THE TUTORENSYSTEM GARCHING: EDUCATION ON SOCIAL COMPETENCIES FOR ENGINEERING STUDENTS

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Abstract

Many companies in industry face a challenging situation, which demands for a comprehensive profile of competencies an engineer has to possess. Besides a well-founded technical knowledge, methodical skills and social competencies are also required. Social competencies, also called soft skills, include the engineer's ability to communicate and present his or her ideas to other people, to work in a team and show leadership qualities, to organise work and time efficiently, among other qualities. In this contribution, we present the "Tutorensystem Garching" (TUTOR), an education programme at the Technische Universität München (TUM), which is dedicated to equipping young engineering students with soft skills and therefore supplementing their technical education. A general overview over the programme's concept and its development is given. Also, the authors' personal experiences with the programme are described, and measures for a maintenance of the programme's quality as well as the continual improvement are derived (http://www.tutor.mw.tu-muenchen.de).

1   Introduction

Companies in the sector of mechanical engineering face a variety of challenges: growing globalisation, increasing market pressure, the necessity to reduce costs, the trend to more customer orientation etc. All these aspects have led to a structural change in industry, which has also had influences on the requirement profile of engineers. An engineer graduating from university and entering professional life in industry is required to exhibit a plentitude of competencies and skills in order to comply with the job specification. Surveys in industry affirm this notion and describe these challenging qualifications [1]. Academia increasingly corresponds to these requirements. An example is an education model focussing on several aspects, including social competence, which is described by Albers et al [2].

In this paper, we point out the importance of supplementing technical education in engineering science with social competencies. We present an education programme, which was developed at the Faculty of Mechanical Engineering of the Technische Universität München (Technical University Munich, short: TUM) to provide young students with soft skills. First, we will go into the details of the general concept of the programme, which has been running successfully now for almost a decade, and which is unique in Germany in this format. Following, we will describe our personal experiences that we gained while organising and coordinating the programme during the period of one year. After a detailed analysis, we present measures and guidelines to ensure a process of continual improvement of this valuable offer for engineering students at the TUM.

2 Importance of Soft Skills in an Engineer's Profile

Primarily, companies expect engineers to have *technical knowledge and theoretical skills*. Here, a reasonable mix between a generalist and a specialist is preferred. The engineer has to possess a well-founded broad knowledge on engineering topics. This includes fundamental subjects such as physics, thermodynamics or material science, as well as lifecycle-oriented topics such as product development, manufacturing or logistics, and last but not least subjects dealing with particular fields of application, such as automotive, aeronautics or process engineering. During his studies however, the engineer has to prove, that he is capable of dealing with a few subjects on a detailed level and therefore has to choose exemplary consolidation subjects. Additional professional qualifications are expected in the field of business management, laws and regulations, sustainability, safety regulations etc.

The list does not end with requirements on technical knowledge and skills. Nowadays, *methodical skills* play a decisive role, and receive more and more attention. The ability to approach a topic systematically and to solve a problem methodically regardless of the domain specific details becomes increasingly important. Nowadays, the amount of technological knowledge is growing rapidly, as well as the possibilities to access this knowledge. Every day, the engineer is likely to be confronted with new problems. Parts of the problems are the search for relevant information, the structuring of collected information, the evaluation of alternative possibilities etc. Considering these aspects, it becomes clear, that the memorisation of large amounts of technical facts cannot be the objective of design education. On the contrary, the design engineer has to be able to approach the given problems systematically; he has to possess methodical skills.

There is another important aspect besides technical and methodical skills, which is necessary to complete the portfolio of a successful engineer, the so-called *soft skills*. The need for these social competencies results from the fact, that engineers nowadays have to work in teams, as a member of the group or even the leader, and that they have to communicate their thoughts and ideas. These teams are often interdisciplinary and distributed; they are sometimes summoned for a special purpose, e.g. the resolution of a critical situation. Therefore communication is not always easy and conflicts naturally arise which have to be managed and solved. Engineers are not only required to come up with innovative ideas, they also have to be able to present their solutions and to convince an audience that might not have a technical background. Not all these challenges can surely be met with technical knowledge alone. However, engineering education at universities still seems to focus traditionally strongly on technical aspects, and in doing so, other important matters are neglected. Thus, industrial enterprises often complain, that graduates need more communication skills, the ability to work in a team and take over responsibility, efficient working and time management techniques, in short: soft skills.

3 The Tutorensystem Garching

The Tutorensystem Garching (TUTOR) has been implemented at the TUM to meet the requirements from industry that a successful engineer needs soft-skills in addition to technical abilities. In the following, we describe the basic objectives of TUTOR. Then we provide a short overview over the historical development, which shows that the programme has evolved to a certain degree and with each year, new aspects have come to focus. Also, a detailed description of the programme's characteristics and the current status is presented. Further information is given in earlier publications on the Tutorensystem Garching by Schwankl [3] as well as by Baumberger and Lindemann [4].

3.1 Main Goals, Motivation of the Programme

The programme is addressed primarily to first year students of the Faculty of Mechanical Engineering. One of the main goals of TUTOR is to help young students with getting oriented at the start of their academic career and develop techniques to organise themselves and their studies properly. Companies often criticise the high age of the graduates. The programme provides students with a set of skills to organise their studies effectively and efficiently, which in turn helps shorten the time for their graduation. Another objective of the programme is to skill the students with multidisciplinary abilities (social competencies and methodical skills).

3.2 Historical Development of the Programme

In 1995, a group of students, professors, and teaching staff started to discuss new ways for improving the quality and efficiency of engineering education at the Faculty of Mechanical Engineering at the TUM. Within the scope of a project management seminar, a concept for contents and organisation of a programme called "Tutorensystem Garching" was developed. A student project team realised a first pilot run in the academic year of 1995/1996. In this phase, the cooperation with professional trainers and a concept for financial funding by the faculty were established.

The programme was officially launched in the winter term of 1996 with seven tutors and 60 participating first-year students. After a successful first run, the number of groups was raised to 20 in order to give more students the chance to participate. From that time on, the organisation and further development of TUTOR was realised by the Institute of Product Development at the TUM. Until the academic year of 2003/2004 approximately 1800 first year students and 137 tutors have taken part in TUTOR, which has established itself as an important part of the faculty's overall education programme offered to engineering students.

3.3 Participants and Structure of the Programme

Figure 1 gives an overview over the programme's environment and participants. Two teaching staff members of the Institute of Product Development organise and coordinate the programme and also coach the tutors. The term "tutor" has various meanings and is often associated with persons giving tutorials on technical matters as a supplement to regular lectures. Within this particular programme however, tutors are third or fourth year students which take on the responsibility of coaching a group of first year students for the time period of a whole academic year. Ten to fifteen first year students form a TUTOR group that meets once a week with their tutor. The focus of their meetings lies on the development of soft skills. The tutors are prepared for their task in training courses conducted by professional trainers. In 2002, an alumni network was established as a communication platform between different generations of tutors and their coaches. TUTOR also maintains intensive contacts to public and industry.

The tutors are the backbone of the programme and responsible for quality and appearance. Therefore, they need to be capable and dedicated to the task. From all third or fourth year students that apply for the programme, a small number is selected to be tutors. They receive preparatory instructions in the required skills they pass on to the first year students in their weekly meetings. The tutors also receive a considerable feedback on their proficiency and their personal progress by the trainers. By applying the techniques learned in the training courses and transferring knowledge and skills to others, they benefit from the programme to a considerable degree. This is what makes the programme attractive for senior students.
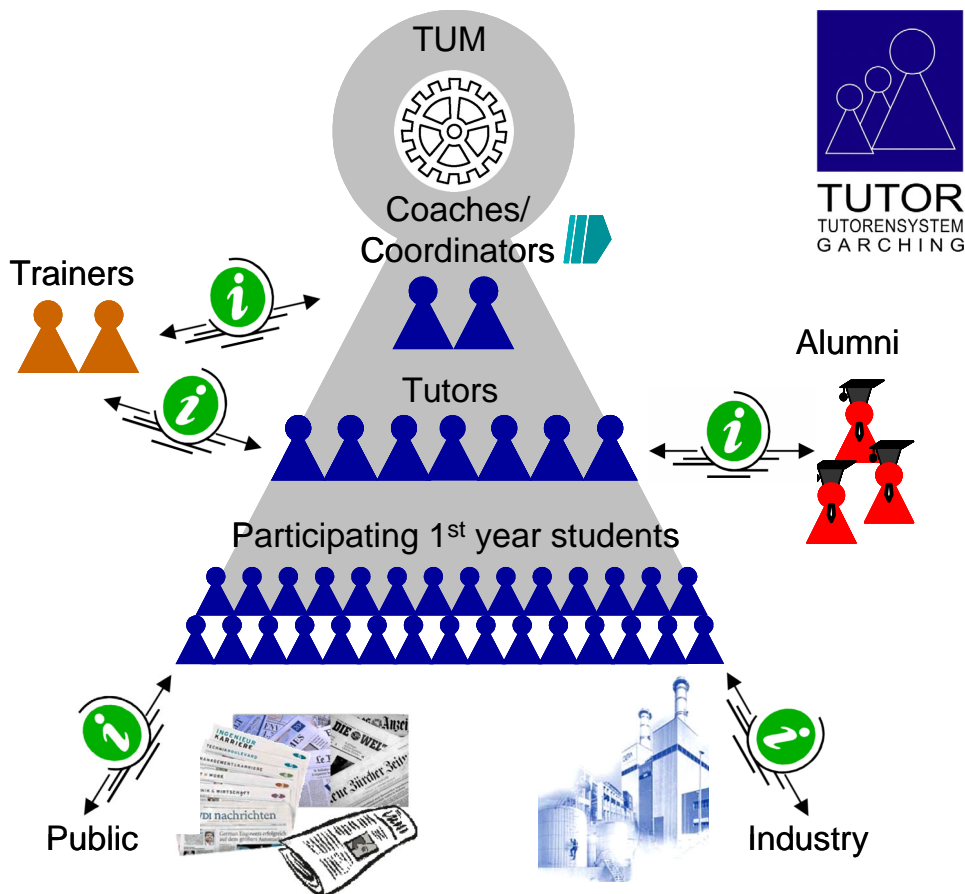
Figure 1. Tutorensystem Garching – Overview over programme environment and participants

3.4 The Course of a TUTOR Year

The annual programme starts in October. During the winter term a broad range of topics is addressed. These topics include team working capability, leadership skills and conflict resolution, communication skills, presentation and moderation techniques, personal time management skills, self perception and performance, study techniques and stress/problem solving, creativity methods, and project management. These skills are described in detail by Baumberger and Lindemann [4].

In the group meetings, the tutor does not present theoretical contents in a conventional way of academic education. The emphasis is placed on "learning by doing". The students themselves work out the background knowledge on the discussed skills, i.e. the procedure how certain methods are applied etc. The tutor merely instructs the exercises, acts as moderator and gives impulses, ideas, and feedback. The underlying philosophy is not to teach the students but to encourage them to work out and practice selected issues on their own. The exercises, which are carried out during the meetings, usually have a varying focus. Sometimes, an exercise serves for strengthening the team character of the group, especially when a given problem has to be solved by the students as a team. An example of such an exercise is the task to cross a chasm by building a bridge with the whole team. Sometimes personal concerns, needs, and interests of the individual team members are addressed. This is the case, when the task is to choose a topic, prepare, and carry out a presentation, and the presenting person is being given feedback on his or her performance (concerning contents as well as style of presentation). A third type of exercises purely focuses on theoretical and practical facts. Overall, the tutor has to achieve a balance between these different aspects (team focus, individual focus and topic focus) in order to maintain the group's motivation.

The TUTOR group also offers the possibility to give the students orientation and guidance in their first weeks at university. The students need to get familiar with the university environment and to plan their studies. Here, the tutor can pass on his or her own experience, is able to provide advice and recommendations. Finally, an important aspect besides all technical and organisational matters is socialising and networking. The participants of the TUTOR group usually get together with their tutor in common leisure activities, which facilitates getting acquainted with the new environment and helps to create a close community that persists far beyond graduation.

About every second week, organisational meetings take place between the tutors and the institute members (in the following referred to as coordinators). In these get-togethers, difficulties with for example organisational issues or group conflicts are discussed and solutions are developed. In the following chapter, we give detailed examples of topics that emerged during our period as coordinators.

The second term of the programme, i.e. the summer term, has a different focus. Skills, which have been discussed, developed, and exercised during the first term, are now put to the test in a small project, where self-defined goals have to be reached in a certain time. Here, the tutor takes over the role of an adviser and team consultant. The objective of the project is to prepare the students early for the requirements of their future job in industry such as working in a team, pursuing and reaching common goals etc. The topic of the project is decided within the group, which has to follow certain general rules (e.g. safety regulations), but is otherwise free to select a topic of their choice.

During the TUTOR year of 2003/2004, most of the groups chose a project, where some kind of machine or device for a special purpose had to be designed. These team projects included the design and construction of a pedal boat, a model sailing boat, a beer pouring machine and a go-kart. Seven TUTOR groups participated in the annual design competition, which is described more in detail in the following section.

3.5 Additional Duties and Activities of TUTOR

In addition to the responsibility for the group of first year students, the tutors have several duties for the realisation of the program itself. These responsibilities include the recruiting of students for the programme, activities concerning public relations and marketing as well as the organisation of events with students and industry. In the following, these extra duties usually carried out by a group of 2-3 tutors are described.

Two recruiting campaigns are necessary to guarantee the programme's operation: firstly, the recruiting of first year students as participants for the TUTOR groups at the beginning of the winter term and secondly, the recruiting of the next generation of tutors at the end of the TUTOR year. Good publicity and reputation of TUTOR are key aspects for a successful recruiting of new students. The goals, topics, and benefits of the programme have to be communicated, misunderstandings have to be avoided. As the term "tutor" has various meanings, there exists some potential for misleading opinions on what TUTOR is about. Also, the two target groups of students have to be addressed in different ways. The recruiting of first year students mainly contains the presentation of the programme during the "study introduction programme", which is organised during the first two days in the new term. The first impression the students get from the programme determines how much interest is generated. Here, the important task is to communicate to potential TUTOR participants, that they must not expect technical tutorials, but getting the chance to learn valuable skills

essential for their further career. In the recruiting of senior students as tutors for the consecutive TUTOR year, the benefits and duties of being a tutor have to be addressed.

Several activities aim at marketing and increasing the reputation of the programme. Here, mainly public and industry are addressed. In this respect, the maintenance of the TUTOR homepage is one task, which is usually carried out by one tutor. Another group of tutors cultivates the contact to public and press. For that purpose, in the TUTOR year 2003/2004 a press brochure was created and several articles were published, reporting about the programme's activities (such as the design competition). The appearance of TUTOR at the annual IKOM fair (Munich fair for industry contacts) was a good platform to improve the contact to industry. In addition, a series of presentations given by representatives from industry during the summer term was organised by tutors. The objectives of these presentations were to enhance the companies' profile among senior students on the one hand, and to allow the students some valuable first hand insights into daily working life of an engineer in a company on the other hand.

Another task is the organisation of the annual TUTOR alumni meeting. This get-together, first realised in the year 2003, is an ideal opportunity for tutors and their coaches of all tutor generations to meet and share experiences. In 2004, various presentations were given on the historical and current development of TUTOR. The real benefit of the programme was discussed with former tutors, now being engineers working in industry for some years. The mutual notion was that the skills learned and practiced during the TUTOR year have been a valuable contribution to a successful professional career in industry.

A design competition runs every June at the Faculty of Mechanical Engineering of the TUM, which was organised by a group of tutors in 2004. The task was to create a device with the ability to haul a rubber chicken over a distance of 10 meters into a cooking pot ("Chicken Fly"). The contest was open to TUTOR groups as well as other teams not involved in the programme. It attracted 11 teams participating with innovative catapults and a great amount of spectators. The event was an overall success, which also had positive effects on the reputation of TUTOR.
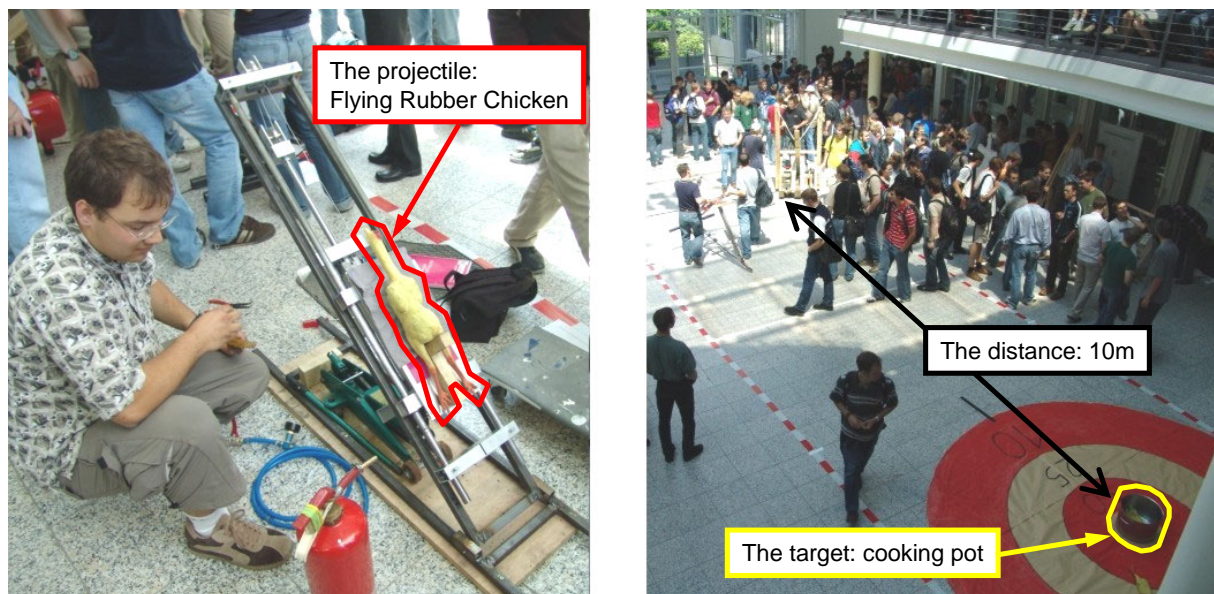

Figure 2. Snapshots from the design competition "Chicken Fly"

4 Personal Experiences with TUTOR

In this chapter, we describe our personal experiences that we gained while organising the programme during the academic year 2003/2004. The coordinators of the programme have various responsibilities. They select students for becoming a tutor. Tutors and coordinators form a team with a certain character depending on the composition of the individuals involved. Hereby, achieving a suitable mix is premise for a successful TUTOR year. Another task is the preparation of the tutor education seminars. There are eight seminars in total, lasting one or several days. In general, these seminars are performed by professional trainers, who educate the tutors with competencies for leading their students groups and working skills that the tutors pass over to the first year students in the group meetings. These seminars have to promote the formation of a strong company among the tutors. The coordinators have to bear this aspect in mind when arranging the seminars. In addition, the framework for the meetings of the student groups during the programme's course has to be organised: the coordinators assist the tutors with scheduling group meetings and provide suitable rooms and working materials. Further responsibilities of the coordinators are providing guidelines for the selection of the topic of the second term project and the tutors' support at coping with emerging difficulties concerning both, theoretical issues or social problems. Moreover, the coordinators have to assist the tutors with their additional tasks for the realisation of the programme itself. This implies that they sometimes have to challenge the tutors. Finally, the coordinators have to take care about the proper use of the financial resources of the programme.

4.1 Experience with the Contents of the Programme

The enhancement of TUTOR itself is an important aspect for the coordinating team. Two different views accompany the programme: the internal view of the TUM as initiator of the programme and the external view with requirements from students, public, and industry.

An essential issue is the cooperation with the TUM. As promoter of TUTOR the TUM has a close look on the achievement of the objectives of the programme: the supplementation of technical education with social competencies, which is associated with a faster orientation leading to a shorter duration of studies. Competing for the most capable students, and supporting the good reputation in industry, the external communication of the achievements of the programme is important for the TUM. We learned that first year students mostly hear about the programme when registering at the TUM. Therefore, we see a need for announcing the benefits of the outstanding education offer to a broader public. In industry, we find a different situation: a few enterprises are already acquainted with the contents and objectives of the programme. They appreciate the supplementary skills of the participants, which gives them a good starting base for later jobs. When getting acquainted with the programme for the first time, enterprises are usually very interested in learning more about TUTOR and its environment.

An additional point is the enhancement of benefits for the first year students involved in the programme. Following the year of participation, we asked 119 students for their experiences with TUTOR. Figure 3 shows the summary of the statements concerning specific matters in a diagram. Most of the students benefited from their participation by getting new acquaintances, gained tips and tricks for studies and learned new working techniques. Nearly ninety per cent had partial opportunity for an application of new knowledge. More than eighty per cent stated that they gained at least a partial overview and motivation for their studies. Moreover, nearly every first year student had fun and thus got accustomed to the new environment at university.
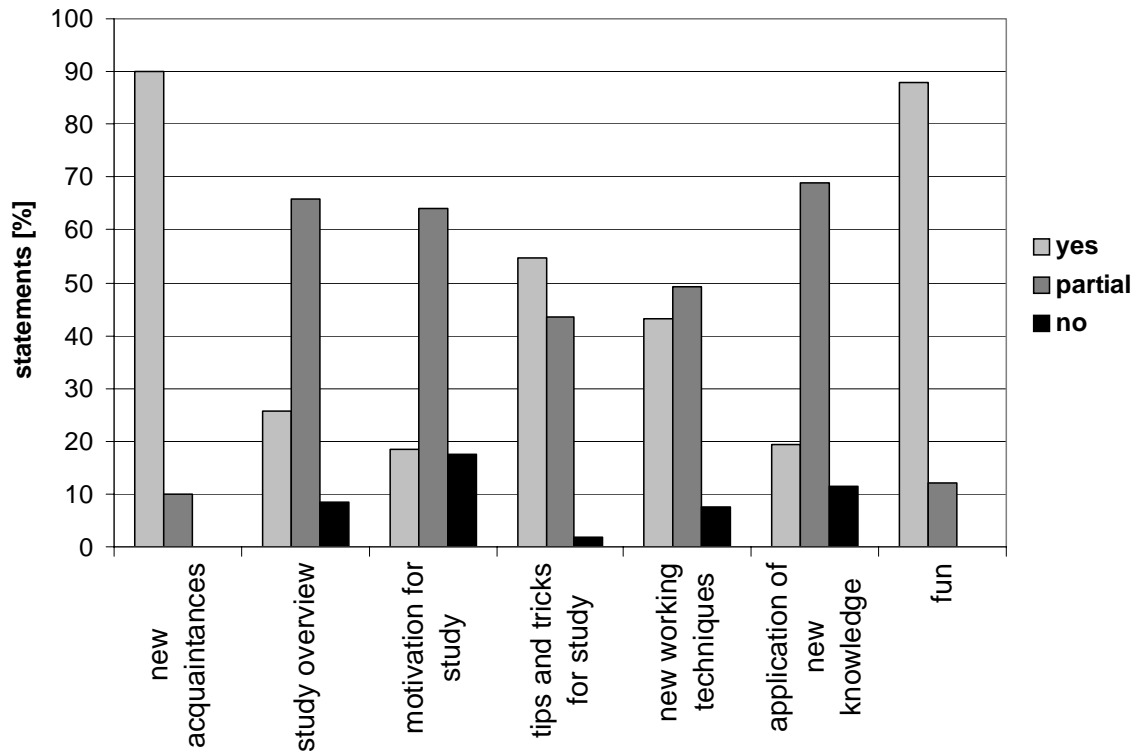
Figure 3. Benefit for the first year students participating in TUTOR groups

Furthermore, the experiences the tutors gained within the year while leading a group of students are very important for a purposeful enhancement of TUTOR. The tutors also see a need for an improvement of the public relations of the programme. Former participants or tutors know exactly the contents and goals of the programme. Their environment (fellow students, friends, etc.) are to some degree familiar with TUTOR or know at least that such a programme exists. In the first years of TUTOR, the results of the second period project were often used to present the contents of the programme to others, as well as the atmosphere/fun. The subject of the project was often the development and construction of driving vehicles or boats. Afterwards a racing competition between several TUTOR groups took place. This led to a reputation of the programme as primarily fun activity. The serious background of the second term project, the use of working methods, and the effects of teamwork in combination with a competing situation were not perceived by outsiders. That notion is still alive, although the public presentation of TUTOR focuses mainly on the contents of the student education.

For the enhancement of the theoretical and practical contents that the tutors learn during the seminars and pass on to the first year students, we asked them about their experiences with the student groups. We learned that the way the contents were transferred to the tutors, the mixture of theoretical background and learning by doing is very accepted by the tutors. All of them choose this way to pass their knowledge on to their student group, which was also the method suggested by the trainers. The tutors made good experiences with the benefit for the first year students. The number of different topics treated in the training courses was rather too high. The tutors had a huge variety of topics to chose from, when preparing for their TUTOR group meetings. One option for planning the training courses for the future was proposed: a focus on fewer topics with a further going into detail. Generally speaking, the education concept of TUTOR has proven to be successful.

4.2 Experience with the Second Term Project

A further point for progress is the project in the second term. Its present performance contains much potential that is not utilised: it may offer a playground for later professional life. The intended improvements refer to the subject, the management, and the general conditions for the realisation. There are two basic conditions connected to the project: the external view on the project and the need for motivated students taking maximum benefit from the execution of the project. We noticed a gap between the external view and project topics that give an incentive for inspiring the first year students. For gaining of experience, the topic of the project is regardless. The focus lies on the proper application of working skills in the sense of project management and in becoming acquainted with group dynamics in a nearly professional situation. A failure of the project does not at all constrain the learning effect. However, the presentation of respectable project results to the public is an important aspect of public relations.

4.3 Experience with the Organisation of the Programme

In the first days of the new term, the registration for students who are willing to participate takes place. As there are a lot of information and optional activities offered for the new students, it is hard for them to figure out what activities are relevant for their studies and which are not. In addition, the first year's schedule seems to leave no room for additional activities; later on, the students find out that some of the appointments are contained twice or are not as important as it seemed in the first days. For supporting the first year students' decision for or against a registration with TUTOR, we see an additional need to give early information about the environment of the programme, its objectives and achievements to a broader public and in particular to the first year students, even before the term starts.

We had a close look at the number of students participating in the group meetings during the course of the whole year and the reasons for their absence or breaking off. The reasons for absence were mostly due to requirements of the studies. The average absence was approximately 10 per cent. As shown in figure 4, the reasons for breaking off (14 per cent) were a general break off of the study (5 per cent), time difficulties with coming to the group meetings (4 per cent) or the students had misconceived the contents and goals of the programme (5 per cent) and left the group after the first meetings.
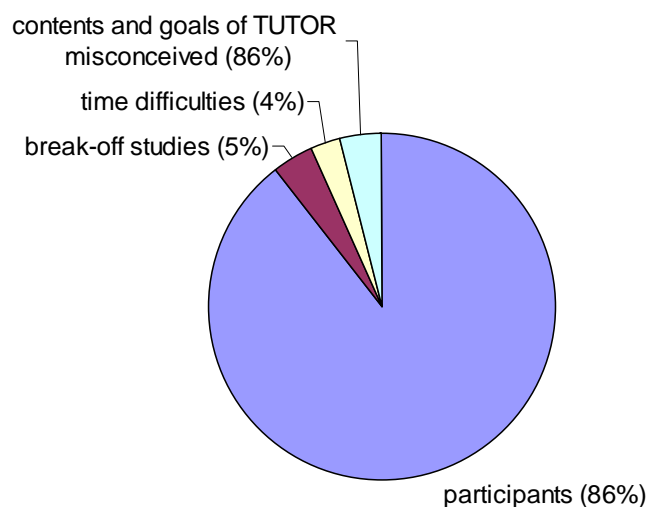

Figure 4. Rate of Participants vs. Students breaking off the Programme

Another goal for an improvement of TUTOR is the enhancement of the internal activities among coordinators and the tutors. We noticed difficulties with working in larger groups that concern especially the efficiency of the tutor meetings, where the organisation of appointments or internal affairs takes place. In addition to a waste of time, it leads to reduced motivation of the tutors. After close investigations we found out, that the reasons lay in the different interests of the numerous students and the long-winded discussions associated with for example group decisions. A further, not minor central point is the identification of the tutors with TUTOR. If the tutors acknowledge the achievements of the programme as personal results, it will foster the motivation of all participants. This is more preferable than a situation where the coordinators have to see to it constantly, that the tutors are motivated.

The experiences of the tutors gained by taking care of special internal tasks are very important for a purposeful enhancement of TUTOR. One point is that the extra duties signify an additional effort. Definitely, the core of the programme is the group meetings with the first year students. However, the environment of TUTOR is as important for the existence of the programme. Therefore, depending on the particular interests, more or less difficulties emerged in motivating the tutors to fulfil their tasks on their own initiative.

5 Maintenance and Improvement of the Programme's Quality

The various experiences, described in the previous chapter, form a basis for the development of approaches for the enhancement of TUTOR. Due to the fact that the programme strongly depends on its members with their particular personalities, the experiences of the coordinators will vary every year. In a couple of meetings with former and the successive tutor coordinators, we derived options for immediate realisable measures for an improvement of the programme's quality.

5.1 Contents of the Programme

The enhancement of the contents implicates its presentation to the environment. The TUM is interested in its effect on attracting and educating the most capable students. This involves that the programme is known in the public and thus by potential students. Therefore, we proposed a direct approach to potential students. This could be accomplished by an improved use of media (print, internet) or even direct contact e.g. at special open house activities. In this way, the contents and goals of TUTOR could be communicated to a broader public.

Our investigation among the first year participants shows potential for supporting them with getting accustomed to the new environment in university. We identify a need for an enhanced passing of tips and tricks for their studies as well as new working techniques. In the same manner, a focus in giving a study overview is to be set. These measures should also foster the motivation of the students for studying efficiently and target-oriented.

5.2 Second Term Project

The focus of the second term lies on the project of the student groups. To ensure results within the limited time during the summer term, the decision for a project topic has to be made in the first term. The identification with the topic is a very important issue for the motivation of the students. Supporting project results, the topic has to be chosen by the group itself. In order to ensure reasonable topics, a framework has to be given by the TUM. The coordinators (representing the TUM) should propose optional project topics for groups needing input.

The procedure of the project is also an important issue for the success of TUTOR. The application of new knowledge learned in the winter term (e.g. on project management, setting and achieving targets etc.) should be applied directly during the project work in the summer term. As visualised in figure 3, this is only partially the case.

Up to now, the course and progress of the project depended strongly on the tutor. Tutors usually do not have much experience with project work prior to their engagement in TUTOR. The training for this task during the TUTOR education courses is not very profound, since a lot of other topics are addressed during the seminars (see above). Here, we propose to provide a framework in which the new knowledge of the first term has to be applied. Connected with a required documentation of procedure and project results, the external view on the project can be enhanced.

5.3 Organisation of the Programme

There are several approaches for improving the transfer of information about TUTOR to the first year students. We propose to mail a clear and brief flyer presenting the TUM's supplementary education option with the registration documents. The knowledge about the contents and goals of the programme could avoid the participation of students expecting a different focus of TUTOR. Thereby, early break-offs of the participation are avoidable. A further point is an early clarification of the suspected time difficulties. A gap in the first year schedule, reserved for TUTOR group meetings or other supplemental activities of the students might be a solution for this problem. Thus, the absence rate emerging from students' parallel activities resulting from the packed schedule could be avoided.

After close investigation of the organisational meetings among tutors and coordinators, we found out, that the reasons for inefficiency lay in the different interests of the numerous students and the long-winded discussions associated with for example group decisions. Of the basic causes, we developed an approach to organise those meetings more efficiently. The key is a reorganisation of the meetings. Issues, not concerning all tutors, should be processed in smaller groups, varying depending on the particular theme. The preparation of team decisions is a second objective of the work in smaller groups. The decisions of prepared themes take place in meetings with all tutors and information concerning all participants is given there. Keeping these important meetings with the large group short will prevent endless discussions with no additional value. In the same manner, a framework has to be created for the additional activities of TUTOR, in order to ensure good results with a reasonable expenditure of time. The benefit of these supplementary efforts for the success of the entire programme has to be clarified and emphasised right from the start of the new TUTOR year. Effective work and the achievement of common goals will lead to more identification with TUTOR and thus increase the motivation of all students involved.

6   Conclusions

The Tutorensystem Garching (TUTOR) is a unique education programme offered to first year students at the Technische Universität München (TUM). The programme changes with the years and the involved persons. Every course reveals prospects for enhancements. There is a need to pass the experiences down to the next generations of coordinators as well as tutors. The first years started with few structures and high goals. We, the coordinators of the eighth year of TUTOR in operation, recognised potential for more success.

The main content of the programme is to impart soft skills on first year students by tutors. A survey among participants revealed potential for improving the benefit for students taking part in the TUTOR groups. The communication of goals and contents of TUTOR to students, public and industry is essential for the programme's success. The second term project represents a playground for the later professional life, where students are confronted with e.g. group dynamics, team situations, and conflicts. Here, the application of working techniques learned in the TUTOR groups is significant. This transfer of theory to practice also shows potential for enhancement. In addition, a balance has to be found between motivating students for the project work and achieving project results that help improve the reputation of the programme. The internal organisation of TUTOR is a challenge for coordinators and tutors. Special importance has to be placed on internal meetings and the execution of additional duties by the tutors. These duties are necessary for the operation of the programme, but they also represent a considerable effort. Therefore, motivation and identification of the tutors with TUTOR have to be guaranteed.

Corresponding measures for the enhancement of all these described aspects, for example towards a better application of learned theoretical contents, were developed. For every tutor as well as for every programme coordinator it is important to make own experiences and not just to adopt given structures. We documented our experiences made in the TUTOR year 2003/2004 and derived options for future enhancements. The conclusions developed here are (in a generalised form) applicable for other processes.

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