

Educational Structures, Learning Outcomes, Workload and the Calculation of ECTS Credits

Background

This paper has been produced in the framework of the project *Tuning Educational Structures in Europe*. The project finds its roots in the *Bologna Declaration* signed in 1999 by Ministers responsible for Higher Education from 29 countries. In the project over 100 Higher Education institutions from the EU and EAA-countries participate actively in seven area groups: Business Administration, Educational Sciences, Geology, History and Mathematics. The synergy groups Physics and Chemistry work along the same lines. Tuning is designed as an independent, university driven project, which is co-ordinated by university staff members from different countries. The initiators are grateful to the European Commission for co-financing the project.

ECTS : European Credit Transfer and Accumulation System

1. *The European Credit Transfer System*

The European Credit Transfer System (ECTS) has been developed over the past thirteen years, and today is the most commonly used basis for measuring student workload in European higher education. Other —less widely used— credit systems are based on various criteria such as the

importance of a subject or the number of contact hours in a course; ECTS credits describe only student workload in terms of time employed to complete a course or a course unit. This represents an approach to European learning and teaching which places the student at the centre of the educational process.

ECTS was originally tested and perfected as a **transfer** system in order to make it possible for Universities in different European countries to describe the amount of academic work necessary to complete each of their course units and hence to facilitate recognition of students' work performed abroad. In order to create a common basis for reciprocal understanding, at the beginning (1988) the assumption was made that a complete year's work in any European higher education institution for the students of the country itself was — by definition — equivalent to 60 ECTS credits. Credits were allocated, for the purpose of transparency in description, to each assessed (i.e. marked or graded) activity on the basis of a judgement as to the proportion it represented of the complete year's workload. Hence credits were allocated on a **relative** basis.

ECTS was not just credits: it also aimed at creating a simple and accurate means of communication between higher education institutions, faculties, departments, staff and students in order to facilitate reciprocal knowledge, understanding and trust. Standard forms were created: the ECTS Application Form, the Learning Agreement and the Transcript of Records. Full information about these tools can be found on the Europa server at www.europa.int.eu/comm/education/socrates/ects.

2. The European Credit Transfer and Accumulation System

In several countries ECTS or analogous national systems are used as official **accumulation** systems. This means that entire courses of study leading to recognised qualifications are described using ECTS credits. The basis for allocation of credits is the official length of the study programme: for example the total workload necessary to obtain a first cycle degree lasting officially three or four years is expressed as 180 or 240 credits. The single course units which must be taken to obtain the degree each can be described in terms of workload and hence of credits. Credits are only obtained when the course unit or other activity has been successfully completed and assessed (i.e. marked or graded).

When ECTS is used as an accumulation system certain rules apply. Credits measure only workload. They do not measure quality of performance, contents or level. These elements are described in other ways. The workload of any official learning activity completed can be expressed in credits and can be placed on a student's transcript of records. However credits can **only** be applied to completion of a recognised qualification when they constitute an approved part of a study programme.

When ECTS or analogous credit systems become official, credits receive **absolute** and no longer relative value. That is to say, credits are no longer calculated on an *ad hoc* proportional basis, but on the basis of officially recognised criteria. We should note that national credit accumulation systems based on ECTS principles allow not only national transfer, evaluation and recognition of work performed but also international transfer —always in the respect of the principles of clarity which are the foundation of ECTS.

Furthermore we may note that as more and more countries adopt systems compatible with the Bologna declaration/Prague communiqué there has been a convergence and consensus around ECTS credits as a common measure of student time. In practice 1 ECTS credit is equal to roughly 25-30 hours of student work (that is, including contact hours, independent or guided study, etc.)

3. *ECTS Today*

As we can see, ECTS in thirteen years has developed from a pioneering system of communication between very different European systems and structures into a consolidated and expanding official system which is one of the foundations for the development of a European higher education area. It originally facilitated international student mobility and made possible an increase in reciprocal knowledge of study programmes especially designed for **full-time students**.

As ECTS develops into a Europe-wide accumulation system it also will be an essential tool for the development of other, more flexible kinds of higher education: part-time studies, recurrent study periods and in general what today is known as «**lifelong learning**»: that is, ECTS is a necessary tool for measuring and describing the many learning activities that European citizens will be increasingly engaged in during all periods of their life.

ECTS credits today are increasingly used as a tool for **designing curricula**. Because they express student workload measured in time, they allow higher education institutions to plan the most effective way to achieve desired results within the time constraints of the length of their degree programmes. ECTS credits also provide a useful means for monitoring results and improving teaching/learning performance. ECTS also facilitates student and teacher mobility by providing a common currency and transparency on content and weight of course material and information on assessment methods.

0. Introduction

This paper aims to offer more insight into the relation between educational structures, workload, credits and learning outcomes. The starting point is to recognise that in general the design and the implementation of a course of study leading to a recognised qualification or degree is based on a number of elements of which we mention here the following:

- a) The set of «intended» learning outcomes;
- b) The total number of credits required and its distribution over the several activities (such as the teaching/learning units; the thesis work, the comprehensive examination, etc.) involved in the qualification;
- c) The actual academic contents offered to the students;
- d) The teaching/learning methodologies and traditions appropriate to each institution.

This paper focuses on the concept and role of credits, trying to highlight their connections with learning outcomes and with other factors mentioned. Indeed the tuning process requires a clear definition of the concepts connected to credits, learning aims/objectives and results. This makes it necessary to reach greater clarity and knowledge concerning the following items:

1. The role of credits
2. Allocation of credits to courses
3. Overall curriculum designing
4. Credits and level
5. Calculation of credits in terms of workload
6. Comparison of length of academic years in Europe
7. Relation between workload, teaching methods and learning outcomes

It need not be stressed that all the topics mentioned are interrelated.

It also must be mentioned here that higher education has changed considerably during the last half century. A more socially oriented approach has gradually replaced the Humboldtian one. Forms of instruction designed for a numerically limited elite have developed into mass education systems. At the same time, the traditional and necessary link between university teaching and research has been put under pressure. During the last decades, education has followed the general tendency towards internationalisation. More than ever before, students

are convinced that pursuing their studies at least partly abroad is in their interest. International mobility of a part of the labour force has become a reality. It is evident that, as the percentage of the population with university qualifications increases, and as models of employment and career become more flexible, the current tendency to intersperse academic study and work may increase. Moreover, the emphasis on continuing professional development, involving all parts of universities and virtually every subject area, will become increasingly significant. The changing demands of the educational market-place make it appropriate to consider how continuing professional development, in the context of lifelong learning, can be accommodated within an on-going *qualification framework*. A system of credits for such study and achievement, which can be widely recognised in a mobile labour force and eventually lead to recognised qualifications will be demanded. ECTS provides a vehicle which, as indicated elsewhere in this paper, is already widely understood and accepted and which will prove adaptable to the new needs as well.

1. The role of credits

1.1. ECTS

During the period 1989-1995 the European Commission developed the *European Credit Transfer System (ECTS)*, in close collaboration with some 145 higher education institutions. The intention of this system was to come up with a tool that would make it possible to compare periods of academic studies of different universities in different countries. Such an instrument was thought necessary to improve the recognition of studies completed abroad. ECTS was intended to be a *transfer* system, to connect the different higher education systems and structures of the countries in Europe. As a transfer system, based on general assumptions concerning workload and information and on a philosophy of mutual trust and confidence, it worked well.

Indeed the strength and attraction of ECTS is and was:

- its simplicity;
- its overarching capability of bridging educational systems on a national as well as on an international basis.

It was agreed, from the very start, that study periods completed successfully at other institutions should only be recognised on the basis of prior agreements between academic staff about *level, content* and *load* of course units.

1.2. *Relative and absolute value of credits*

In the information material which was distributed about the European Credit Transfer System (ECTS), it is stated that *credits allocated to courses are relative values reflecting the quantity of work each course demands in relation to the total quantity of work required to complete a full year of academic study at a given institution*. The question of whether this approach is not too simple must now be raised. Especially the expression «relative value» related to «a full year of academic study» requires more attention. During the development phase it was not possible to define credits univocally as relative value in all situations. This seemed due to a large extent to the fact that a number of countries were not acquainted with credit systems. At that time Italy and Germany were identified as the two countries with most difficulties in applying the system. Germany, because it did not have a clearly described study programme for many disciplines, and Italy because there did not seem to be a real relation between the official and actual length of study programmes. Therefore the term «relative value» was given a different meaning in different countries and circumstances. Sometimes credit allocation was based on the official length of the programme and sometimes on the unofficial length, that is the average amount of time necessary to finish the programme successfully in practice. In the countries where a credit system based on the idea of workload already existed, the official length was taken as a starting point for the allocation of credits. In these cases «relative value» actually became «absolute value» in each context.

It is foreseen that in the near future most European countries, and institutions in those countries, will introduce credit systems based on the notion of workload as in ECTS. By doing so credits will be given an «absolute value» in these countries too. This does not mean that the number of hours of workload of a credit will be exactly the same on a national or an international level. The actual lengths of study periods in an academic year differ from institution to institution and from country to country. This poses no problems as long as the differences are kept within certain limits. We will come back to this issue later.

1.3. *Types of programmes*

Sometimes a distinction is made between regular programmes and extra challenging programmes. The latter programmes are intended for

very bright students¹⁴. In both cases the prescribed study programme should be based on the assumption that an academic regular year counts a total number of 60 credits. This makes clear that although credits **always** represent workload and are only given on the basis of successful assessment, the **standard** of the work, i.e. the performance achieved by the student in order to gain them, may be different. This follows from the fact that there are not only different types of education (i.e. teaching and learning methods/traditions), but also different learning performances within the same type of education. In other words, as far as the credits are concerned, the actual recognised qualification defines how many credits (as a whole) and how many single increments or «bits» of credits (through the «modules» or teaching/learning blocks) a student receives. Credits per se have only **one** dimension: workload, but —in the Diploma supplement, Transcripts of Records, etc.— they accompany and are accompanied by **other** indications, such as (host) institution, degree programme, level, contents, quality of performance (i.e. grading), etc. For the sake of clarity, the focus of this paper is on the typical student who takes a regular degree programme.

1.4. *ECTS as an accumulation system*

As stated, credits are **not** an entity in themselves, but always describe work completed which is part of a curriculum. If we refer to a credit accumulation system, we mean a system in which credits are accumulated in a coherent programme of studies. In this respect a credit is a *unit* which reflects a certain amount of work successfully done at a certain level for a recognised qualification. Therefore, *credits are not interchangeable automatically from one context to another*. Admission officers *always* have to evaluate work done (credits awarded) at a different educational institution, whether abroad or not, before it can

¹⁴ Three different meanings seem fit to the words «*extra challenging programmes*». They are:

1) normal programs can be squeezed by brilliant students who can then gain more than 60 credits in a single academic year (see also §6.2 below);

2) In some places, i.e. at Oxford and Cambridge, Ecole Normale in Paris, Scuola Normale in Pisa, the students have to attend extra-curricular lectures/activities/etc.

3) A student can substitute in his study curriculum some less challenging credits with other (equal in number) credits which are more challenging: a student can reach a higher level in the same period of time, without getting more ECTS credits (e.g. in programmes that skip details that would appear in a normal programme). Level is not determined by the number of credits.

be included in their own degree programme. ECTS as an accumulation system *facilitates* the recognition of such credits. By evaluating, the total of course work done should be taken into account to avoid course to course comparison. This method of academic recognition of work taken elsewhere has been established as a basic rule in the past decade within the ECTS framework. ECTS is suitable as an accumulation system because it is based on this concept of context-related credits and recognition by the institution which ultimately awards the degree.

As said, until now the transfer aspect of ECTS has been stressed, but in the future certainly the focus will shift to the accumulation aspect of ECTS. It will constitute one of the mechanisms necessary to deal with the developments in higher education and the labour market.

In this perspective it is in the interest of the higher education sector to develop ECTS into a reliable accumulation system for academic studies. In the first decade of its existence the right conditions for such a step were lacking. However, especially in the last three years, changes have taken place in European higher education policies which have created the possibilities and underlined the necessity for a European accumulation system. The *Sorbonne Declaration* (1998), the *Bologna Declaration* (1999) and the *Prague Communiqué* (2001) on the one hand and the reforms taking place in a number of countries on the other, are clear expressions of this. They follow the idea of a European framework of an open market, free exchanges of persons and goods and one economic area. Therefore, an accumulation system is now considered to be one of the preconditions for the tuning of educational structures in Europe.

In practice, the transfer of credits and the accumulation of credits are two sides of the same coin. During recent years it has often been suggested that the abbreviation «ECTS» be changed to include the accumulation aspect. It has been decided not to do so in order to avoid confusion. ECTS has become a well-known trademark during the last decade in Higher Education, which reflects a unique methodology of academic recognition. This methodology includes both transfer and accumulation. After all, ECTS requires that credits be allocated to all courses in all programmes. The basic idea of ECTS is that recognition is not realised on the basis of course to course comparison, but by recognising periods of studies at a comparable level and content in a more flexible way.

1.5. *Credits and the length of a degree programme*

Since the *Sorbonne Declaration* (1998) and the *Bologna Declaration* (1999) the discussion about credits has received a new impulse. Not

only have more countries decided to introduce a national credit system—which in nearly all cases coincides with ECTS— but also a debate has been initiated about the structure in cycles of the higher education sequence and about the desired length of the study programmes. A consensus appears to have developed in Europe about the following general structure:

- First cycle or undergraduate: 180-240 credits (see the conclusions of the Helsinki conference 2001, where a general consensus was achieved on this range of lengths, later on confirmed by the Salamanca Convention).
- Second cycle or (post)graduate (the required length is subject of discussion).
- Third cycle or doctoral (180 to 240 credits).

2. Allocation of credits to courses

2.1. Student workload

ECTS was designed as a credit system based on student workload. This was in accordance with developments in the 1980s in a number of EU countries like in Scandinavia, the Netherlands and the United Kingdom. In those countries the (national) credit systems were set up as accumulation systems. ECTS could therefore be easily implemented. In other countries, which had based their teaching systems on the number of contact or teaching hours, implementation proved to be much more complicated. Initially, in these countries the following approach was mostly used: Allocation of credits to courses was based on the number of teaching hours for each course unit. This approach is based on the assumption that the number of teaching hours reflects more or less the workload involved for the student. However, in practice this is not always the case. Experiences in Italy and Spain, for example, show that in the long run this approach is not satisfactory. The same teaching load may correspond to different student workloads. In a number of countries the situation is complicated by the fact that the contents of the curricula to a large extent are decided at central government level: there is a fixed list of subjects which has to be taught. This approach leads to rather rigid course structures and a fair allocation of credits becomes problematic.

Some countries, which have taken workload—in terms of the quantity of student work rather than teaching hours—as the basis for allocation, have met other kinds of problems. In a number of cases

misunderstanding occurred about the relation between the importance of a topic and the number of credits to be allocated to a course unit. It proves difficult, in practice, to make clear that the complexity or importance of a topic *as such* is **not** the basis for credit allocation. Credits depend only on the amount of time it takes to learn the subject matter and to complete the course unit successfully.

2.2. *Student-oriented versus teacher-oriented programmes of studies*

Discussions of this nature reflect a different emphasis on teaching and learning. Educational systems can be described as being more teacher-oriented or more student-oriented. The teacher-oriented approach is generally time independent, based on the assumption that the proper object of study is what the individual professor thinks the student should learn in his or her course. The student-oriented approach gives greater weight to the design of the overall curriculum and focuses especially on the usefulness of study programmes for a future position of the graduate in society. With respect to this latter approach a correct allocation of credits as well as a sensible definition of learning outcomes play a decisive role.

Until recently most systems in use were teacher oriented. There is now a tendency however to give greater attention to the obstacles encountered by a *typical* student in finishing his or her studies in time. Student workload is acknowledged to be a crucial factor and educators recognise that there is a tension between what a student **should learn** and **is able to learn** in a given period of time. In particular, when determining the number of credits required for a particular set of learning outcomes and degree programme specifications, allowance must be made for differing prior knowledge, skills and competences, acquired before entering university. Different assumptions about these prior factors are made in different countries because of differences in the architecture of secondary school education.

3. **Overall curriculum designing**

3.1. *Role of desired learning outcomes*

In the quantitative framework assured by the use of credits, it would seem beneficial to develop course programmes on the basis of desired learning outcomes. Learning outcomes can be defined as statements of

what a learner is expected to know, understand and/or be able to demonstrate after completion of a learning programme.¹⁵ Experience with this approach has been recently built up by the *Quality Assurance Agency (QAA)* in the United Kingdom and the method is also known but less widely used in most other European countries.

By designing programmes in this way, more transparency and coherence can be achieved. This approach makes it possible to develop *cumulative* programmes, with specific *entrance requirements* for each of the cycles, the study years and levels as well as the course units.

The learning outcomes foreseen for the first cycle and the second cycle must be clearly distinguished. Although the final outcomes and the competences to be acquired should be discipline/programme related, more general objectives can be formulated also. In practice two types of learning outcomes can be distinguished:

- General competences (transferable skills)
- Subject specific competences (theoretical, practical and/or experimental knowledge and subject related skills)

Both should have a recognisable place in the course programme and should be verifiable at the end.

Generic and subject-specific competences (skills and knowledge)

When we speak of **general competences** we refer to such things as capacity for analysis and synthesis, general knowledge, awareness of the European and international dimension, capacity for independent learning, co-operation and communication, tenacity, capacity for leadership, organisational and planning abilities. In other words, we are speaking of qualities which are of use in many situations, not only those related to the specific subject area. Furthermore, most of them can be developed, nourished or destroyed by appropriate or inappropriate learning/teaching methodologies and formats.

In addition to these more general competences—which hopefully will be developed in all study programmes— each course of study will certainly seek to foster more **specific subject competences** (skills and knowledge). The subject related skills are the relevant methods and techniques pertaining to the various discipline areas, e.g. analysis of ancient scripts, chemical analyses, sampling techniques and so forth, according to the subject area.

¹⁵ Compare the report *Credit and HE Qualifications. Credit Guidelines for HE Qualifications in England, Wales and Northern Ireland*, published in November 2001 by QFW, NICATS, NUCCAT and SEEC.

The **subject related theoretical and practical and/or experimental knowledge** includes the actual contents, that is specific factual knowledge relating to the discipline, ways in which problems are approached and solved, knowledge of the history of the subject and of current developments within it and so forth. Here too, careful analysis must be made, in terms of definition of priorities and required levels for each kind of subject related knowledge, in order to design a satisfactory curriculum.

The same learning objectives and competences can be reached by using *different* types of teaching and learning methods, techniques and formats. Examples of these are attending lectures, the performing of specific assignments¹⁶, practising technical skills, writing papers of increasing difficulty, reading papers, learning how to give constructive criticism on the work of others, chairing meetings (of seminar groups, for example), working under time pressure, co-producing papers, presenting papers, making précis or summarising, doing laboratory or practical exercises, fieldwork, personal study.

At first glance, it seems reasonable that the more general learning outcomes should be pursued in the first cycle. Some previous experience shows however that the «general» learning outcomes are to an extent subject dependent. It is suggested here that, in general, at completion of the first cycle, the student should be able to:

- show familiarity with the foundation and history of his/her major (discipline);
- communicate obtained basic knowledge in a coherent way;
- place new information and interpretation in its context;
- show understanding of the overall structure of the discipline and the connection between its sub disciplines;
- show understanding and implement the methods of critical analyses and development of theories;
- implement discipline related methods and techniques accurately;
- show understanding of the quality of discipline related research;
- show understanding of experimental and observational testing of scientific theories.

The completion of the first cycle functions as entry requirement for the second cycle. The second cycle usually is the phase of specialisation, although this is one of the possible models. The student who graduates

¹⁶ I.e. finding out about a specific topic and writing a report or an essay

must be able to execute independent (applied) research. It seems that, with regard to the learning outcomes of the second cycle the student should:

- have a good command of a specialised field within the discipline at an advanced level. This means in practice being acquainted with the newest theories, interpretations, methods and techniques;
- be able to follow critically and interpret the newest development in theory and practice;
- have sufficient competence in the techniques of independent research and to be able to interpret the results at an advanced level;
- be able to make an original, albeit limited, contribution within the canons of the discipline, e.g. final thesis;
- show originality and creativity with regard to the handling of the discipline;
- have developed competence at a professional level.

Not all the mentioned learning outcomes or level indicators are of the same relevance for each discipline.

3.2. *Modular and non-modular systems*

For some the introduction of a credit system automatically implies the introduction of a modular system, that is, course «units» or modules, to which are allocated a «limited/reasonable number» of credits in more or less standard multiples. In practice there are many existing options and the «*multiple standard*» is not often taken into consideration. The modular system has obvious advantages, because in some countries it might prevent too much fragmentation and therefore avoids too many examinations. It also makes the transfer of credits easier. A modular system is not a precondition for overall curriculum designing, although in practice it facilitates the process. The negative aspect of a modular system is that it decreases the teaching freedom, when the amount of contact hours within the module is limited, but the positive aspect is that it increases the flexibility insofar as it becomes possible to build different curricula having points of contact between them. While in a non-modular system (i.e. when a large amount of credits is given to a course unit taught by a single teacher) the choice of the material is given priority, in a modular system it is the structure of the over-all curriculum which will constitute the primary consideration.

In any kind of system, modular or non-modular, the question of the allocation of credits can be approached from two sides: from the bottom and the top. In a bottom-up approach the course unit or building brick is the central point of attention. In that situation the position of the specific course unit within the overall curriculum is not clear. The risk involved in this approach is that teachers overestimate (or underestimate) the role of the course units they teach. This is reflected in the amount of work that a student is asked to do for a course. For students this might mean that they will not be able to use their time in the most profitable way because their total workload is too heavy (or too light).

In a top-down approach the starting point in this process is to describe the intended learning outcomes at four levels:

- the degree programme of the second cycle (MA/MSc-level);
- the degree programme of the first cycle (BA/BSc-level)
- each year/level of the study programme, e.g. first, second, third and fourth and fifth;
- each course unit (or module or teaching learning activity).

3.3. *Distribution of credits*

When we talk about desired learning outcomes or competences, we refer to factual knowledge, analytical skills, practical skills, etc. Special attention should be put in avoiding the inclusion of inappropriate learning outcomes (e.g. too much detailed coverage of a given topic). After the desired learning outcomes have been formulated, the next step is to decide how much time is required to reach each of these learning outcomes. This calculation is based on the estimate of what a *typical* student can do in a certain amount of time. In effect, this calculation and the total amount of time available¹⁷ will probably not match. That is the moment to make *compromises* with regard to the level of knowledge and skills as formulated in the desired learning outcomes and the available amount of time. It will probably mean that the learning outcomes have to be adjusted. If this exercise is executed correctly, it will show how much time is available for each teaching/learning activity in the course programme (e.g. teaching block or module or course unit, thesis work, fieldwork, placement, comprehensive examination, etc).

¹⁷ Available e.g. on the basis of the teaching/learning tradition in the given «institution + country».

The credits allow calculation of the necessary workload and impose a realistic limit on what can actually be put in the whole course or in each academic year.

The total number of credits needed to complete a degree or a single academic year can be divided in various ways, in order to facilitate the definition of courses of study and of the degree of flexibility allowed. For example, the necessary credits needed to complete a degree could be divided into different categories: e.g. those pertaining to mandatory «core» courses, auxiliary courses or complementary course units or the like.

Such a distribution into categories of course will vary quite a bit from institution to institution. Indeed institutions differ greatly as to the available teaching resources and as to the preparation of their students at entrance, and hence will need to distribute credits in an appropriate way in order to *optimise the use of resources* and the efficacy of the teaching learning activities.

4. Credits and level

While there is no suggestion within ECTS that credits measure level, it is apparent that, when credits are used within an accumulation system, the rules relating to the award of a qualification generally specify not only the number of credits required for the specific qualification but also a set of sub-rules in relation to the level at which those credits must be obtained as well as the type of courses.

This project has not endeavoured to tackle this issue basis but it is evidently one which all those institutions implementing a credit accumulation system will need to address and which, if credits are to be transferable between institutions and between member states, will need to be addressed in a European perspective. Currently, such issues are resolved on an ad hoc basis, sometimes utilising the NARIC network, but if larger scale use of a European credit accumulation system is to be successful, there will need to be a European understanding —or even a European-wide system of *level indicators*. A system of *course type descriptors* will be required as well. Moreover, developing these further indications in conjunction with credits will be a critical factor in a system of accrediting prior learning or prior experience so that all concerned will understand, in a transparent way, the level at which the credits are being awarded. Similarly, as the pace of continuing professional development accelerates, the level at which credits are being allocated will need to be made clear.

A possible path forward could be to introduce extra descriptors, which go along with ECTS as an accumulation and transfer system. A

pre-condition for such a European wide system is that it should be transparent and easy to understand and to implement. The consequence is that credits will be distributed over levels and type of courses. If we talk about levels we can distinguish the following ones:

- **B**asic level course (meant to give an introduction in a subject);
- **I**ntermediate level course (intended to deepen basic knowledge);
- **A**dvanced level course (intended to further strengthening of expertise);
- **S**pecialised level course (meant to build up knowledge and experience in a special field or discipline).

With regard to the type of courses the following ones can be distinguished:

- **C**ore course (part of the core of a major programme of studies);
- **R**elated course (supporting course for the core);
- **M**inor course (optional course or subsidiary course).

The levels and types of courses offer us additional crucial descriptors. In order to make clear and immediately evident what learning experience the credits represent one can imagine that a *simple code system* could be introduced. This system would include not only the amount of work done by the student in terms of credits, but also descriptors which give an indication of the level and the type of course unit. To give an example: The code 5-I-R might tell us that the unit has a load of 5 credits, is offered on an intermediate level and is related to the core.¹⁸ For courses taken outside the framework of a programme, for example in terms of lifelong learning, the last code letter would be superfluous.

5. Calculation of credits in terms of workload

5.1. *The definition of credits*

The actual calculation of credits in terms of workload has proven to be a difficult issue. First of all it should be clear what is meant by credits. The following definitions seem to be workable:

Credit is a measure of student workload based on the time necessary to complete a given teaching/learning unit.

¹⁸ This code system is based on a proposal of the EUPEN network.

In ECTS terms:

- 60 ECTS credits measures the workload of a typical student during one academic year.
- The number of hours of student work (that is, of the typical student) required to achieve a given set of learning outcomes (on a given level) depends on student ability, teaching and learning methods, teaching and learning resources, curriculum design. These can differ between universities in a given country and between countries.

Since credits, whether relative or absolute are, hence, only a measure of workload within a curriculum, credits can only be used as a planning or monitoring tool when the curriculum itself has been defined. In order to create, modify or evaluate a curriculum, general and specific learning outcomes must be agreed upon.

5.2. *Estimating average workload and performance*

It is often argued that the *typical* student does not exist. How to determine the average standard of brightness? There is a consensus though, that it takes time and a certain standard of preparation/b background to acquire certain knowledge and skills. Therefore, time employed and personal background are the two elements that can be identified as variables in learning achievement with respect to a particular course or study programme. In this context, pre-requisite knowledge when entering a given recognised qualification is a basic element. Its actual level/amount may measurably influence the workload of the student during the course programme. Teaching staff normally has a rough idea of what it can ask a student to do in a certain amount of time in a certain programme. Furthermore, teaching staff has a clear notion about quality standards. However, it is commonly accepted that if a *typical* student puts in more effort into preparing an examination the grade will probably be somewhat higher. Similarly, if a good student spends the expected amount of time to prepare an examination, he or she will be rewarded with a good grade. If less time is spent, the grade will probably be lower. In other words, there is a relationship between the effort and the results of a student. Accepting the fact that the actual time that any particular student needs to spend in order to achieve the learning outcomes will vary according the capacities of the individual student and be influenced by the degree of prior learning and to the mode of learning, the so-called *notional learning time* can be defined. The notional

learning time is the number of hours which it is expected a student (at a particular level) will need, on average, to achieve the specified learning outcomes at that level.¹⁹

5.3. *Methods of calculating workload*

In practice different approaches are used to calculate the student workload. Although there are differences due to the subject, common denominators can be identified also.

In the calculation of workload the following items play a role:

- The total number of contact hours for the course unit (number of hours per week x number of weeks);
- Preparation before and finalising of notes after the attendance of the lecture / seminar;
- The amount of further independent work required to finish the course successfully.

The last item is the most difficult one to calculate and depends largely on the discipline concerned and the complexity of the topic. Independent work can contain the following items:

- The collection and selection of relevant material.
- Reading and study of that material.
- Preparation of an oral or written examination.
- Writing of a paper or dissertation.
- Independent work in a lab.

It should be obvious that the calculation of workload in terms of credits is not an automatic process. The professor has to decide on the level of complexity of the material to be studied per course unit. It goes without saying that prior experience of the staff plays an essential role. One of the main contributions of the process of credit allocation is that it leads to more reflection on curriculum design and teaching methods on the part of the teaching staff.

In order to check regularly whether students are able to perform their tasks in the prescribed period of time, it has proven to be very useful to utilise questionnaires. In those questionnaires students are asked not only about how they experienced the workload, but also about their motivation and the time reserved for the course.

¹⁹ *Credit and HE Qualifications. Credit Guidelines for HE Qualifications in England, Wales and Northern Ireland, p 4.*

6. Length of the academic year in Europe

6.1. Results of Tuning surveys

Just as with defining the typical student, it does not seem easy to cope with the variety of the lengths of the actual study period per academic year within Europe. As stated before, the length of the academic year, i.e. the number of working hours of an academic year, is one of the factors in determining how many student working hours one ECTS credit contains. In Europe the length of the academic year at first glance seems to differ from country to country and in some cases within a country from institution to institution. Although time in itself is clearly an insufficient measure, the Tuning project has done a survey to obtain a better picture of the actual situation. From the acquired information a number of general conclusions can be drawn. The first one is that a distinction has to be made between the actual number of teaching weeks, the number of (independent) study weeks and fieldwork, the preparation time for examinations and the number of examination weeks. The total of these gives the actual length of the teaching period and offers therefore comparable information per discipline, institution and/or country. The second conclusion is that, when programmes are broken down, the *differences* in length prove to be *much smaller* than one would expect at first glance.

This last conclusion is in line with the information that has been collected about the *official* length of the academic year of institutions and countries, e.g. the beginning and the end of an academic year. This calculation takes into account vacation periods during which it is normal for students to be expected to continue to work, prepare assessments, projects, dissertations. In the latter case nearly all countries fit in the range of 34 to 40 weeks per year. If it is accepted that a week contains 40 to 42 hours, the actual number of «official hours» in which a student is expected to work during an academic year runs from 1400 to 1680 (1800²⁰). Even in the cases of systems where the formal specification of hours is lower, it is evident that, in practice, because of work undertaken in vacation periods, the actual number of hours corresponds with the general norm. The point average seems to lie around 1520 hours per year. Given the fact that an academic year contains 60 ECTS credits, one credit represents then approximately

²⁰ In a number of countries it has been stated in law that an academic year for students has a workload of 1500 to 1800 hours.

25 to 30 hours of student workload. This range of difference seems to be acceptable. The average point lies around 25 to 26 hours per credit.

6.2. *Some special cases*

If a regular study programme is 34 to 40 weeks, there is limited time left to obtain more ECTS credits than the set standard number of 60 within an academic year. If the assumption is accepted that a normal study programme should contain 36 to 40 working weeks, there remains a maximum of 10 weeks in which extra course work can be done. This observation is relevant for second cycle programmes, which are based on a *full calendar year* of study instead of 9 study months. These programmes are on offer for example in the UK and Ireland. If a programme lasts 12 months, which are approximately 46 to 50 weeks, it should have an allocation of 75 ECTS credits. A structure in which an academic year contains more credits than that number is undesirable. If we summarise:

- a normal course programme has an official load of 60 ECTS credits per academic year;
- a second cycle programme or so-called «intensive programme» of a *full calendar year* (e.g. a 12 months programme) can have a maximum load of 75 credits (which equals 46 to 50 weeks);
- a second cycle programme or Master programme of 90 ECTS credits is based on a lengths of 14 study months (which equals 54 to 60 study weeks).

For all programmes which demand more than 1500/1600 hours (36/40 weeks) per year, to be able to award more than 60 credits, evidence of the workload should be given.

It has also to be recognised that many students study part-time nowadays. If for example, a part-time study programme holds 45 ECTS credits a year, four years of study equals three years of full-time study. Credits give a fair way to organise part-time learning programmes.

7. **Workload, teaching methods and learning outcomes**

Workload, teaching methods and learning outcomes are clearly related to each other. However, there are other relevant elements. In achieving the desired learning outcomes a large number of

interrelated factors play a role. These are not limited to the number of working hours, workload and brightness of the student. Also methods of teaching and learning have to be taken into account. It might make quite a difference whether teaching is organised in large groups or more individually: in other words, whether the majority of course units a student has to take are lectures or seminars, exercise courses and practical exercises. Furthermore the number of students in a working group might have its effect on the result of teaching, as probably the use of a tutorial system has. Also the kind of assessment will play a role, as will the design and coherence of the curriculum (is it focused on gradual progression in performance or does it make excessive or insufficient demands in some phases?) as well as the quality of the organisation and the availability of advanced teaching aids like computers. Furthermore, national and regional traditions have to be taken into consideration. For example, in some countries most students will live at home and need time to travel, while in others they live on their own and have to look after themselves. In others again they will be housed on campuses. All these factors bear, in some measure, on the results of the teaching/learning experience as measured in time (in terms of credits) and in performance (in terms of level of achievement). In an ideal situation the aims and objectives set will be fully reached in the notional learning time. As said before, notional learning time is not the actual time that any particular learner needs to spend in order to achieve the learning outcomes. *The actual time will differ from student to student.* In many cases the ideal situation will not exist.

To summarise, we may consider the relevant elements which play a role under the following headings:

- Diversity of traditions.
- Curriculum design and context.
- Coherence of curriculum.
- Teaching and learning methods.
- Methods of assessment and performance.
- Organisation of teaching.
- Ability and diligence of the student.
- Financial support by public or private funds.

The above mentioned factors make clear that it is not only impossible, but also undesirable, to identify one way of achieving desired learning outcomes. Given the internal and external circumstances and conditions the right balance for every course programme has to be found in terms of the above mentioned factors, of which time is one. This mix will vary

from institution to institution and from country to country. Thus it becomes clear that *different pathways can lead to comparable learning outcomes*. In this way the existing diversity in Europe can be fully maintained.

Study programmes require continuing monitoring, adjustment and evaluation. This guarantees that the required learning outcomes can still be obtained when the circumstances and/or conditions, i.e. one or more of mentioned factors, change. Monitoring, adjusting and evaluating are very important internal processes for which staff and students are responsible equally.

The most important external way to check whether the applied mix is the ideal one is by regular quality assurance and accreditation. We will come back to this issue in a separate paper. What can be said here is that quality evaluation schemes are developed to check whether the actual learning outcomes are of the intended level and whether they are actually met by the content of the programme. At present, these are mainly organised on a national level, but it may be expected that quality assurance and accreditation will be internationalised in the near future.

8. Conclusion

This paper makes clear that many factors play a role in the teaching and learning process. It also makes clear that credits as such are not a sufficient indication for the (level of) learning achievements. The only reliable way to compare pieces of learning and study programmes offered by (higher) education institutions is to look at learning outcomes / competences. By defining the right learning outcomes, standards can be set with regard to the required level of discipline related theoretical and/or experimental knowledge and content, academic and discipline related skills and general academic or transferable skills. With the exception of the last one these will differ from discipline to discipline. To make programmes more transparent and comparable on a European level, it is necessary to develop learning outcomes / competences for each recognised qualification. These learning outcomes should be identifiable and assessable in the programme that opts for such a qualification. Learning outcome should not only be defined on the level of formal qualifications such as degrees but also on the level of modules or courses. The inclusion of learning outcomes in the pieces and the total of a curriculum stimulate its consistency. They make explicit what a

student should learn. It is obvious that credit accumulation and transfer is facilitated by clear learning outcomes. These will make it possible to indicate with precision the achievements for which credits are and have been awarded.

The definition of learning outcomes / competences is a responsibility of the teaching staff. Only specialists of the same field will be able to formulate useful learning outcomes, although, it is useful to consult other stakeholders in society. The fact that the higher education sector has been internationalised and that institutions and disciplines compete on a global level nowadays, makes it necessary that the more general learning outcomes for each discipline or field are designed on a supranational level. By defining learning outcomes in this way universal standards are developed, which should be the bases for internal, national and international quality assurance and assessment. One of the major tasks of the project *Tuning Educational Structures in Europe* is the development of the required methodology for defining learning outcomes / competences. This methodology should offer the mechanism to cope with recent developments like the internationalisation of labour and education, the interruption of academic studies as an effect of the introduction of a two-cycle system and lifelong learning. In this paper we have tried to clarify the definition of credits to use these effectively in planning courses designed to achieve the agreed learning outcomes / competences.

The objective of the paper has been to show the relationship between educational structures, learning outcomes, workload and the calculation of credits in particular within the context of the Bologna Process. This relationship is very relevant in the world of today where traditional teaching is partly replaced by new types of teaching and learning and where traditional higher education institutions experience more and more competition with comparable institutions and with non-traditional institutions which offer novel, attractive opportunities for learners. It is in the interest of society as a whole that learners find their way in a global educational market-place. Transparency is not only the keyword for that market-place but also for degree programmes. Quality assurance and accreditation is an integrate part of this picture. Competitiveness requires the definition of learning outcomes / competences to be transparent and requires a credit system which allows comparison. In this respect the ECTS methodology and tools (learning agreement, transcript of records and—in future— level and course descriptors), relevant for both mobile and non-mobile students, are of crucial importance. The same is true for the Diploma Supplement. Employability in both a national and an international setting is critical

for today's student. It implies that the student will shop for study programmes that fit best to his or her abilities. Comparison requires not only comparable systems of higher education on a European level but also comparable structures and content of studies. The definition of learning outcomes / competences and the use of ECTS as a transfer and an accumulation system can accommodate these objectives.

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