Report on Workshop 5: Self-Study

Lars Funk, The Association of German Engineers

Input 1: Professor Dr Johann Haag, St. Pölten University of Applied Sciences, Austria, and Dr Christiane Metzger, Project ZEITLast
Input 2: Professor Dr Daniel Schilberg, RWTH Aachen University
Panel chair: Lars Funk, The Association of German Engineers

According to the Bologna Process, the time for self-study has been incorporated into the calculation of credit points for each module. This means that students should be engaging with the materials and methods of their disciplines outside classroom and that teaching staff should assist in planning this learning. Learning outcomes should therefore be set for self-study, and students should receive guidance to that end as well as obtain feedback on their progress. Some questions arising from this were discussed in the workshop:

- Is there a culture of autonomous and independently-organised learning in engineering education? What characterizes this culture?

- How can classes and self-study be usefully interwoven, organised and structured in terms of time, feedback and content?

- What is expected of students outside of classroom-based learning activities and to what extend is self-study useful?

- Which role do teaching staff play in self-study?

A presentation was given by Prof. Dr.-Ing. Daniel Schilberg from RWTH Aachen. He spoke about a practical example at the RWTH Aachen with a huge number of participants (more than 1 400) in the second Semester. The task for the students is to do the programming of a robot in teams of two students. At the end of the course the students have to pass an exam.

The course is characterized by a group of learning activities with focus on certain aspects. Learning tools and learning services can be recommended based on the chosen learning activities and the skills of the student, they are written down in a so called "Dependencies Knowledgemap", which is available via internet. Thereby a high flexibility and individuality is given despite the huge number of participants.

The hits and logins on the Knowledgemap are shown in figure 1. It is obvious that only two weeks before the exam there were significant traffic on the website, with a peek in the last three days before the exam. As a conclusion it is obvious that self study is not happening steadily during the whole semester but intensified immediately before the exam. The arising question is how to motivate students to use the offered tools for self-study activities in a meaningful way.
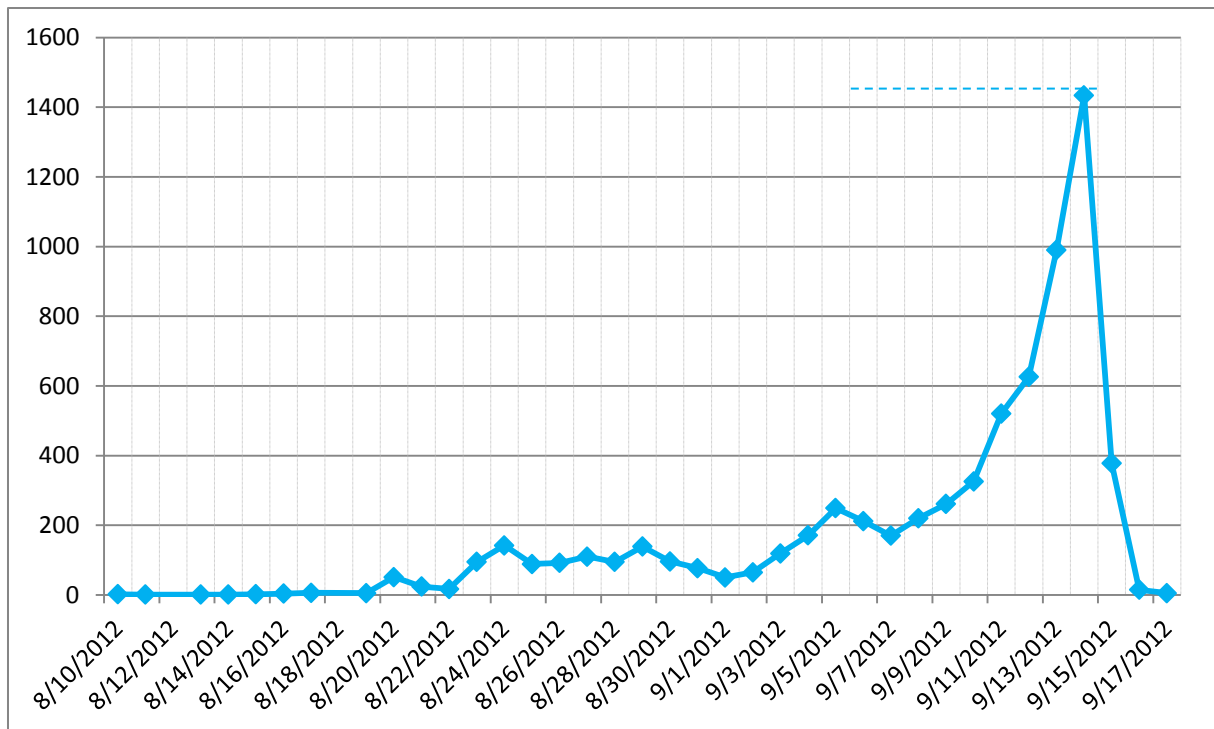
Fig.1: Hits on the Knowledgemap-Website of the RWTH Aachen-course "Computer Science in mechanical engineering"

Another presentation was given by Dr. Christiane Metzger and Prof. Dr. Rolf Schulmeister who spoke about the realization of a block plan concept at FH St. Pölten, Austria. The five modules of the IT Security course were delivered successively in time and not parallel and weekly. This project is described in an article available on the HRK website: http://www.hrk-nexus.de/uploads/media/Haag_Metzger_Blockunterricht_im_Studiengang_BSc_IT_Security_Panel5.pdf, the block plan design is shown in Fig. 2.

Dr. Metzger and Professor Schulmeister stated a lot of important results of the project:

- The (subjective) impression of a to high work load and the actual amount of student engagement measured in time are different things

- A block plan concept (each module as one block) avoids the competition of modules within the week and the collision self study tasks (cognitive load)

- Integrating self study phases between lectures and seminars creates a continuous collaboration and learning motivation and reduces examination anxiety

- Counselling and tutoring students in phases of self-studying is important and creates trust and self-confidence

- Motivation is a decisive factor for learning success whereas educational background, preknowledge, gender and social criteria and other criteria are less significant.
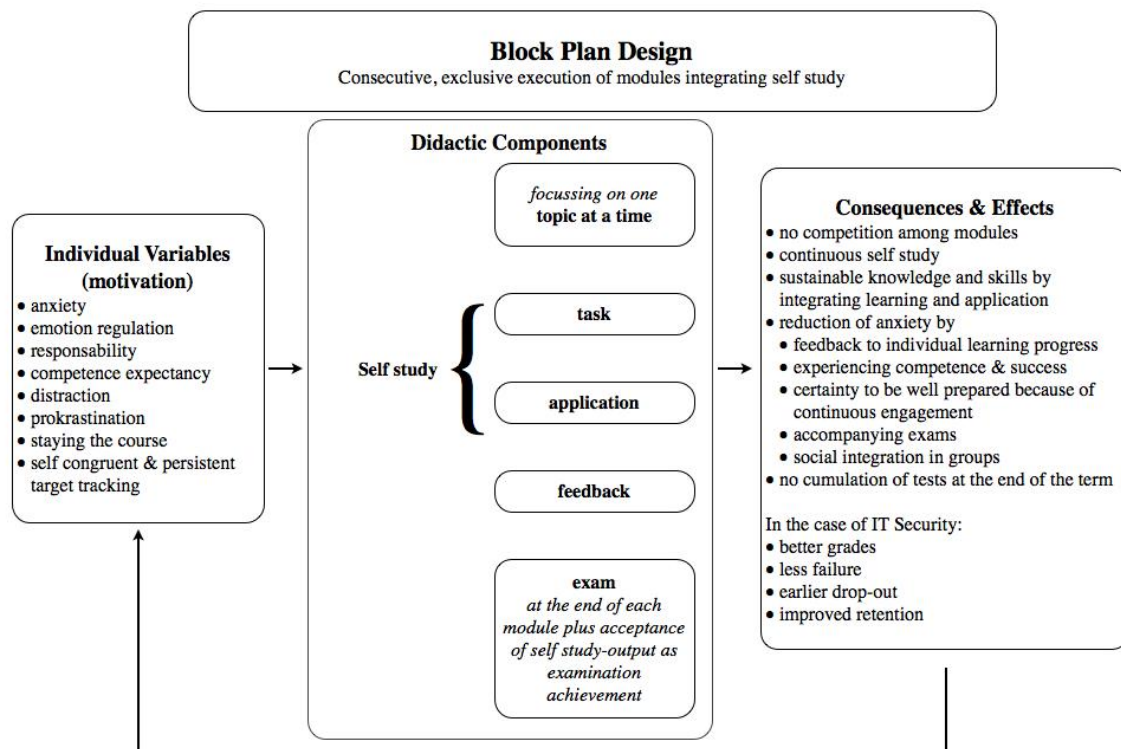
Fig. 2: Individual variables, didactic components, and consequences of the block plan design

There was a lively and serious discussion about how to motivate students for using self study phases steadily during the whole semester. The main conclusions of the discussion are:

1. Students are diverse in
   o how they are able to focus on their work or how easily they are distracted by entertainment, communication, social contacts and social media from their work
   o postponing learning tasks to future days (procrastination)
   o how to cope with strain, negative feeling and anxiety

   As a consequence a consistent counselling of the students is an essential requirement for bringing self study to success.

2. A learning and feedback culture has to be developed. This includes that feedback has to be given in shorter periods and in different ways. Possibilities are:
   o individual feedback
   o experience of achievement
   o peer review
   o bonus points

3. A block plan concept can be a very successful way to organize and structure self study and classes but the feasibility depends on the premises at the university (availability of dedicated rooms).