

IMPLEMENTATION OF MODERN ASPECTS IN DESIGN EDUCATION

S. Schneider and U. Lindemann

ABSTRACT

In the contemporary time the requirements on graduates and young professionals changed more and more. Beside professional skills in our days also other skills become more and more important in engineering design: soft skills, multidisciplinary, internationality, team work, or life long-learning [8]. In this paper the implementation of these aspects in design education at our institute will be presented.

Keywords: Design education, Soft skills, Multidisciplinary, Internationality

1. INTRODUCTION

Beside professional skills in our days also other skills are required from graduates of mechanical engineering: soft skills, multidisciplinary, internationality, team work, or long life -learning. The Department for Product Development has an extensive offer of lectures and seminars. In this paper the implementation of these aspects in design education at our institute will be presented.

2. REQUIREMENTS ON GRADUATES AND YOUNG PROFESSIONALS

In former times companies in the selection of graduates set much value on the professional qualification of the applicants. Meanwhile the requirement profile changed out of several reasons. Young graduates must present their work results and defend them, conduct sessions, manage projects, or even take over personnel responsibility. Especially in large-scale enterprises multidisciplinary and international teams are usual. As knowledge faster and faster becomes out-of-date lifelong learning becomes increasingly more important. If one considers the discussion concerning the encouragement of elite it is also necessary to create offers for excellent students. An overview on requirements can be seen in Figure 1.

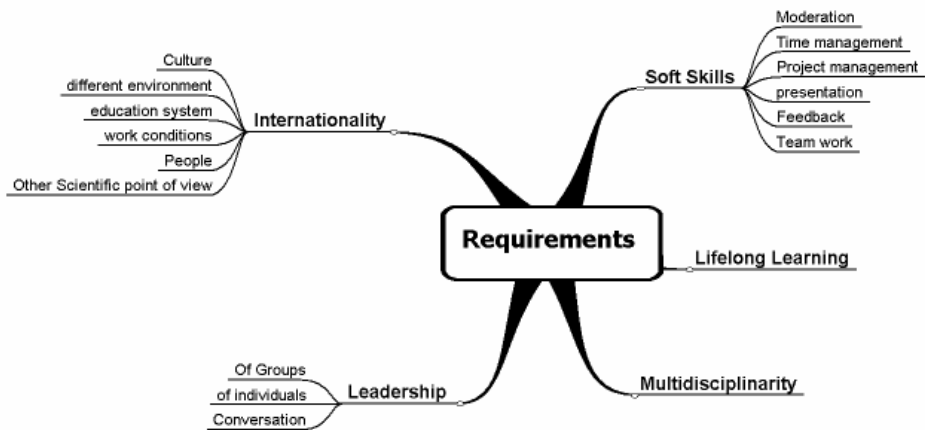


Figure 1. Requirements on graduates and young professionals

3. OFFER OF LECTURES AND SEMINARS

The Department for Product development offers a wide range of lectures and seminars.

- “Methods for product development” deals with methods in product development processes
- “Product development and design” covers the design process of products
- “CAD in product development” shows how CAD can support product development
- “Developmental Management” deals with the management of development processes
- Tutor is a seminar for first-year student
- LEAD is a seminar for graduates to train leadership competences
- “Ferienakademie” is a two-week-seminar for excellent students
- Project works must be conducted during the study
- In Product Development seminars 4-8 students work in a complex industry project

4. INTEGRATION OF MODERN ASPECTS IN DESIGN EDUCATION

4.1 Lectures

Beside theoretical basic knowledge students also expect practical aspects in the lectures. This is achieved by the integration of results from research and industry projects in lectures. In addition some guest lecturers from industry report on current results from industry. Examples here for are lectures about Virtual Reality and Developmental Management.

Especially in large-scale enterprises with several sites the Distributed Product Design plays an increasingly more important role. In the CAD practical training students can try this with the cooperation with the TU Darmstadt.

4.2 CiDAD – E-Learning

As knowledge faster and faster becomes out-of-date lifelong learning increasingly gets more important. For this purpose corresponding aids must also be provided. The method database CiDAD (Competence in development and Design” contains the contents of the lecture “Methods of the product design” and cross-links these with means descriptions for example. It offers the possibility to complete usual courses and visualise difficult problems.

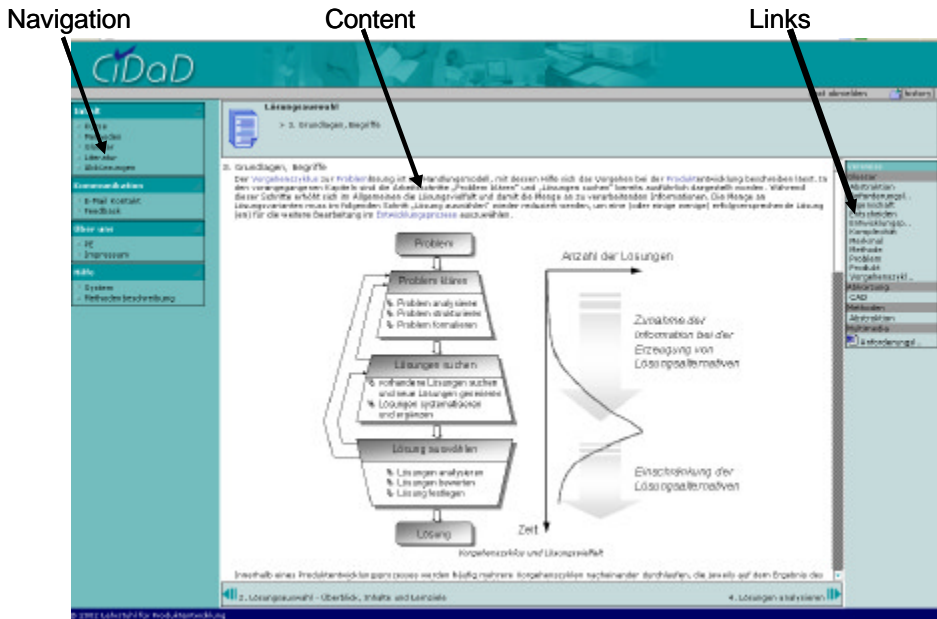


Figure 2. Method data base CiDaD (Competence in Development and Design)

4.3 Tutor, LEAD

Soft skills like moderation, time- and self-management, presentation, project management or guiding groups are important, especially for projects in industry. In TUTOR up to 20 tutors out of the advanced study course teach 10-15 beginners these skills in the first semester. Therefore they are prepared in four weekend trainings by coaches from industry. In the second semester the beginners have the possibility to test their skills in a project (for example the building of a float or an airship, organising a development competition). Further details about Tutor are described in BAUMBERGER (2004).

Graduates earlier and earlier get managerial responsibility. To train them the seminar “LEAD” was created in 1998. In one week students out of the advanced study course learn how to lead individuals, groups and groups with more hierarchy levels. Also appraisal interviews are simulated and trained.



Figure 3. Lead, Tutor

After seven (Tutor) and five (LEAD) successful years an alumni network was funded based on the initiative of students. First of all there is an annual meeting where all actual and former participants can come together and talk about their experiences. A homepage was created to support the communication between all participants.

4.4 Ferienakademie

Universities, especially in Mechanical Engineering, have to teach a lot of students. At this huge amount it is difficult to support excellent students. One possibility here for is the “Ferienakademie” (= holiday academy). 10-14 students in 12 courses (overall more than 200 students) can participate in this combination of seminar and holidays. They are supervised of two professors and one assistant per course. The Ferienakademie is funded by contributions of the industry.

Each participant has to prepare a presentation of 45 minutes, afterwards there is a 45-minute-discussion. Guest lecturers report about their experiences in industry. Beside there is a great offer in recreational activities: hiking tours, city tours to Bozen, table-tennis or gues, and Törgellen, a south tyrolean event.

In 2003 the main topic of the course was „Methods for product innovation”, the presentations dealt with bionics, distributed product development, variant management, mechatronics, 3D-sketching, virtual reality, and trouble shooting in product development processes.

Beside the scientific claims of the seminar also soft skills were integrated. For each session one student had to prepare and conduct the moderation. Therefore at the beginning criteria for a good moderation were collected. This was also conducted for presentations. After each presentation/moderation the students gave feedback according to the defined criteria. The results of the discussion were collected and structured in mind maps, so that it is possible to comprehend the discussion.



Figure 4. The “Ferien – Akademie”

4.5 Project works in foreign countries

Young professionals more often work in international project teams or go to foreign countries. Therefore intercultural competences and mobility are necessary qualities. At our department two different opportunities for students are possible: the realization of project works at universities or at companies in foreign countries. When studying at a foreign university the students are in contact with students of other countries and cultures. They also have to deal with another point of view on scientific issues. One student for example made their diploma thesis in Cambridge. In the Across Design Project she analyzed and compared design processes from different disciplines (product development, urban planning, graphic design). In this project she learned a lot about the working style, the scientific point of view, the education concept and standard of the university.

When working at a foreign company the students learn more about working conditions, educational systems, technological, economic and social standards, and cultural peculiarities of the people and the country. Working at a foreign company one gets a better view on the characteristics of the home country. A student worked at a company in New Zealand. There he was integrated in the development of a new dish drawer. Beside technical knowledge about the product he got much experience about New Zealand, its culture, people, working conditions, and so on.

4.6 Product Development seminars

In a product development seminar teams of four to eight students work on a complex development project. Typical examples here for are a rudder ergometer, a flush, or an outdoor-PDA. In this paper the development of a measurement module for the reaction forces of the head in downhill skiing will be described. The team is composed multidisciplinary: three students of mechanical engineering and three of informatics. The engineers should develop the Measurement module whereas the computer scientists program a software for the analysis. In the project the students learn a lot about team work, moderation or meetings, and project management. They must learn to cooperate, collect information and exchange them, search for solution alternatives, discuss them and find a common solution. Meetings must be planned and moderated so that they come shortly to an acceptable result.

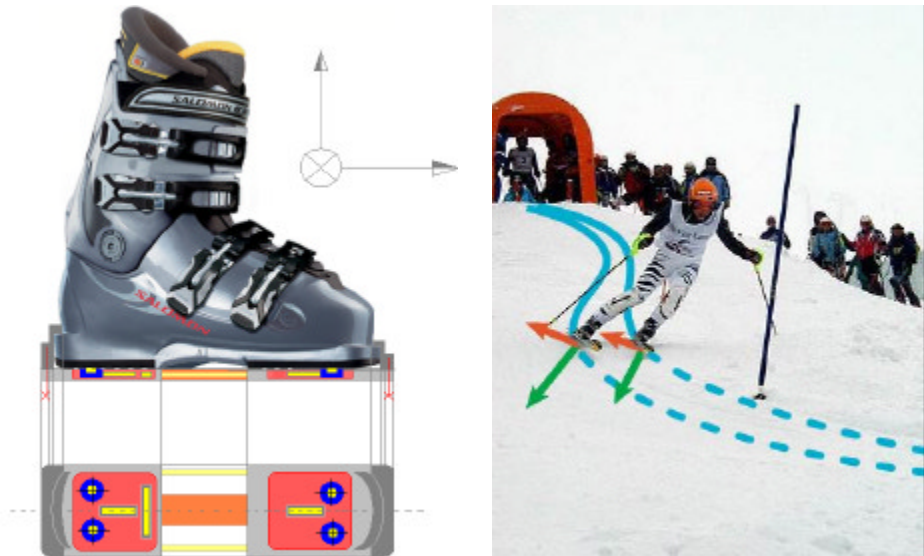


Figure 5. Measurement Module and the visualisation software

5. CONCLUSION

Modern aspects like soft skills, multidisciplinary, internationality, team work or e-learning get more and more important. Some examples of the implementation in design education are presented. They show that a combination of professional and other skills in lectures and seminars is possible.

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Contact Information:

Dipl.-Ing. Sebastian Schneider
Department for Product Development
Technical University of Munich
Boltzmannstraße 15
85747 Garching
Germany
Tel.: +49/89/289-15136
Email: schneider@pe.mw.tum.de