A PRACTICAL GUIDE FOR TEACHERS AND CURRICULUM DESIGNERS

GIVE ME TIME TO THINK

DETERMINING STUDENT WORKLOAD IN HIGHER EDUCATION

UNIVERSITY OF OULU
TEACHING DEVELOPMENT UNIT

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Learning takes place in student's time and through student's learning activities.

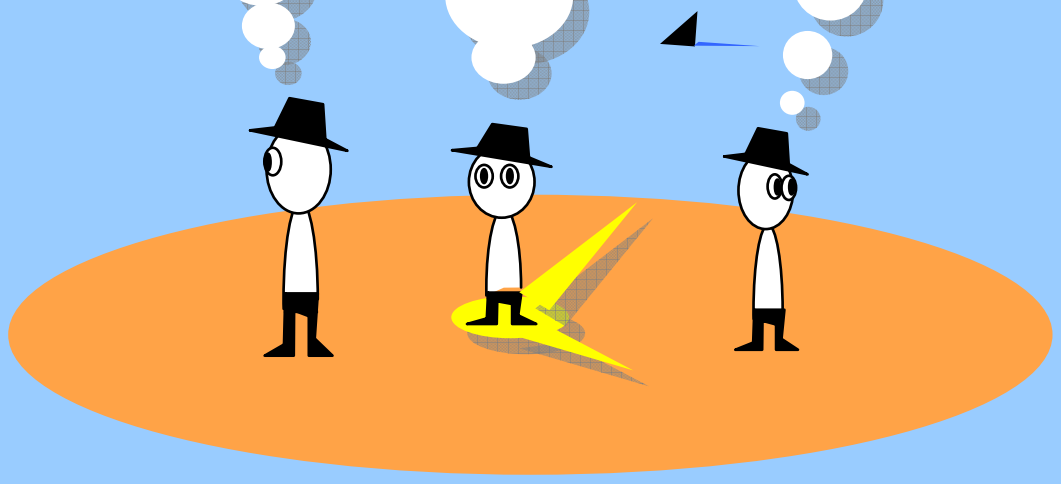
If there is no time to undertake learning activities, it is impossible to learn.

If a student does not spend any time for independent studying, learning can take place only during contact teaching hours.

The worse a student's potential for learning is, the more teaching and counselling hours s/he needs.

The quality of learning outcomes cannot be concluded based on the number of hours used for teaching

The evaluation of the quality of learning outcomes cannot be based on the number of hours used for studying



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FOREWORD

This guide was first written in 2002 when the Finnish higher education system was about to enter the Bologna process and a new two-tier degree system. The guide is a joint effort of an educationalist, a mathematician and an engineer, who also developed models for quantitative study planning. The guide is mainly based on experience accumulated in Finnish universities since the 1970s degree reform, which gave strict time limits for the completion of university studies. In Finland the workload per course was indicated in credits known as study weeks. Here we introduce a heuristic GET model for calculating the workload of academic studies. The GET model was first published in 2003 and has since been widely used in all fields of study in the Finnish higher education, both in universities and vocational higher education institutions.

The present book was originally written for Finnish universities to assist in entering the Bologna process. Its contents are consistent with the principles of the European ECTS credit system. Because of the success of the GET model, we wish to open up the possibility for larger audiences to comment, apply, adapt and further develop both the GET model and our ideas. As there are

significant cultural differences between European countries, many details and principles are bound to be contextual. For example, Finnish universities apply numerus clausus with admission based on entrance examinations. Current teaching methods support students' creativity and initiative and promote investigative study designs. There has been a movement towards authentic assessment. However, Finnish university instruction continues to be characterised by lectures and other traditional methods of teaching and assessment. The curriculum has been quite flexible, unregulated and based on the idea of academic freedom, although lately there has been some development towards a more structured and modular frame.

The present guide uses the terms “determining study time”, “workload calculation” and "study (time) calculation" as the main concepts by which we mean activities where teachers and other curriculum designers allocate exact time resources to courses by using uniform guidelines. Our focus is on student workload and learning. Information overflow and excessive workload are enemies of a deeper approach to learning. The purpose of study time calculation is to ensure that students will have enough time for high quality learning. We hope that you will GET enough time to read through this book.

We wish to thank all those who have contributed to the writing process and want to give a special mention to professor Lloyd Ruddock for his valuable comments.

Asko Karjalainen *Katariina Alha* *Suvi Jutila*

TIME IS AN ESSENTIAL PREREQUISITE FOR LEARNING

Time is an essential resource for all human action. Learning and studying also take place within the framework of time. The relation between time and learning is one of the most perplexing questions in teaching, something which probably every teacher has contemplated on. The time that the student needs for studies and the time provided for him or her in the curriculum forms, together with the quantity and the level of difficulty of study material, form the workload of studies. Workload is appropriate when students are provided with enough time for completing learning tasks and learner capacity is taken into account. A too tight schedule does not enable effective learning but results in student overload and superficial learning.

For example, a student is only able to read a certain amount of text in a certain period of time. Insufficient time allocation leads to students feeling themselves overworked (student overload), which in turn increases their tendency to abandon the use of the deep learning strategy and encourages them to move towards surface

learning.[1]

The relationship between student workload, study material, study time and learning strategies has become evident in learning research since the 1970s.[2] The essence of this research can be summarised as follows:

1. When the amount of study material is excessive, the student tries to learn by rote only the minimum required to pass the exam.

2. A high course content leads to students having difficulties recognising the relevant from irrelevant, which directs their learning towards memorising (often) irrelevant details for the exam in order to pass the course.

3. Experience of overload is a central factor in defining a student's working habits. Students experiencing overload are prone to aiming their efforts at surface learning. Excessive workload is related to a surface approach to learning. This connection seems to hold the other way around, too: a student who is oriented towards surface learning is more likely to feel that courses are overloaded.

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1 See Kember & Leung, 1998; Lizzio et. al. 2002; Entwistle & Smith, 2002.

2 Relevant studies in this area are for example : Marton, 1976; Entwistle & Tait, 1990; Entwistle & Ramsden 1983; Chambers 1992; Garg, Panda & Panda, 1992; Kember & Leung, 1998; Lawless, 2000.

Thus, this phenomenon may also be a self-strengthening cycle.

4. Experience of overload can be only partially explained on the basis of the actual workload (the actual time used on study activities).[3] Several factors connected with the student's learning environment, learning history and situation in life also affect the experience.

The experience of overload is linked to experiences of difficulty, anxiety, stress, wasting of resources and desire to give up due to the student's inadequate prior knowledge, faulty study habits and insufficient learning skills. The problem is that a student experiencing overload is not capable of efficient learning and cannot reach positive learning experiences similar to his or her colleagues who are experiencing an "adequate load".

It is interesting to note that according to certain research findings, the overload experienced by students is influenced more by the amount of contact teaching than the amount of time provided for independent studying. Thus an excessive number of contact teaching hours can lead students to use a reproducing approach – superficial and rote memory based studying. Researchers have

3 In Kember & Leung (1998) only 4% of perceived workload was explained by the actual workload.

proposed that the reduction of class contact hours may improve learning outcomes. [4]

Studying is an activity taking place in the student's time. It is work aimed at learning. It is essentially intellectual work that consists of thinking, writing, reading and solving mathematical problems.It also includes co-operation and interaction with other students, teachers and tutors. The most essential actions for successful learning take place in the student's mind.

Above all, the student needs time for mental processing - thinking. During the thinking process, new knowledge is connected to what is known before. The learner reflects on experiential evidence, understanding both meanings and reasons, distinguishing the relevant from the irrelevant, separating parts and unities, interpreting puzzling observations and building a personal notion. Exercises, conversations with other students, essay writing and book reading are environments for mental activities.

Thinking is a process which the students can do only by themselves. Only through their own mental activities can there be any learning.

4 Kember & Leung 1998.

Time provided for independent work is the resource allocated for the actual learning process. Contact teaching provides students with new material which is to be learned. Whether this is accomplished or not still depends on how much time the student spends on working with the material and what type of learning tools (concept mapping, conversations etc.) he or she uses.

The relation between time and learning is first and foremost a logical relationship. This means that learning inevitably takes place in time, in the student's time. If a student is given a learning assignment and no time to do it, it would be absurd to even talk about learning or teaching. There is individual variation in how much time a student needs, but the relationship between learning and time is presupposed. If there is no time for learning, it is impossible to learn. However, even an infinite amount of time does not guarantee learning, as although the existence of time is an essential condition to learning, it is not sufficient by itself - other factors are needed as well.

WHAT IS THE REAL WORKLOAD?

Determining study time refers to allocating the appropriate time for learning activities. Successful study time calculation leaves the student with enough time, which

creates the basic precondition for learning.

Allocating the right amount of time is a difficult task. It can even seem an impossible mission. Many factors influence the student's actual need for time, not the least of which is the personal learning objective the student knowingly aims at. If the student aims at just barely passing a course, he or she needs considerably less study time than another student who wants to understand the subject matter.

The minimum work required to pass a course can involve only a fraction of the time needed for deeper learning. Cheating in its different forms is an extreme procedure to minimise the work.[5] The more fixed the courses and exams are from year to year, the more standardised the minimum workload for passing seems to become. Students learn the most effective, energy saving survival techniques and pass them down from one student generation to another[6].

It is also possible that the study path is such that a student cannot properly use the time allocated for studies.[7]. If

5 See Harding (2004)

6 The plagiarism, copying of essays, laboratory reports and other literary works from another and turning them over as one's own is in many cases routine practice in the student community and an example of the energy-saving method passed on from one student generation to another.

7 The study path refers to the student's route with individual choices from starting studies to passing a degree. It includes the student's studies, course and subject choices and study attainments

students have several courses to do work for during the same week, they have to find a way to split their time between the different tasks. In the worst case there is not enough time for a deep approach to any of these. The stacking of courses can be a result of not only inadequate curriculum coordination or a too tightly drawn timetable, but also the students' own course greediness. It has been common in the Finnish study culture for students to choose to take several courses simultaneously to achieve more study credits at a time.

In addition to the reasons mentioned above, external factors also influence the actual workload: family issues, student employment during semesters, actual life situation, problems of living etc. We can illustrate the effect of these factors with the following example:

A certain course **y** has a total time resource of 30 hours in the curriculum. The student **x**

1. **would need** 40 hours for efficient (in-depth) learning (LEARNING),

2. **could pass** the course with the minimum of 8 hours of work, for example by studying only one night for the exam (PASSING),

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(Olkkonen & Vanhala, 2001).

3. **could**, due to the other courses going on at the same time, **spend** at the most 20 hours for studying (STUDY PATH),

4. **will finally study** only 12 hours for the course in question due to some unforeseen incident in his or her life situation e.g. working during the study period. (SITUATION).

The time which the student needs for efficient learning is an individual factor, and the differences from student to student are a sum of several variables. In addition to the factors already mentioned, the time is influenced by, e.g.:

- ability and talent
- motivation
- quality of the student's previous knowledge
- difficulty of the course
- quality of teaching
- quality of counselling

Due to the above described factors, it is inappropriate to calculate study time based only on the measured use of time. Such an approach can pose a threat of making a *categorical assessment error.* A categorical assessment error refers to a situation where an ordinary student's need

for time to learn efficiently is estimated on the basis of realisation (PASSING/STUDY PATH/SITUATION) instead of on the basis of use of time needed for deep learning (LEARNING).

Despite the above mentioned difficulties, the basic question itself remains unchanged: the student has to set aside enough time for studying. The less the student has time, the more likely his or her learning efforts are to turn into superficial and strategic survival efforts: the student begins to experience overload, anxiety and will set his or her standards lower and lower. Hence, the student will have increasingly less of a chance to meet the learning objectives set for a course and they remain only a dead letter on the curriculum pages. Furthermore, the time used by the teacher to prepare for each course and teaching occasion will lose meaning if no learning takes place in the student. Teaching will become a wasted effort.

Calculating study time is, therefore, necessary and has to be done carefully. The most significant problems will arise from a negative calculating mistake in which the allocated time is shorter than the student's actual need. Meanwhile, a small positive calculating mistake is not a significant problem. A starting point for the calculation is as follows:

From the perspective of teaching, the student's need for time has to always be estimated from the viewpoint of deep approach to learning[8]*. No study module or single course included in the curriculum should be allocated time on the basis that it can be passed without real, actual learning. The objective of higher education cannot be the pursuit of superficial learning or furthering uneducation.*

TIME AND THEORIES OF LEARNING

Theories of learning are attempts to define what human learning essentially is. They also try to describe and model the human learning processes. There are several learning theories, each of which describes the learning phenomenon from its own viewpoint. In practice, each different theory emphasises some specific part or characteristic of learning. The following sections briefly introduce the three most researched and most widely applied theory groups from the point of view of time needed for learning.

8 If one wishes to set the aim of the academic course to something else than deep learning one has to be especially careful as only deep learning is cumulative. On the other hand, the need for time in learning that emphasises only remembering is not at all lesser factor and the learning process can include also periods where the way to understanding is through remembering. (cf. Entwistle & Smith 2002, 326)

According to the **behaviouristic theory,** learning takes place by the learner reacting to stimuli and by strengthening the correct reaction in the learner. The teacher's task is to expose the student to clear and carefully planned stimuli. A teacher shows, explains and emphasises things and can also put the students in performance situations, where they react in different ways and the teacher then rewards the right reactions (e.g. the right answers). Learning results are improved with repeats and by allowing more time for practice. The best result could be achieved if the students would continue practising for weeks and even months after they had already learned something. The message of the behaviouristic teaching model from the viewpoint of study time calculation is that students need time for repetition and continuous practising: the more time it is possible to use, the better learning results will be achieved.

Experiential learning theories see learning as a process stemming from human problem solving activities. According to this line of thought, learning happens when the learner 1) counters (experiences) a problem, 2) thinks about (reflects on) this experience, considers what knowledge and know-how he or she is missing in order to manage the situation, improves his or her knowledge and 3) makes assumptions as conclusions and 4) tries to solve the problem on the basis of the assumptions. The

problem-solving trial gives the student a new experience and the cycle of studying and learning will continue. The teacher's task is to organise the assignments to facilitate the learning process and to arrange situations that will help to clarify the experience. The teacher is also responsible for guiding the learning process in its different stages.

In other words, experiential learning is learning in action where the progress is measured in terms of the student's insight. The process is a slow one and requires a great deal of thinking. The teacher's task is to by offering guidance save the student's time in situations where the student would otherwise get stuck. If the student does not receive any support, the learning through experience method will be very slow.

Constructive theories explain learning as the construction of a personal cognitive model. What has been learned before (prior knowledge) operates as a basis for the learning of the new. Even great efforts and generous study time allocation cannot compensate inadequate prior knowledge, which will cause the student to not do that well in learning. For this reason, the teacher has the important task of assessing the students' previous knowledge and linking the new subject matter to it. The teacher is more of a facilitator of learning and uses multiple tools,

assignments, concept maps, disputations, lectures etc. when needed.

The concept of learning refers to understanding the meaning of the subject matter. This is why the learner has to be able to connect matters into meaningful entities and build and rebuild knowledge structures. This is supported e.g. by having students draw concept maps. According to this theory, learning does not happen primarily in the teaching situation or in a certain bordered system. Learning is rather a constant process taking place in a social learning environment, where the student's active mental struggle has a central role. The student has to be provided with time to work for his or her own learning, as learning can only happen through these efforts. The student needs time for employing their previous knowledge, doing assignments, working out meanings and modelling the subject matter. Time is also needed for communication with student colleagues, tutors and other support personnel.

The concept of the significance of time consumption in learning can be seen in all of the above discussed learning theories. Time is a quality factor in learning, needed both before and after the actual contact teaching situation. Learning theories also reiterate the fact that the objective of teaching is to promote and motivate the learner towards

deep learning rather than towards a superficial approach. Superficially learned matters are easily forgotten and thus nonaccumulative, resulting in short-term memorising (e.g. for passing an exam). Deep learning is based on understanding and the learned matters will be available for long-term use. As a result, the learner experiences a permanent change in his or her way of thinking and acting. However, learning theories do not give any guidelines as to how to estimate the time required for studying. Neither do they help to estimate the actual need for time for an ordinary student.

REGULATION OF WORKLOAD IS AN ACT OF STUDENT GUIDANCE

The model for determining study time is always hypothetical and verified by experience.

It is vital to realise that by determining the time needed for deep learning, the teacher creates an optional frame for the student’s studies. The allocation of time is in itself an effective act of teaching.

If the teacher does not require the students to do any homework after contact hours, he or she will not leave any time for it, and the students will have to adjust to the

situation in a way which will definitely affect their learning. The question touches also on the ethos of teaching. When students are given time for independent work, they are also taught that diligent working is an essential contributor to learning. They have been (quietly) advised to work hard on the subject. By allocating time for the students, the teacher performs a significant act which will have a widespread influence on learning activities and learning outcomes.[9]

CREDITS AND CALCULATION

Most countries have a unique crediting system which communicates the course workload to students. Member states of the European higher education area are jointly developing the ECTS credit system. The credit unit previously in use in Finland was called a “study week”. One study week corresponded to 40 hours of student work, one academic year consisting of 1600 hours of student work. According to the new system, 60 ECTS credits correspond to 1600 hours of student work. One credit thus represents 26.7 hours of student workload.[10]

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9 This presupposes two things: 1) the students are aware of that time has been allocated for self study, and 2) that study time for courses the students are taking at a time is calculated correctly.

10 In most European countries the academic year mainly runs from 1400 to 1800 hours of student work divided between 34 to 40

Despite the defined relation, it is clear that in determining study time, the focus will have to be on study load measured in hours, not on calculating credits. There is a permanent tension between credits (credit unit, study week, ECTS credit etc.) and study time. Study time is expressed in hours for the benefit of learning, but the credit is in itself an instrument of valuation. Credits are used to allocate resources and promote studies. The credit easily transforms into a (unofficial) value in itself. There is a danger of credit collection and manoeuvring becoming a superficial game where learning is not the players' primary goal. The social value of credits should not be strengthened in the students' imaginations. The teachers should point out express that even if a student ends up working more than the numeric value of credits would suggest, it is only the quality of learning that matters.

THE ORDINARY STUDENT

It is essential to provide the student with the time that is required for learning. When allocating study time, the factor to consider is the time required for learning the

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weeks per year. One credit thus approximately represents 25 to 30 hours of student workload (in Finland 26,7 hours).

intended study matter. Need for time is an individual variable, but study time cannot be determined separately for each student.

Let us start by creating an image of an ordinary[11] student with an average need of time. Determining time needed for learning is not a precise operation, which makes it susceptible to critique. Nevertheless, all teachers certainly have a more or less fixed idea of a typical student, although variation between conceptions may be significant.

A Finnish professor defined an ordinary student in the late 1960s as one *who is a little bit shy and has a slight tendency towards laziness*. Our guiding principle is that the calculation of student workload should simply be tied to the set of ordinary students. This set includes 70 % of a students on a course, leaving out the most brilliant and the weakest ones. The brightest students (15%) do not need any teaching and the weakest (15%) must work extra hard in order to achieve the required learning outcomes. There is, of course, quite a lot of variation among the said 70% of

[11] We have deliberately chosen to use the concept 'an ordinary student' instead of 'an average student' because we want to emphasise the idea that the qualities of a student and the features of his behaviour should not be described mathematically or quantitatively, but rather in a qualitative way.

the student population, which emphasises the need of close connection between study time determination and core curriculum design. This idea is developed further in the next chapter. By our definition of an ordinary student we will impress that the allocation of study time should always serve best the majority of students.

TIME ALLOCATION AND CORE CURRICULUM PROCESS

Designing and developing an academic curriculum is a challenging process. The most important parties in this process are professors and teachers. They are both the experts on the subject and the ones who actually work with the students. When involved in curriculum design, teachers tend to focus on what they know best, course content, and thus the curriculum development process becomes input oriented. Nevertheless, there is a trend towards output oriented curriculum development processes, where more emphasis is put on learning outcomes and graduates' characteristics (abilities, skills, competences, knowledge).

It seems that teachers often have difficulties in realising the optimal time resource a student needs as a prerequisite for quality learning. Overlooking the critical

connection between student time and learning activities may result in information overflow. If teachers add more and more material to the course, students will aim their efforts more and more towards surface learning activities.

When considering the inevitable relation between content and study time, the concept of core curriculum is the most useful schematic tool for teachers and other curriculum designers. It also implies that in education we must always be able to concentrate on the essential.

Defining the core content is a fundamental part of curriculum development. One way to illustrate the core curriculum process is presented in Table 1.

Table 1. Core curriculum process.

Steps of the core curriculum process
1. MISSION Why should this kind of education exist? What future needs does it respond to? Basic needs can arise from the occupational world or from scientific education (scientific base, professional base).
2. COMPETENCES What kind of qualifications should a (degree) programme produce in order to respond to the basic needs? What are the core competences (cognitive, technical, affective, transferable)? What are the argued and realistic objectives of the education? How are they expressed as learning outcomes?
3. CURRICULUM FRAME What kind of a curriculum frame (curriculum structure) is the most appropriate for reaching the learning outcomes? Should the curriculum be divided into (competence based) study modules or blocks? How are the modules divided into individual courses?

4. ANALYSIS OF THE CORE CONTENTS, STUDENT WORKLOAD AND TEACHING METHODS What are the core contents of the modules, integrative blocks, courses? How extensive are the individual courses? Is the student workload reasonable? How is it measured / assessed/ regulated? What teaching/evaluation methods are the most effective to promote learning?
5. EVALUATION AND DEVELOPMENT OF THE CURRICULUM How is the curriculum being evaluated, developed and updated? What kind of evaluation system does the department use/need for monitoring student progress? Are the students involved in the evaluation and development process?

The CRITICAL QUESTION that deals with allowing sufficient time for quality (deep) learning must be asked at least four times during the core curriculum process:

1) When setting up realistic objectives. If, for example, the bachelor's degree includes 4800 hours of student work, curriculum designers must carefully consider what sort (and what level) of learning outcomes are achievable within this time frame.

2) When deciding about the curriculum frame. The more structured the frame is, the easier it is to allocate credible time resources. The more fragmentary and split into separate course units the design, the greater the threats of information overflow and student overload.

3) When defining course core contents and working methods. Courses are students' concrete working environments within the curriculum entity. During a course

students interact with teachers and materials through teaching and assessment methods. The foundation of successful study time estimation is laid here.

And finally,

4) When pondering how to monitor students' progress in the programme. Students' use of time is a critical indicator of learning quality, and program leaders need valid up-to-date data on students' actual use of time. The last, but by no means the least, step in the core curriculum process is developing methodologies to measure student workload.

Our focus in this guide is on creating a model for calculating study time within the frame of reference of the course core contents and working methods.

When designing an academic curriculum, teachers should be able to determine the core contents of the subject taught and studied. What is meant with the term "core"? It can be defined in a number of ways:[12]

1. professional core: essential for professional practice
2. academic core: essential component of each subject (discipline)

12 Bandaranayake (2000) lists the most relevant meanings of core content.

3. integrated core: relevant to many disciplines
4. compulsory core: should be mastered by all students
5. minimum core: the minimum required by a student in a specialty for further studying
6. pragmatic core: content that can be taught within the time allocated for a given system

By analysing the different meanings above more carefully, we can summarise that they are closely and logically interrelated. The problem of the pragmatic core must always be set first, because it is impossible to teach an unlimited amount of material in a limited period of time. If we are ready to admit this, the next logical step is to consider the minimum core, which may be defined in terms of professional, academic or integrated core. When the minimum core has been specified, it certainly should be mastered by all students.

Defining the core content is part of the curriculum process, but thus far the problem has been the lack of practical tools for core content analysis. In order to overcome this, we have developed a simple tool, the Core Content Divider (CCD), which gives heuristic help for classifying the contents in relation to three categories.

Table 2. Core content divider (CCD).

MODULE, BLOCK OR A SINGLE COURSE OF A STUDY	**CORE 1 (C1)** **Essential knowledge. Underlying principles and knowledge structures. The deep learning (mastery) of this content is necessity for further studying.(Must know)**	**CORE 2 (C2)** **Supplementary knowledge.** **The more detailed information, which is useful but not compulsory. (Should know)**	**CORE 3 (C3)** **Specialised knowledge. The most specific details of the case/subject matter.** **(Nice to know)**
Academic discipline			
Professional skills			

During the core analysis, the teacher (or some other agent or team in charge of the course, module etc.) uses CCD to sort the components of the subject under the core categories. Categories on the rows may differ depending on the interest of the analysis. For example, a division between factual knowledge, skills and attitudes may sometimes be found useful.

A CCD driven core analysis offers a means to explicitly assess the relevance categories (CORE 1 to 3) of course content, which is a precondition for rational design of cumulative course continuums and student workload assessment. It also creates factual (as opposed to emotional) conversation on the subject of study, which is an essential part of academic curriculum development. Teachers can also compare the core analyses they have

made to the objectives of the curriculum. How do the contents of their courses contribute to these objectives and the required learning outcomes? Obviously these requirements cannot be met merely by teaching some subject matters, and the need to consider pedagogical approaches and teaching methods becomes apparent.

The CCD method has proved a useful tool in the process of overcoming information overflow.[13] Teachers have been able to reduce the amount of course material, and addressing the essentials during contact teaching hours has been easier than before. The method has also helped students to focus on learning more deeply the CORE 1 contents. Core analysis guides the allocation of teaching resources: 80% of the contact teaching hours should be devoted to CORE 1, 15% to CORE 2 and 5% to CORE 3.

PRINCIPLES OF DETERMINING STUDY TIME

Study time determination refers to the calculatory assessment of the extent, duration and workload of studies in order to create optimal conditions for students' learning. Extent is expressed in study credits in connection with workload, while duration is expressed in years and

13 CCD method has been tested in all Finnish universities during the years 2003-2005.

workload in student working hours.

There are two aspects in study time determination which should not be in conflict with each other. One has to provide a realistic amount of time for the student to learn the course contents (critical question 3 above). At the same time the total duration of the studies (i.e. courses) must be an exact match with the total time provided for getting the degree (critical question 1 above).

The Finnish study time calculation system is based on the norm that a student's annual working time is 1600 hours, which is divided between courses and study modules so that all the academic years are commensurable. The two semester system involves the student spending approximately 800 hours per semester studying for a degree. Studies should be planned so that the student is able to study full time approximately 160 hours during a study month (corresponding a calendar month). One calculatory working week is five days long and consists of approximately 40 hours of work. If the student studies effectively for 10 months a year, he or she is expected to study 40 hours a week. If the student's working (studying) time on the annual level is 9 months, then the approximate weekly amount of working hours is 44.

In Finland it is recommended that on the working week

level, the calculation should follow the minimum rule, i.e. that approximately only half of the weekly hours can be used for contact teaching.[14] In other words, there can only be about 20 hours of contact teaching per week. Students must always be provided time for their assignments, other independent work and the thinking process needed for learning. It is also possible to design studies so that the number of contact teaching hours increases or decreases the standard 20 during a week or period, which is then compensated during another week or period.

Study time determination has to be realistic. It is crucial that the ordinary student can really achieve the learning goals of the courses within the given time. A determination mistake is allowed to be positive, meaning that time has been provided somewhat over the actual need. For this reason, these instructions are minimum recommendations. Later, when giving calculatory options, it is recommended (in order to secure good learning conditions) to always choose the option that produces the largest time resource for the student's use.

There are numerous variables affecting individual students' actual need of time during the learning process, and it is impossible to take all of them into account. What

14 Ministry of Education, Report of the committee for the development of university degree structure, 39:2002

we need as a starting point is a concrete heuristic model giving draft-type guidelines on how to allocate time. After that we must build an iterative process where we measure how much time the students actually spend studying and whether the expected learning outcomes are being realised properly during this time. Study time determination is more about an assessment process than a process of accurate mathematical estimation. It is neither a science nor a pedagogical technique, and, unfortunately, seems to have been quite a neglected area within educational literature.

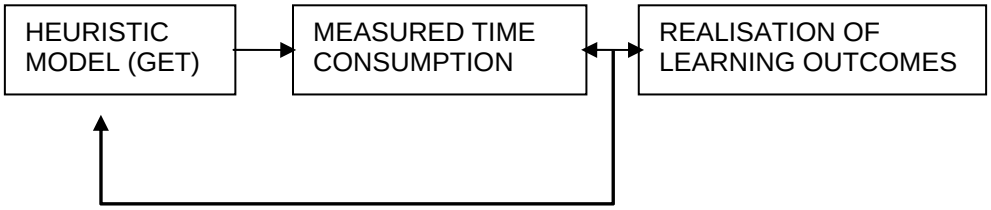

Figure 1. The iterative process.

The heuristic model we have developed to serve as a starting point has four critical modelling areas:

-student's potential for learning (e.g. motivation)
-learning outcomes
-core substance
-working methods

Student's potential refers to a student's motivation and commitment to his or her studies. It also refers to a student's prior knowledge. Learning outcomes refer to the expected competences and characteristics of a graduated student. Core substance refers to the contents (material) of education divided into the three core categories (C1, C2, C3). Working methods are teaching and evaluation methods used in education.

Table 3. Modelling areas of the GET model.

STUDENT'S POTENTIAL	**LEARNING OUTCOMES**	**CORE SUBSTANCE**	**WORKING METHODS**
LOW About 15% of all students NEED	...FOR THE COMPREHENSION AND DEEP LEARNING OF...	CORE 1 a lot more time than the ordinary student	..with especially painstaking and attentive support from teachers.
NORMAL/ ORDINARY About 70% of all students NEED G IVE ME		CORE 1 the estimated time and may considerably progress with C2 and C3 E NOUGH	..with the help of teaching activities determined according to this guide. T IME
HIGH About 15% of all students NEED		CORE 1 less time than the ordinary student and can therefore reach very good learning outcomes also on the levels C2 and C3	..with teaching/tutoring provided when needed.

Table 3 above presents our reasoning in a most simplified

manner. Students below the average need a large amount of both contact teaching hours and independent working hours in order to advance (to reach deep learning) and catch up with the others. Students above the standard are prepared, self-directed, deep oriented and most likely diligent students with self-supporting skills of learning. They do not need a lot of guidance or organised teaching in order to advance.

According to our philosophy, a careful study time determination made with using the typical student as a standard, results in that 85% of the students benefit from teaching and achieve the learning goals.

DETERMINING STUDY TIME –THE HEURISTIC MODEL

The usual external frame for determining study time for a course is the total number of hours reserved for a course in the core curriculum process. How much time should be provided for contact hours and guided work, independent work, work on different assignments and literature reading is then estimated within this time resource. Other things to be considered include determining the learning objectives and how demanding the subject is.

The aim is to organise teaching in order to support effective learning. For the sake of study time determination, one should be able to define to what extent learning is expected to take place during a contact teaching session and how much the student may be asked to work independently. Independent work can be required to take place both before and after a contact teaching session, depending on the teaching method.

It is a teacher's duty to tie together the contact teaching hours and independent study time. Teachers can help the students use their independent study time more effectively and thus improve their learning.

The sum total of hours used for learning includes the following:

- number of (students') independent preliminary work hours
- number of contact teaching hours
- number of (students') independent work hours after contact sessions

Independent work includes the following:

- preparation for contact teaching sessions that can consist of revising course material, doing preliminary exercises or other intellectual training
- doing tasks or exercises given during contact teaching time
- doing assignments to be assessed and/or preparing for exams
- other spontaneous work, interaction and acquisition of further information in order to gain a deeper understanding of the subject matter

Studies can be carried out also as independent work without any contact teaching to support it. In this case it has to be defined how much time it will take for the student to read the materials, do different tasks and how demanding tasks he or she can be given.

TEACHING METHODS

Contact teaching involves the use of different teaching methods. Is there a teaching method that would not require the students to do any work in preparation or after contact teaching sessions? The following scenarios are worth considering:

1. A teaching method could be so effective that learning would not require any further efforts from the student than attending the teaching session and working during it. However, such an efficient teaching method has not yet been found.
2. The student could not, for some technical reasons, work before or after a contact session (e.g. not having a laboratory at home). However, learning cannot be outlined to occur only in a certain fixed situation. The work done before and after a contact session is necessary for learning (especially and particularly in science) and mostly involves mental processing that is not confined by the lack of specific environment, equipment etc.
3. The teacher would not see it necessary to allocate any time for the students' independent work. In this case the teacher’s reasons should be particularly good and they should be connected to the learning objectives of the course. For instance, a valid reason would be the teacher’s notion of that the students are not actually

supposed to learn the matter, as the aim of the meeting is only to get the students to know each other better, coordinate further cooperation etc.

If the teacher or curriculum designer argues that a certain teaching method does not require independent student work, it is always an exception and needs to be considered separately. The basic rule is that all teaching methods should include some independent work with sufficient time provided for it.

From now on, the term 'teaching method' will be used to refer to the general categorisation of teaching methods according to their characteristics. In order to consider different teaching methods, we have created the following five categories[15]: information transmission, activity based teaching, assignment based teaching, literature based learning and virtual teaching.

The coefficients given in the following are intentionally simplified and are meant to serve as a starting point for discussion on time needed for learning in higher education.

15 Teaching method categorisation has been designed to cover all methods in use today. Research on teaching methods has proved that different methods have different effects and different degrees of effectiveness. Time allocation is an important factor influencing the effectiveness of different teaching methods.

A) INFORMATION TRANSMISSION

Information transmission refers to the kind of teaching where the teacher explains, shows or demonstrates the subject and students follow the presentation, possibly taking notes. The most common examples of information transmission are traditional lectures and the type of practicals or demonstrations where the students do not actively participate. Also highly structured practicals where right answers and (clean) processes are delivered to students without any experimental work are included in this category.

The effectiveness of information transmission from the viewpoint of deeper learning is especially weak if the students do not prepare for the contact teaching sessions in advance and do not review their notes and study material afterwards. The less time there is allocated for independent learning, the greater the chance there is for the learning results to become superficial.

A1) Traditional lectures

There has been a lot of criticism directed towards the efficiency of lecturing. The method is best suited for (the quite few) auditive students who are well prepared for the lecture. Also well motivated students benefit from the

method. By including demonstrations, good support materials and immediate feedback, the efficiency of this method can be increased to a certain extent. Lecturing is best suited for teaching quite simple matters. Good prior knowledge and preparation in advance make it easier for students to follow presentation and demonstration. The calculated minimum relation between contact teaching hours and independent work is as follows:

Chart 1. Calculation for traditional lectures

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**3**

A good prerequisite for learning is gained if three hours of independent studying are used for every contact teaching hour.[16]

A2) Passive demonstrations

During passive demonstrations, students are shown how some critical processes are done (the illustration of a certain phenomenon or process). Demos can be done both in lecture halls and laboratories. If the student has not

16 If students are not used to utilising their private time for furthering learning, they should be informed about the importance of independent work.

worked beforehand with the assignments or if he or she does not spend time afterwards to understand the processes and solutions connected to the assignments, learning results are usually weak. The calculated minimum relation between contact teaching and independent work is as follows:

Chart 2. Calculation for passive demonstrations

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**2**

B) ACTIVITY BASED TEACHING

Activity based teaching is divided into six subcategories. A feature common to all of them is that they keep students active in much more challenging ways than just by having them follow the presentation and make some notes. Activity based teaching involves active student participation during contact teaching sessions. Students are often given home assignments and preparative tasks for the next contact teaching session. In order for activity based teaching to work as desired, students have to be well prepared for teaching situations. The calculated minimum relation between contact teaching and independent work in activity based teaching is as follows:

Chart 3. Calculation for activity based teaching

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**2 - 3**

Every contact teaching hour requires the minimum of two hours of independent student work. This relation can be applied to all activity based teaching methods with the exception of problem-based learning (PBL).

B1) Cooperative learning

Cooperative learning requires active student participation and immediate response during contact teaching sessions by e.g. doing exercises, discussing with teacher/tutor/peers and making project plans alone or in teams. The teacher may give short lecture-like presentations which introduce students to the new problem, illustrate complex phenomena or summarise theories or experiences. Also students can give this kind of short information lectures. Cooperative learning may also be called the workshop method. Students are required to carefully prepare for contact teaching sessions, but a lot of learning may also take place during the meetings.

The calculated minimum relation between contact teaching and independent work in cooperative learning is as follows:

Chart 4. Calculation for cooperative learning.

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**2**

If it is reasonable to emphasise students' active role either before or after the workshop session, this should be credited in student working hours.

B2) Guided exercises

In guided exercises the active agent is the student. This method means learning by doing. The student may be given tasks even before the working session. During the session the student works alone or in a small group and receives guidance when needed. This kind of exercises can also take place in a laboratory.

The idea of guided exercises is to have students do active learning work for which they need to prepare for beforehand with sufficient time. This is why the general

minimum relation between contact teaching and independent work should be increased.

Chart 5. Calculation for guided exercises

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**3**

B3) Active demonstration

The purpose of active demonstration is to motivate, provoke thinking and create personal images of the subject's practical meaning. Often the purpose is to practise and/or illustrate the meaning of some abstract matters in a practical context (simulations etc.) or to get first-hand experience. Related theoretical core may be introduced earlier or it can be lectured on in more detail afterwards. A part of active demonstration can also involve field trips and visits to some outside facilities.

If the contact teaching which belongs to this category consists of nothing but excursions or visits, it is then justifiable to reduce the amount of independent work even lower than the following recommendation suggests.

Chart 6. Calculation for active demonstrations

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**2**

B4) Work-based learning

Work-based learning refers to a training period in real, professional circumstances in an actual working environment. During the training period, students apply their knowledge and skills already learned in real life situations and learn at the same time many transferable skills.

The total time consumption of work-based learning depends on the goals of the education. In addition to the time taken by practical work, students have to be allocated time for considering real life experiences and reporting on the training period.

B5) Problem-based learning (PBL)[17]

In problem-based learning there are usually two (two-hour long) weekly small team meetings. The teacher

17 Seven-step problem based learning method.

participates in these sessions in the role of a tutor. Students crystallise the set of learning objectives during team sessions. The problems they are given are solved based on independent study done between team meetings. The method emphasises student's independent information retrieval and active problem-solving thinking processes.

Using the problem-based method, deeper learning occurs mostly during the independent study phase. The approximate recommended time allocation is as follows:

Chart 7. Calculation of PBL study time

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**5**

If there are two two-hour contact sessions weekly, the total student workload is thus estimated as 4 x (5+1) = 24 hours. This time allocation also includes reading the supplementary course literature.

B6) Seminars

The seminar course involves (in Finland) the students composing either independently or under guidance a

written seminar work that they present to other course participants in a joint gathering. The task of every participant is to familiarise themselves with the paper to be presented, assess its the quality, make critical notes on it and possibly also discuss it with the presenter.

Seminar courses should include time for writing the paper, reading literature and getting prepared for the joint sessions. If students are not well prepared for the upcoming session, the quality of discussion will suffer and the atmosphere at the seminar becomes more or less uncomfortable.

Chart 8. Calculation of seminar study time

CONTACT TEACHING HOURS	INDEPENDENT WORKING HOURS
1	**2 - 4**

C) ASSIGNMENT BASED TEACHING

In assignment based teaching there is no organised contact teaching at all or it has a minor role. The teacher gives students an assignment which may be a research project, practical laboratory experiment, field investigation, case problem for home essay etc. Students are committed

to do the assignment independently and self-reliantly according to given instructions. The assignment can be given either to an individual or a group. Individually tailored guidance is provided only when needed. Assignment based teaching consists entirely of independent study. The amount of work is influenced by the amount of material to be studied and the extent of the required assignment.

The end product of assignment based teaching can be any of the following:

- *a written work:* workload is estimated by using the formula 100 words/hour, meaning that students should be allocated one hour for writing a 100-word paragraph. This includes both writing the drafts and accomplishing the final text.

- *artefact*.[18] An artefact can be a design, drawing, software or other object. It can also be a product transmitted (audio-) visually or produced and recorded by using e.g. some kind of electronic media. The actual amount of time required to accomplish this kind of assignments is usually much higher than expected. As workload calculation

18 Philosophically speaking, an artefact can be any work that has not made itself. In this context it refers to material – other than written product – made by the student.

should be based on practical experience, it is impossible to give a universally applicable rule.

- *(live) presentation*. This can be e.g. a speech, presentation, play, or any other type of artistic performance. The difficulties encountered here are similar to those discussed above (see Artefact). The need for time is certainly great, but the calculation has to be done based on practical experience. There is an informal rule in Finnish universities that the preparation of a (new) one-hour-long lecture generally takes the minimum of three hours for an expert. For a novice, the preparation time will be at least twice as long.

- *authentic task.* An authentic task is a real-life assignment, such as a commission. From the viewpoint of teaching and studying, study time determination depends on the form of the required final product, that is, whether it will be a written product, artefact or presentation.

When allocating time using any ofl the above-mentioned categories, the time needed for reading compulsory literature has to be added to the time frame.

D) READING LITERATURE

In most courses, students are required to read literary material related to the study contents of the course either independently and according to given instructions. It can serve as a supplement to contact teaching or form a separate learning task.

D1) Literature as supplementary reading

Literature can be seen as supplementary reading supporting studying when it broadens and/or deepens the contents of contact teaching, but is not examined separately.

Literature used as supplementary reading does not require extra time allocation in addition to the time reserved for independent study.

There should be an explicit mention of whether the literature is meant only as supplementary reading or is assigned for an examination. This needs to be made absolutely clear to both students and teachers either in the study guide or by some other means before the beginning of the course.

D2) Literature assigned for a separate exam

A book exam refers to a written or oral examination. Both cases require the reservation of separate time for reading. It is important to remember that the time provided for reading the literature must be estimated from the viewpoint of reading for comprehension. This includes generally at least the following three stages of reading:[19]

1. Browsing through a book
2. Careful reading by taking notes
3. Revision

The text has to be read three times in order to meet the minimum requirements for understanding. The easiest way to define the adequate use of time is to use the relation between page requirement and hour requirement divided into two categories of difficulty. This model includes the above mentioned reading stages.

Reasonably readable text:

100 pages	**20 hours**

19 The three-stage model is a traditional study model used especially during the behaviouristic period. Afterwards the models of reading have multiplied. These include four, even five stages, as in e.g. the SQ3R-model: browsing, phrasing of the question, careful reading, explaining and revision.

Difficult (or foreign language) text:

100 pages	**30 hours**

Another possibility is to use the assessment criterion used by the British Open University that is based on the amount of words in the book, its level of difficulty and the use of time required for reading for comprehension.[20]

Chart 9. Word based calculation model

TEXT QUALITY	TIME FOR COMPREHENSIVE READING
EASY	**100 WORDS/MINUTE**
DEMANDING	**70 WORDS/MINUTE**
VERY DEMANDING	**40 WORDS/MINUTE**

The number of words in a book is estimated and divided by the coefficient according to the level of difficulty. This calculation produces the number of minutes which must be reserved for reading the book. For example: the time required to learn and comprehend this guide (the text quality is defined as quite demanding) is 11520:70=165 minutes or (11520:40=) 288 minutes (when the quality of

20 Chambers 1992. See also: Garg, Panda & Panda 1992. The authors originally suggest reading a text only once. According to Finnish book examination practises, three readings are advisable for deep learning.

the text is evaluated to be very demanding). Let us take another example and think about a literary study titled "The basics of calculating study time for higher education courses". The goal is to learn to calculate the optimum study time for one's own courses. The course material will be this GET model guide. Would approximately 4,8 hours (288 minutes) of reading be enough to reach the goal? Probably not, which is why the number of hours calculated by the formula below should be multiplied by the number of reading times.[21] The resulting approximately 14,4 hours of study time (3 x 4,8 hours) would provide the ordinary student with a more reasonable time resource.

Generally the easiest way to estimate the use of time required by a book exam is to apply the page amount criterion given above. Then the time provided for a student is in most cases more realistic than when using word-based calculation.[22]

D3) Home essays, reports, learning diary or equivalent assignments

A book based exam is not usually as effective for learning

21 Each stage of the three-stage reading method is different in length. The first reading requires less time, while careful reading takes a lot longer and revision also requires some time also.

22 The differences are small. Using the word-based calculation, (3 reads) a 100-page book (250 words per page) takes 18 hours of reading time (page-based calculation:20 hours); a similar but more demanding book takes about 31 hours (page-based calculation: 30 hours).

as a learning diary or an essay done on one's own time. When the student reads books for e.g. writing a report, reading is highly motivated and more efficient. Writing also supports comprehension.

Time required for reading the books and time required for completing a written product partially overlap in this method. For this reason, the reasonable time necessary for literature reading is obtained by using the word-based calculation model for one reading time.[23]

D4) Literature used in research as reference material

When literature is used as a tool in a research work (e.g. a master's thesis), it is studied for reference points to one's own ideas by browsing and sometimes also by searching of keywords. In such cases the book is most often not read through as a whole. The reader glances at the book chapters and reads the essential parts in detail. The reading process is directed by the reader's idea of the research problem.

Even this kind of use of books requires plenty of time, which has to be taken into consideration while determining study time. The basic time reservation is assumed by

23 The time required by reading a literary work based on 100 words an hour is added to this formula.

means of a word-based assessment according to reading through the text once.[24]

E) ICT BASED TEACHING

Virtual teaching refers to teaching via a computer network in electronic learning environments. Alternatively, it can also refer to more traditional forms of distance teaching. In virtual teaching the students do assignments and communicate primarily in writing. The teacher/tutor is present via some type of electronic instrument, and there may not be any actual face-to-face contact at all. Distant education students need time for working with the computer, searching for material, reading and writing literary (electronic) materials.

Virtual teaching can consist of all the above mentioned teaching methods, but as a whole its implementation is different from traditional teaching. Lack of traditional face-to-face contact with the teacher puts teaching and studying into a new situation where the new learning environment itself often becomes an important target of learning. The student has to learn not only the matter itself

24 This can be used to calculate a 64-page master's thesis workload when 30 books, each with the average of 200 pages (one page having 250 words), are used. An investigative reading of the books will take 625 hours (40 words a minute) and writing the thesis will take 320 hours (50 words per hour). A total of 946 hours (35 study credits) is needed.

but also how to operate in a new situation and how to study so that it would be beneficial. Nowadays virtual teaching mainly refers to studying in web-based learning environments, to which the students can be connected with a number of different technical tools (PC, PDA, etc.). Owing to lack of previous experience of this type of studying, determining study time is more difficult than with the more traditional form of teaching.[25]

When estimating the need for time in virtual teaching, the following areas have to be taken into consideration:

1. Required use of time for completing learning assignments (e.g. literary assignments),
2. Required use of time needed for communication (with tutors and other course participants),
3. Time needed for reading course literature or other study material,
4. Time needed for material search,
5. Time required to learn how to operate the software, learning environments and other special tools,
6. Time required for possible contact teaching modules connected with the course.

25 Thousands of years of experience in the traditional form of teaching provides an intuitive basis for study time calculation. Virtual teaching as a concept has only been known for about 20 years.

The above mentioned models are applicable when allocating time to be used for reading, writing and other study assignments. Time provided for electronic communication is estimated according to messages produced by a student (100-200 words an hour). Another option is to use other means to allocate a realistic amount of time for electronic communication. Time needs also to be reserved for the students to do material searches.

Furthermore, enough time has to be provided also for learning to use the software and other required electronic tools. Whenever a course requires the introduction of new software, students need to be provided with time to learn to use it. A good rule of thumb is that for every new software application, one day (8 hours) has to be reserved for learning how to use it.

Electronic learning environments are also major challenges to study time calculation. There is a lot of field experience on how students' concentration on web-based courses is disturbed by the learning environment itself. This has been found to often lead to students not only wasting time in wondering about the operations of the environment and its use, but also criticising it (which can be both frustrating and harmful). A part of the total time resource, between 8 to 24 hours, should be provided for getting to know the electronic learning environment, the

final amount of time allocated for this purpose depending on whether the students have previous experience on similar tools and working methods.

One area of difficulty within the field of new teaching technology is the time loss caused by technical error functions and unstable software operation. Connection to the learning environment can be lost several times during each course due to technical reasons, and the required software may be unstable in many ways. Errors may result from not only individual hardware and software bases, but also from network and server error operations. While waiting for the introduction of reliable, stable and hardware-independent applications, it is only realistic to consider technical problems as a distraction impeding the students' learning. The time that students spend in struggling with different errors and searching for software detours can in reality be surprisingly long.[26]

Contact teaching hours that may supplement virtual teaching are taken into consideration in study time calculation in the same way as with traditional teaching. Time reserved for independent work should be proportioned to the different types of contact teaching (e.g.

26 This dead time (or meta time) use should be noted by ICT based teaching coordinators, as it is likely to have a significant effect on learning results.

video conferences) according to the principles of activity based teaching methods.

ASSESSMENT METHODS

Learning assessment keeps also the students busy. Preparation for assessment (e.g. examination) and the assessment situation impose a load on the student that can be expressed in actual hours. The thus formed aThe assessment load is influenced by the total extent of the course. Different types of assessment methods, i.e. examinations, also require different kinds of time use. The term “exam” is here used to refer to all possible methods of passing a course, which is required in order for students to receive a mark in their transcript of records. Allocating time for traditional book based exams, essays and theses was already discussed above in connection with literature reading. There should be no overlapping in time allocations.

The main principle is that for assessment preparation, time should always be provided depending on the type of exam. Different assessment methods can be divided into three calculation categories from the point of view of time requirement:

A1) Traditional exam and its variations

Traditional exam refers to a separate assessment situation where students are given tasks to accomplish. In addition to the exam situation itself, students need time also to prepare for the exam.

The following guideline can be used to allocate time for preparing for a traditional exam: 8 hours of study time must be provided for each average week of study (40 hours). The said weeks are naturally calculated from the total extent of the course: if, for example, the total extent of the course is 80 hours, 16 hours will need to be provided for preparing for an exam.

A2) Project assignment

In project assignments, the assessment (in the form of e.g. essays, reports, portfolios) is started or even completed alongside with contact teaching. Some time may be provided at the end of the course for finishing the assignment. The method can also include oral reporting. It is also possible that the entire course is done as an assignment, home essay or project. Students need time for reading course material and doing the assignment, which usually refers to a written work of certain length.

Assignment workload is assessed according to a separate written work and by also taking into consideration the time needed for reading related literature, cf. “Assignment based teaching” and “Literature reading” above. If the product is something else than a written work, time allocation has to be made completely case specifically.

A3) Continuous assessment

Continuous assessment means evaluating student learning within teaching-learning interaction without a separate exam situation or compilation of a final product. The assessment is done with the help of small tasks, observations, exercises or case assignments .

When applying the method of continuous assessment, there is no need to allocate any time especially for assessment purposes. Continuous assessment increases student activeness during the course, and students generally use the time provided for the course especially effectively.

CONSIDERING THE LEVEL OF DIFFICULTY

The difficulty level of each course has to be considered when determining study time. The level of difficulty can be

estimated from the viewpoint of the ordinary student as based on the formal difficulty of the study level.

The need for contact teaching and guidance is greater in Bachelor's studies than Master's studies. Master's studies require the students to be able to produce scientific information and make progress as creative and independent problem solvers. This requires a deeper understanding of study contents and promotion of scientific reasoning.

Our GET model is intended to meet the requirements of bachelor level studies. The level of difficulty may be taken into consideration by multiplying the hours provided for independent work with an additional reservation coefficient.[27] It is reasonable to consider the level of difficulty also when allocating study time for reading course literature and working on assignments.[28]

27 This is a general instruction and needs to be considered case by case especially in connection with assignment-guided teaching and literature reading. On a general level, these instructions do not apply to the PBL method.

28 If the use of coefficient is difficult in these areas, the level of difficulty can be raised in literature reading (word based assessment model). In producing text the relation of 100 words per hour can be changed into 50 words per hour. The assessment of other works must always be done under special consideration.

Chart 15. Reservation coefficient for different levels of difficulty

LEVEL OF DIFFICULTY	ADDITIONAL RESERVATION COEFFICIENT OF INDEPENDENT WORK
BACHELOR STUDIES	**1**
MASTER STUDIES	**2**

Let's take an example of a course in master studies which includes 20 hours of lectures. According to section A1, the basic reservation for independent study is 40 hours (applies to bachelor studies). Because dealing with teaching on advanced level, the share of independent work must be multiplied by 2. Twhen the resulting is 80 hours of independent work to correspond are then added to the 20 hours of lecturesing, which makes theand the total amount of study hours is 100.

CONVERSION TO ECTS CREDITS

The total extent of a course is defined as a sum of contact teaching hours and independent working hours provided for the student. This forms an estimate of the total workload of the course for the ordinary student (=student workload, SWL). The following formula can be used to

convert student workload into ECTS credits[29]:

$$\frac{\text{SWL}}{\text{STUDY HOURS PER ACADEMIC YEAR}} \times 60 = \text{AMOUNT OF ECTS CREDITS}$$

When defining the total extent of courses, the minimum extent of an individual course is recommended to be 80 - 160 hours (3-6 ECTS). A large number of "too small" courses multiplies the calculating mistake and generally promotes overload.

GROUPS NEED MORE TIME

The use of team work is very popular with modern teaching, and the importance of performing in a group is emphasised. Students and also teachers have felt that studying in small groups or pairs is often slower and more laborious than individual performance. This is a result of the process of social dynamics. The reaching of mutual understanding may require plenty of discussion,

29 The Finnish academic year includes 1600 hours of study. The formula is x/1600x60.

conciliation of different views and multiple interactions. Team work usually requires more time than individual studying. Complicated group processes force students to ponder matters more deeply and from several different points of view.

However, students' actions in a group do not always aim at learning. One person can end up doing the job for the others, or the assignment can be divided into more or less random shares and no-one can actually form a good picture of the whole. This is to say that students can use the group in a different manner than the teacher has intended. This kind of misuse can be a result of wrong attitudes, but more often the reason is simply lack of time or poor planning.

A basic rule of thumb is that more time should be provided for group work than individual work if the aim is to promote deep learning. There is no clear rule as to how much additional time should be provided for group work, but each teacher has to decide this on the basis of their own experience.

Calculative models give teachers tools and starting points for guiding student work towards right kind of learning. If the teacher wants to emphasise the importance of learning a particular matter, he or she can allocate more time to

deal with it than our heuristic model would recommend. If the teacher anticipates that a certain team of students will need more time than students on the average, he or she should advise the team to use enough time for learning.

FOLLOW-UP

Even when study time has been carefully determined, the result should be considered as a rough guess. Follow-up studies are needed to enable the making of better estimates. How many hours do students actually use for independent learning, essay writing, book reading etc.? What are the passing rates? Are learning outcomes as intended?

Students' actual use of time should be monitored annually. Teachers do not necessarily need any complicated or standardised instruments for monitoring their students. The purpose of this kind of field study is pragmatic: to get practical information and immediate feedback in order to further develop teaching arrangements. A teacher can easily monitor students' use of time by making inquiries and asking them to keep time diaries. Learning outcomes may be evaluated by using self-evaluation tools such as portfolios, rubrics etc. and/or more sophisticated (summative) tests, authentic tests or problem-solving

exams. We have noticed that, for instance, time diaries can have powerful side-effects by intensifying students' use of time. They can thus also be intentionally used as tools for promoting students' working methods.

The primary purpose of monitoring students' time expenditure is to find out about their willingness and possibilities to properly use the time resources given to them. If and when problems arise, both the study path and students' orientations need to be influenced. In a longer range, such experiences may lead to fine-tuning the model used for study time determination (iteration of the Get model). However, this type of monitoring students' use of time supposes that the level of students' effective learning has been taken into consideration.

EPILOGUE

The realm of time in the world of teaching and studying is axiomatic in theory. Nevertheless, attempts to define the time relation more accurately in the real world of courses and curricula may be met with resistance. We have been keen on discussing the matter with teachers who are unwilling to apply some, or even any, of the principles of the GET model. We claim that declining to use the model is only acceptable if the teacher is able to produce some

other explicit heuristics by which to determine study time.

If a person completely denies the possibility to evaluate study time using some well-defined uniform principles of time allocation, is not he or she subconsciously claiming that successful study time calculation is an automatic process based on instinctive skill? However, such an instinct or automatic success in self-acting study time allocation does not exist not even within academic circles. Instinctive practices result in only coincidental successes or failures. We hope that systematic training with explicit tools will help teachers and students to reach more qualified interaction and get better learning environments steeped in time.

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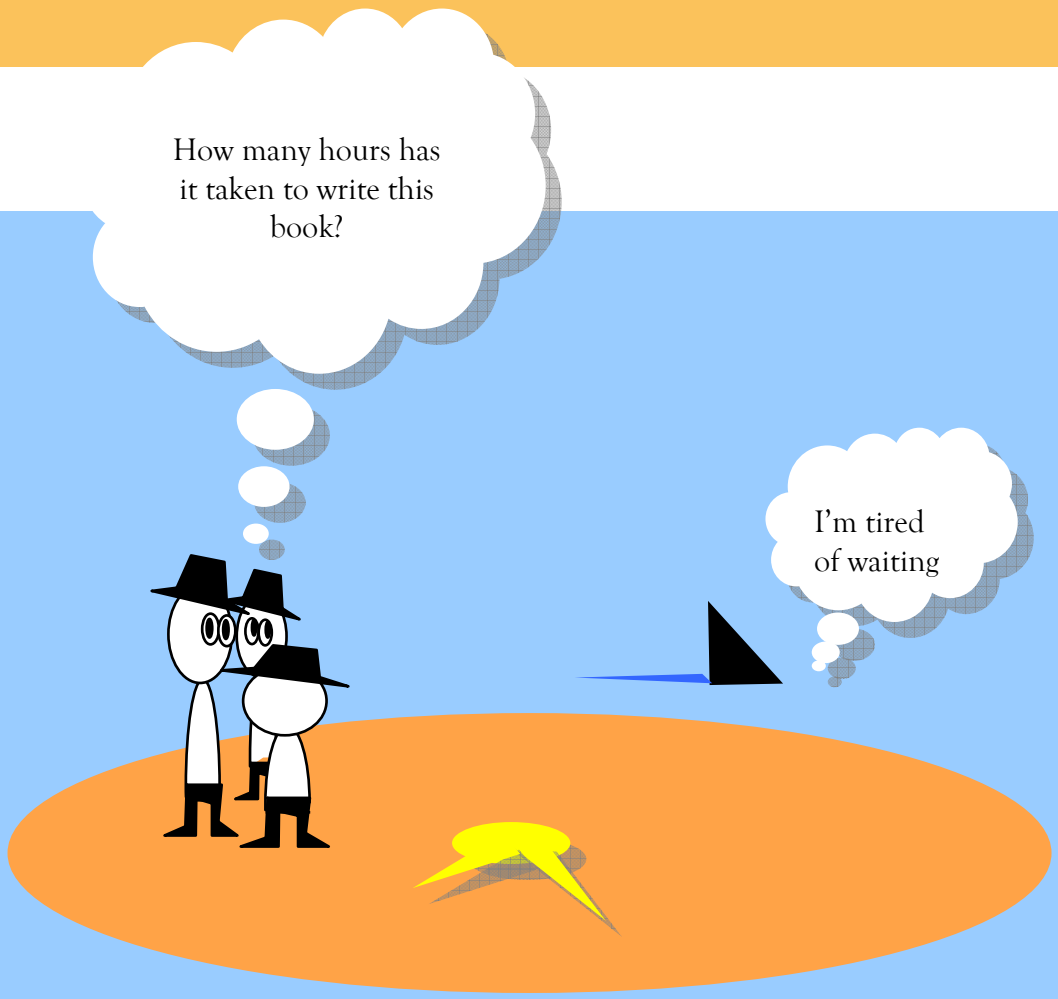
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The objective of higher education must be the pursuit of deep learning.

This guide deals with the relation between different teaching methods and allocating time for courses in the curriculum. It presents a pedagogically sound and practical model for study time calculation for curriculum designers.

Time is an essential resource for all human action. Learning and studying also take place within the frame of time. A too tight schedule does not enable effective learning but results in student overload and superficial learning. From the perspective of teaching, student's need for time has to always be estimated from the viewpoint of a deep approach to learning. No study module or single course included in the curriculum should be allocated time on the basis that it can be passed without real, actual learning. The GET model introduced in this guide gives hints on how to apply these principles in practice.

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