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特 別 寄 稿

**University Reform and Introduction of the Harvard
System to Medical Education**

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Background and Problems

Numerous medical schools the world over are presently in a phase of change. To determine a clear target for a new orientation, analyzing the current situation is profitable. Summarizing it in one sentence, which applies at least to Germany, we may say that all groups involved at medical schools are not content with education. Students do not have enough personal contact with patients and they feel overtaxed with theory and left alone by professors. Those in turn assume that students are not ready to work hard and that they are disinterested in scientific basics.

This discomfort is further aired by public opinion, resulting in the common assumption that medical studies in Germany place far too much emphasis on theory and leaves no room for practical application. Yet on the other hand the excellent medical education of the peak group of students in Germany is one of the reasons why scientific institutes abroad willingly accept German students as post-docs and in higher positions.

It is not at all the case that those responsible in the universities are not aware of the problem. Medical universities, however, are currently in a dilemma that seems all but easy to solve: their financial resources dwindling, they have to fulfill more and more tasks in research, education, and patient care, not to mention the ever-increasing demand for administrative capacity.

The individual university teacher finds himself in a dilemma as well. On the one hand, he sees himself as a scientist, who wants to contribute to an understanding of life processes. On the other hand, he is expected to train students for practical work in a medical profession. If the individual university teacher is additionally involved in patient care, he has no other choice than to set priorities. What will guide his decision, then, is the economical value of various tasks and his personal qualification. Contrarily, I do not see the problem in an overly large number of students or a too small number of teachers, in the universities' restrictive admission policy, and maybe also in the system of examinations.

History of Continuing Reform

Hitherto, any attempt to reform university studies has exclusively concerned itself with the structure of studies by analytically describing the various fields of research, curricula, duration

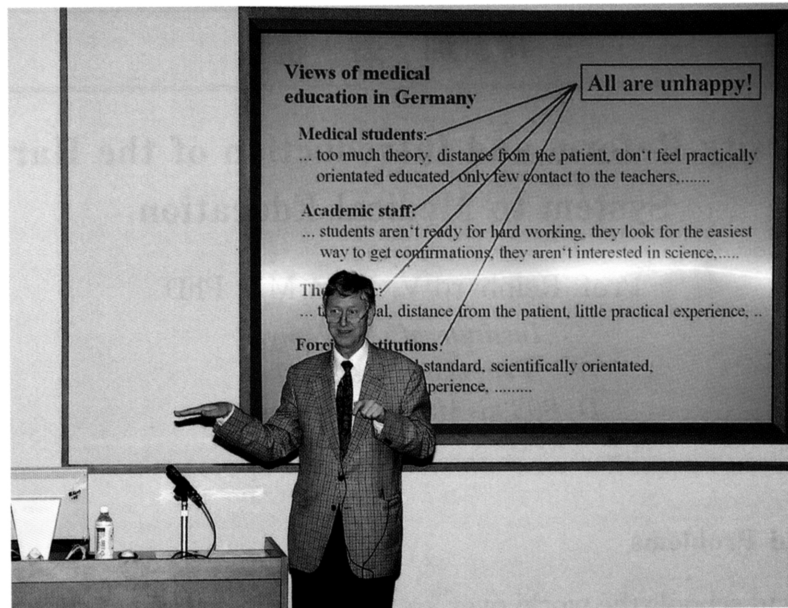


Fig. 1 Prof. Reinhard V. Putz at the lecture.

of studies, and size of groups. As opposed to this, the new German order of approbation made a step toward describing the process of conveying knowledge in a modern way. For instance, in the new order of education we encounter “didactic key words” such as “problem-based,” “integrative,” “linking subjects”, “patient related,” and “practice related.” Furthermore, there is a strong demand for a more thorough connection between theoretical and clinical education. Integrative seminars and so-called “cross over areas” were newly introduced, encompassing education in at least three fields.

Yet before making plans about ratifying a new order of studies, every faculty should have decided on the following questions :

- What kind of doctor do we want?
- Is there a consensus of opinion among all members of the faculty about this goal?
- Do the students in each field feel teachers are aware of the defined goal?
- Are teaching and learning goals compatible?
- Which approach helps the individual student to become a better doctor?

Once these questions have been answered, the goals of education may be fixed. This may include placing more emphasis upon scientific or practical education. Specific profiles may be built up, such as molecular medicine, general medicine, holistic medicine, crossovers to the public health system, or biotechnical crossovers.

Philosophy of New Educational Ideas

For a practical realization, there are two viable strategies. In Germany, most faculties will continue to take the classic systematic approach. Several faculties, however, have begun to rely exclusively on integrative forms of teaching (problem-based learning [PBL]). As a result of many years of collaboration with Harvard Medical School (Boston, MA) Munich and

Heidelberg have developed a hybrid system which takes a differentiated systematic approach in the first two years of studies and after this aims at an integration of individual fields with other theoretical and clinical fields.

Beginning in the seminars, PBL is to become the dominating teaching strategy in the following semesters. Especially in the clinical section of studies, lectures are to take on a new significance. While they previously were systematic presentations of factual knowledge, they are now to summarize and offer overviews.

The important role of PBL is to stimulate students to autonomous learning. Experience made with it in Munich shows that this strategy does make it possible to motivate less active students to show more initiative in appropriating knowledge. Targets to which PBS has proved particularly favorable are the following :

- Imparting problem-solving strategies
- Experiencing the benefit of efficient team work
- Development of empathy
- Reflecting on personal attitudes

Thus PBL supports the development of techniques that make life-long learning possible.

Introducing a new order of studies implies introducing a new order of examinations. While the significance of MC questions for assessing factual knowledge will be unbroken, other - and more exhaustive - techniques, such as OSCE (objective structured clinical examination) will make it possible to evaluate students' abilities and behavioral patterns besides their knowledge.

The use of standardized patients has appeared to be a particularly valuable tool for teaching and examinations. The standardized patient is instructed to demonstrate more or less realistic symptoms of a particular disease and to tell the corresponding medical history. Standardized patients allow students to get direct and helpful feedback concerning the quality of their assessing of medical history, of physical examination, of communication, and of overall behavior during investigation.

Our Own Experiences

Over the past seven years, the medical faculty of Ludwig Maximilian University of Munich, in consultative cooperation with Harvard Medical School, has built up a teaching experiment. Our new order of studies is based upon this. (N. B. 4,850 students ; 1,700 staff ; preclinical admission, 720-840 students per annum ; clinical admission, 450.) The aims of the reform experiment are as follows :

Students :

- Activation of autonomous learning by PBL
- Integrative work on chosen topics
- Standardization of skills
- Experiencing team work

Faculty :

- New consciousness of academic teaching
- Targeted didactic training of teachers
- Interaction between teachers and students improves

At the center of the experiment there were four blocked courses of one month each. These clinical courses, compulsory for all students, were broadly based upon PBL. For covering a wider range of fields we were able to rely on a computer-based training program (CBT) developed at the Munich faculty (Dr. Martin Fischer). The courses covered the following topics :

- Cardiovascular system
- Infectiology and immunology
- Emergency medicine and musculo-skeletal system
- Nervous system and behavior

The time schedule, which is presented below, demonstrated that tutorials were the model's central element. Retrospectively, five tutorials per week seemed to be too much ; however, students accepted this due to the compact course. Other than tutorials, there were daily lectures and instruction in physical examination twice a week.

Evaluation of the model has shown that this new type of courses was accepted by students in an exceptionally positive way. Tutors, too, experienced the new way of teaching as intensive and personal.

Retrospective evaluation, including examinations (carried out as triple jumps and OSCEs), has shown that the new teaching system does not differ from previous systems as regards the factual knowledge of students. Skills developed by the students, however, such as taking medical history, physical examination and case report among others, appeared much improved. The overall impression yielded by the evaluation was furthermore that the new blocked course system allowed us to convey the significance of team work, communication, and empathy to a degree unknown to other methods. Yet it must not pass unnoticed that such courses demand enormous commitment of teaching staff. In four parallel courses per semester, regarding the large number of students, 500 members of the medical faculty had to be occupied.

Looking back on the experiences made, the faculty has gained the following insight :

- Increasing commitment of lecturers
- Increasing commitment of students
- Increasing didactic awareness on part of the staff
- Increasing use of evaluation
- Implementation of an administrative structure for education
- Implementation of structure for educational quality management



Fig. 2 Comments and discussion session with audiences.

Medical Curriculum Munich (MeCuM^{LMU})

Building on our experience of several years, and triggered by the introduction of the new order of approbation, we are introducing a new order of studies at LMU at the end of this year. It takes into account, corresponding to legal regulation, the reduction of examinations to two Staatsexamina (national board examinations) higher emphasis upon internal examinations, new forms of examinations, combination of fields and size of groups.

The following illustration shows the structure of the first period of studies.

**Lectures,
block courses,
interactive
exercises**

1./2.term : integrative Morphology including
- Biology, Anatomy, Histology, Embryology
- selected integration of Physiology, Radiology,
and other clinical aspects

2./3. integrative Physiology including
- first steps in Pathophysiology, Biochemistry
- appropriated clinical topics

3./4. integrative Biochemistry including
- Pathobiochemistry
- appropriated clinical topics

Seminars
based on PBL
and other related
techniques

4. integrative seminars including all fields

Fig. 3 Structure of first part of new curriculum

The fields mentioned in Fig. 3 are taught in lectures, blocked courses, and interactive seminars. In the fourth semester, we introduce interdisciplinary seminars based upon PBL and related techniques. The Staatsexamina continue to be taken in both oral and written form.

The clinical period of studies, corresponding to the sequence of semesters, falls into six blocks:

Block I	Basics of clinical medicine Patho., Radiol., Genetics, Mikrobiol., Pharmac.,
Block II	Conservative medicine Internal, Emergency, Infectiology, Immunology, ...
Block III	Surgical medicine Surgery, Anaesthesiology, Orthopedics, Urology, Emerg.
Block IV	Nervous system, Sensorium Dermatol., Ophthal., ENT, Neurology, Psychiatry, Psycho ...
Block V	Life periods Pediatrics, Obstetrics., Rehabil., Phys. med., ...
Block VI	Family medicine, Electives, Repetitorium clin. Pharmakol., clin. Pathol., ...

Fig. 4 Structure of second part of new curriculum

The weekly schedule is organized according to the pattern of our previous model, albeit the number of tutorials was reduced to two. A significant new element is the so-called longitudinal course, for which every Wednesday – during the first period of studies, every first Wednesday – is reserved. This course that accompanies the entire process of studies deals with topics related to the relationship between doctor and patient.

This means primarily the psychology of interaction, furthermore, communication and investigation technique. However, also basics of the doctor – patient relationship, such as economical questions, evidence-based medicine, palliative medicine and treatment of the dying patient, preventive care and patient guidance in the case of chronic diseases. Since this course begins already in the first semester, students are given a clear line of education. Thus, the medical faculty hopes to achieve a better integration of theoretical and practical issues.

An indispensable condition for successfully realizing the new order of studies is that faculty staff members learn to understand and apply the new methods of teaching alongside with the old. It is precisely the tutor in PBL who plays a crucial role.

Therefore the medical faculty introduced training courses for staff members some time ago, which allow lecturers to improve their teaching skills besides their scientific qualifications. The medical faculty of LMU thus draws the consequence from the insight that the process of teaching / learning is more important than the structure of the curriculum. As the base of a new understanding of the teaching process it is necessary to be aware of adequate methods and to see ourselves as one unit of teachers and students.

	Monday	Tuesday	Wednesday	Thursday	Friday
08.15	Lect (Tutor meeting)	Lect	Longitudinal course	Lect	Lect
09.00		Skills lab, etc.			Skills lab, etc.
09.45	Tutorial I				
11.15					
12.00					
13.00					
14.00	Bed side / Seminar				
15.00				Bed side / Seminar	Students meeting
16.00		Spez. inV.			

Fig. 5 Standard week of new courses in second week of new curriculum

In the courses, topics are brought up that seem self-evident at first sight and that are yet ignored in many cases :

- Listener expectation (with respect to content and presentation)
- Listener's understanding of educational process
- Accompanying the listener over a long period of time
- Lecturers' accepting students
- Assessment of listeners' intellectual capacity

Furthermore, course participants concern themselves with teaching theory, new media, PBL, and rhetoric. A crucial goal is the development of a culture of giving feedback.

Experience from courses with 400 participants has shown that - after initial reluctance - staff members react to the model in a highly positive way. There has developed a veritable network of didactic interest at the faculty.

Summary

At this point we may observe that problems in medical education should be sought for neither in the tutor-student ratio nor in the conditions of studies, but rather in the universities' general dilemma, in the conflict between patient care, research, and education. It is furthered by the absence of academic teaching's "market value" and of a specific didactic training.

A series of teaching experiments, the Munich model among them, have shown that a successful strategy is viable toward developing a new system of teaching once the foundations have been laid by a clear-sighted analysis of the existing problem and of a precise definition

of educational targets. This means groundbreaking work in developing a new spirit of medical education.



Fig. 6 Frauenchiemsee: the dawn site of education reform in Munich.

ラインハルト・プッツ ミュンヘン大学 副学長

「ドイツにおける大学改革—医学教育へのハーバードシステム導入の経験から—」

九州大学とドイツのルードウヒ・マクシミリアン大学（ミュンヘン大学）とは、1984年に学術交流協定を締結し、着実な研究教育の交流を行っている。これまででは主として、法学、文学、物理学などの分野で交換教授訪問や学生短期留学が進められてきた。今回40歳台のフバー新学長の九州大学訪問に続き、新たに第一副学長に就任なさった医学部のプッツ教授が医歯薬分野での交流促進のため本学を訪問された。プッツ副学長は同行されたミュンヘン大学・辻理名誉評議員とともに、総長・部局長等との意見交換を精力的に行い、またご希望によりこの機会に病院地区で講演会が開催された。9月16日コラボI視聴覚ホールで行われた大学改革についての講演の後には、本学教官との活発な質疑応答がおこなわれた。本稿は、その講演内容を後日抄録として福岡医学雑誌にご寄稿いただいたものである。

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九州大学副学長 柴田 洋三郎