importance of the learning outcomes based on the following items:*

- **Frequency** - the number of times that the individual may carry out the learning outcomes in a professional context
- **Autonomy** - the degree of professional autonomy an individual applies via the demonstration of the learning outcomes
- **Transferability to other contexts** - the ability of the individual to adapt and apply the learning outcomes in a range of other contexts

2. *Defining the complexity, scope and volume of learning outcomes in the unit:*

- **Complexity** – how much integration, e.g. between knowledge and skills within one learning outcome or between different learning outcomes is needed
- **Scope** – how broad is the context in which the learning outcome can be applied
- **Volume** – how many learning outcomes are envisaged in the unit

Scoring mechanism

For all these items a scoring mechanism is proposed. In order to be able to use quantitative data, a numerical scoring system is proposed, that is meant to be simple and workable;

- Zero / not relevant = 0
- Low weight = 1
- Medium weight = 2
- High weight = 3

Process

A score is attributed to *all* six headings/dimensions (see table below). It is recognised that there is an element of subjective, qualitative judgement in allocating the score, but that acknowledges the 'art' of education, whereas the numerical representation attempts to capture the 'science' of education. However an important factor to address is consistency of score attribution, and this can be enhanced by working up an element matrix.

UNIT X:

| | Frequency | Autonomy of application | Transferability to other contexts | Complexity | Scope | Volume |
|--|----------------------|-------------------------|-----------------------------------|----------------------|----------------------|----------------------|
| Learning outcomes attributed to the unit | 0 – 1 – 2 – 3 (1) | 0 – 1 – 2 – 3 (2) | 0 – 1 – 2 – 3 (3) | 0 – 1 – 2 – 3 (4) | 0 – 1 – 2 – 3 (5) | 0 – 1 – 2 – 3 (6) |

The result of such a scoring exercise for an individual unit, would be a certain number which is either the summation [(1) + (2) + (3) + (4) + (5) + (6)] or the multiplication [(1) x (2) x (3) x (4) x (5) x (6)] of the summations of the results of the six items. This result then represents the relative value of unit within the overall course.

An example can make this clearer:

Unit: Basic concepts of scientific writing

| | Frequency | Autonomy of application | Transferability to other contexts | Complexity | Scope | Volume |
|--|-----------|-------------------------|-----------------------------------|------------|-------|--------|
| Learning outcomes attributed to the unit | 1 | 1 | 2 | 2 | 2 | 3 |

There are then two possible results:

1. A summation: $1 + 1 + 2 + 2 + 2 + 3 = 11$
2. A multiplication: $1 \times 1 \times 2 \times 2 \times 2 \times 3 = 24$

The advantage of a multiplication is that there is more distinction possible between the results (a range of $0 \rightarrow 729$ in stead of a range of $0 \rightarrow 18$).

If all units within one course ("qualification") are scored in such a way, the final result is that there is a certain 'weight' attached to each unit. These weights can then be transferred into ECVET-points, as can be seen in the table above

4 Useful Literature

KENNEDY D., HYLAND A, RYAN N. (2007) *Writing and Using Learning Outcomes: a Practical Guide, Cork (University College Cork)*

Kennedy D, Hyland A and Ryan N 2006: *Writing and Using Learning Outcomes: A Practical Guide. Bologna Handbook C 3.4-1.*

Available from: <http://www.bologna.msmt.cz/files/learning-outcomes.pdf>

A Tuning Guide to Formulating Degree Programme Profiles - Including Programme Competences and Programme Learning Outcomes (to be found at <http://www.core-project.eu/documents/Tuning%20G%20Formulating%20Degree%20PR4.pdf>)

The European Credit System for Vocational Education and Training (ECVET); for more information see: <http://www.ecvet-projects.eu/> or http://ec.europa.eu/education/lifelong-learning-policy/doc50_en.htm

The European Credit Transfer and Accumulation System (ECTS); ECTS User's Guide to be found at http://ec.europa.eu/education/lifelong-learning-policy/doc/ects/guide_en.pdf)

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